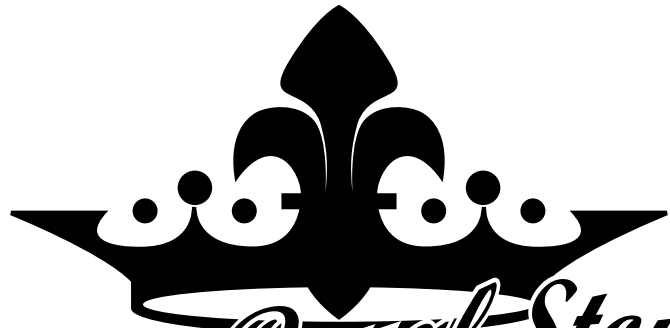
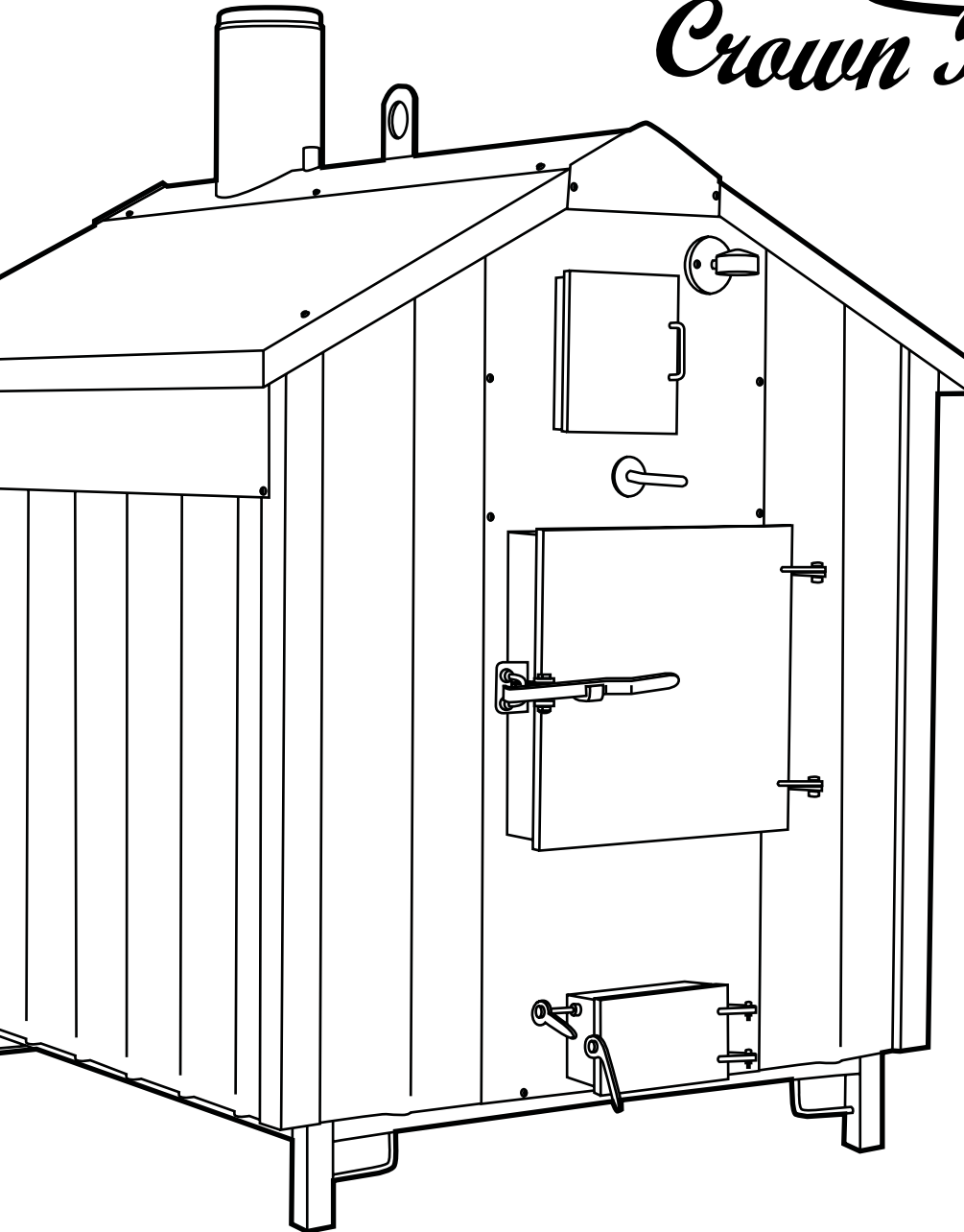


# OWNER'S MANUAL

Models: RS7200 • RS7300 • RS7400 • RS7500



**Crown Royal Stoves**  
STAINLESS STEEL



## Installation, Operation & Maintenance Manual 2012

RETAIN THIS MANUAL  
CONSERVEZ CE MANUEL  
UL 391, UL 726 & CSA B366.1

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**GTM**  
**GREENTECH**  
manufacturing inc.

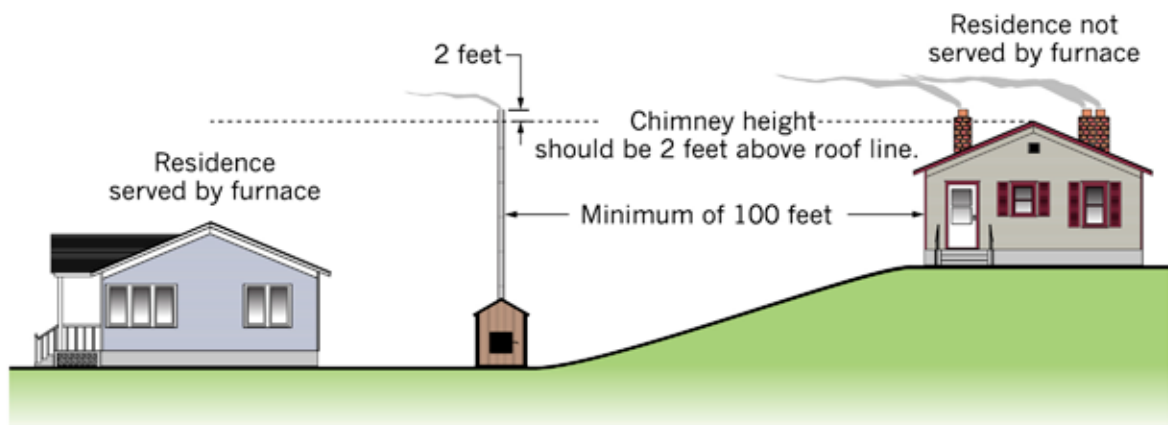
## **TABLE OF CONTENTS**

HPBA Outdoor Furnace Best Burn Practices .....	3
HPBA Smoke Troubleshooting .....	4 - 7
Safety Instructions .....	8
Pre-Installation Tips .....	9
Installation Guide .....	10 - 11
Making Water & Electrical Connections at the Stove .....	12
Piping Inside the Building .....	12
Wiring Inside the Building .....	13
Electrical Requirements .....	13
Existing Hot Water Heat .....	14
Wire Diagram for Gas Boiler .....	15
Domestic Hot Water .....	16
Existing Forced Air .....	16
Flat Plate Setup .....	17
Water to Air Setup .....	18
Electrical, Pressure, Temperature Coil Components .....	19
Rocker Grate Assembly .....	19
Control Panel .....	19 - 20
Filling the Water Jacket .....	20
Firing the Furnace .....	20
Starting a Wood Fire .....	21
Daily Fueling .....	21
Off Season Maintenance .....	21
Maintenance .....	22
Coal as Fuel & Buying Coal .....	24
Starting a Coal Fire .....	24
Starting a Ear Corn Fire .....	25
Safety & Starting during a Prolonged Power Failure .....	25
Ash Removal, Rotation & Disposal .....	26
Creosote Formation & Removal / Safety .....	26
Runaway Chimney Fires .....	26
Troubleshooting .....	27
Electrical Troubleshooting Flow Chart .....	28
Furnace Wiring Diagram .....	29
Water Treatment .....	30
Wood Burning Furnace Treatment .....	30 - 31
Maintenance Dosage .....	31
System Testing .....	31
EMERGENCY FIRST AID PROCEDURES .....	32
Warranty .....	33
Warranty Registration and Delivery form .....	35
Warranty Claim .....	37
Conditional Work Order .....	39
ETC Single Stage Electronic Temp Control .....	40 - 41

# OUTDOOR WOOD FURNACE BEST BURN PRACTICES

1. Read and follow all operating instructions supplied by the manufacturer.
2. FUEL USED: Only those listed fuels recommended by the manufacturer of your unit. Never use the following: trash, plastics, gasoline, rubber, naphtha, household garbage, material treated with petroleum products (particle board, railroad ties and pressure treated wood), leaves, paper products, and cardboard.
3. LOADING FUEL: For a more efficient burn, pay careful attention to loading times and amounts. Follow the manufacturer's written instructions for recommended loading times and amounts.
4. STARTERS: Do not use lighter fluids, gasoline, or chemicals.
5. LOCATION: It is recommended that the unit be located with due consideration to the prevailing wind direction.
  - Furnace should be located no less than 100 feet from any residence not served by the furnace.
  - If located within 100 feet to 300 feet to any residence not served by the furnace, it is recommended that the stack be at least 2 feet higher than the peak of that residence.

## Chimney Height Installation Scenario



6. Always remember to comply with all applicable state and local codes.



OUTDOOR FURNACE MANUFACTURERS CAUCUS

July 2006

## **HPBA Smoke Troubleshooting Checklist For Outdoor Furnaces**

### **I. Installation Issues (Improper Smoke Dispersal)**

#### **A. Chimney height relative to nearest downwind neighbor**

1. If located 50 feet or less to any residence not served by the furnace, it is recommended that the stack be at least 2 feet higher than the eave line of that residence.
2. If located more than 50 feet but no more than 100 feet to any residence, it is recommended that the stack be at least 75% of the height of the eave line of that residence, plus an additional 2 feet.
3. If located more than 100 feet but no more than 150 feet to any residence, it is recommended that the stack be at least 50% of the eave line of that residence, plus an additional 2 feet.
4. If located more than 150 feet but no more than 200 feet to any residence, it is recommended that the stack be at least 25% of the height of the eave line of that residence, plus an additional 2 feet.

#### **B. Furnace located in sheltered area; insufficient wind to disperse smoke.**

C. Furnace sizing. Similar to other heating appliances, furnace should be properly sized based on the estimated heat loss of the served structure.

### **II. Fueling Issues**

#### **A. Burning less than optimal fuel loads**

1. Loading: Firebox should be loaded based on outdoor temperature, anticipated heat load requirements and the manufacturer's instructions. Do not overload the chamber.
2. Charging intervals: Firebox should be charged regularly at the intervals specified by the manufacturer's instructions. Optimally, the firebox will be charged "hot," i.e., the fire will not go out between chargings.

#### **B. Burning improper fuels**

1. Only burn fuels approved by the manufacturer
2. Do not use volatile starters (such as lighter fuels, gasoline, chemicals) unless approved by the manufacturer
3. Do not burn the following:
  - a. Trash or household garbage
  - b. Plastics
  - c. Gasoline
  - d. Rubber or tires
  - e. Naphtha
  - f. Material coated with petroleum products (e.g., particle board, railroad ties, pressure-treated wood)
  - g. Leaves
  - h. Paper products or cardboard

### **III. Operational Issues**

#### **A. Improper combustion air – Natural Draft Units (No Blower):**

1. Air inlet not restricted by debris (creosote, ash, etc.)
2. Flame baffle/flue not restricted by debris

3. Chimney not restricted by debris
  4. Door seal in satisfactory condition (provides air-tight seal when door is shut)
  5. Air inlet (damper or flapper) operates properly  
(opens/shuts per manufacturer's instructions, provides air-tight seal when shut)
  6. Door seal in satisfactory condition (provides air-tight seal when door is shut)
- B. Improper combustion air – Forced Draft Units (Blower):
1. Verify combustion blower operates in accordance with the manufacturer's instructions
    - a. Blower starts and stops properly
    - b. Combustion blower wheel spins properly
    - c. Blower runs at proper speed – verify voltage to blower motor
  2. Combustion blower tube not restricted by debris (creosote, ash, etc.)
  3. Flame baffle/flue not restricted by debris
  4. Chimney not restricted by debris
  5. Air inlet (damper or flapper) for blower operates properly  
(opens/shuts per manufacturer's instructions, provides air-tight seal when shut)
  6. Door seal in satisfactory condition (provides air-tight seal when door is shut)
- C. Verify controls operate in accordance with the manufacturer's instructions
1. Water temperature controls set properly
  2. Draft controls set properly

#### IV. Maintenance Issues

A. Verify that the furnace is being maintained in accordance with the manufacturer's instructions. Specifically, inspect:

1. Excessive ash buildup
  - a. Grates blocked, restricting air flow
  - b. Combustion fan blocked, restricting air flow
2. Excessive creosote buildup
  - a. Combustion fan blocked, restricting air flow
  - b. Flame baffle blocked, restricting air flow
  - c. Chimney blocked, restricting air flow

#### V. Discussion

Wood, like other fuels is made up of various amounts of carbon, hydrogen, and other elements. The burning of wood is a chemical reaction that depends on many factors. The essential factors to complete wood burning are time, temperature, and turbulence. Some other factors to take into consideration are: air intake; amount and placement, density and moisture content of the fuel, size of the firebox compared to the size of the wood load, and adequate room for the combustion process to take place.

The smoke that is seen coming out of a chimney is essentially a combination of unburned fuel (carbon and hydrogen) and moisture in the form of water vapor. The reason for the smoke is usually attributed to: (i) not enough time for complete combustion, (ii) not enough mixing (turbulence) to complete the chemical process, (iii) not enough temperature to get the fuel to that chemical conversion stage, or (iv) a combination of the above. In many cases, excessive smoke can be reduced by adopting practices that improve complete combustion, reducing visible emissions in the form of smoke.

## **A. Fuel**

### **1. Improper Fuels**

Burning materials not recommended by the manufacturer can play a major role in visible emissions. Materials such as plastics, garbage, rubber tires, and even wood products such as cardboard and paper that may be coated with petroleum products may emit excessive smoke. Fire starters such as gasoline, oil, and other chemicals can also make an ordinary wood fuel load seem very dirty once burned. If people who own outdoor furnaces start fires with some kindling and load with wood fuel as recommended above, they can eliminate a lot of the smoke that others see and the problems that go with it.

### **2. Loading**

The amount of coal loaded into an outdoor furnace in relation to the firebox size also has an effect on visible emissions. For every size of coal load there is a minimum amount of space needed to complete the combustion process. For instance, if a person were to load a relatively small firebox completely and load a larger firebox with the same amount of wood, with all of the other factors being the same, the larger firebox would burn cleaner. In the smaller firebox, the combustion process does not have enough room to expand, heat up, and mix before exiting the firebox (insufficient time, temperature, and turbulence). Just because a firebox is large does not mean that it should be filled completely. This large volume is used in part for what happens AFTER it is loaded.

## **B. Furnace Size**

The size of a furnace should be large enough to provide sufficient heat without constant reloading. If the target burn time is 12 hours, an adequately sized furnace will provide enough heat for 90% of all heating days. There will always be the extraordinarily cold days for which no one can plan. A small furnace that needs constant reloading will unavoidably be left unattended and will lose much of its available heat. In these situations, the firebox is left relatively cold and restarting will be dirtier because of flame quenching on the cool firebox walls. A good rule to follow, is that if the furnace cannot stay within 20% of its set point under regular reloading, then the unit is undersized and a larger furnace is needed.

## **C. Chimney Considerations**

Although chimney height has little to do with overall emissions, it should be considered in ALL installations of outdoor furnaces. Installers and dealers should first take a look at the proposed location and take a few things into account. Location of nearby buildings, structures, and natural geography all affect the furnace's ability to draft. While higher is generally better, it is sometimes tough to convince the furnace owner to add length to the chimney because of the extra cost.

## **VI. Conclusions**

The proper use of an outdoor furnace can significantly reduce the visible emissions that it produces. Simple fuel considerations with regard to moisture content, size, and amount help hinder the production of smoke and ultimately help improve efficiency. Other obvious ways to help reduce smoke is to only burn fuels recommended by the manufacturer and to not overload the furnace. In addition, the furnace size should be properly matched to the heat load so that cold starts and overfilling are avoided. Chimney height should be in accordance with the state and local codes, as well as surroundings, including neighbors. These areas, along with the "Best Burn Practices for Outdoor Furnaces," can greatly help in providing clean, safe heat from all outdoor burning furnaces.



# **SAFETY INSTRUCTIONS**

**ALL INSTALLATIONS AND OPERATIONS MUST FOLLOW FEDERAL, PROVINCIAL, STATE, AND LOCAL CODES FOR WIRING, PLUMBING, INSTALLING CHIMNEY. ALL WORK MUST BE PERFORMED BY QUALIFIED PERSONAL ONLY.**

**READ AND UNDERSTAND ALL PRECAUTIONS BEFORE OPERATING THE FURNACE.**

**ATTENTION!!!** Save these instructions. Retain this manual as long as you own your Crown Royal Stove. Carefully read and follow these directions.

**DANGER!!!** Do not start fire with chemicals, volatile fluids, rubber, plastics or garbage. Some processed wood contain resins and should be avoided. Only competent persons with a sound understanding of this heating method should operate this furnace. Improper firing could result in personal injury and/or damage to unit, and void warranty. **Do not burn garbage, gasoline, drain oil, naphtha, engine oil, railroad ties, particle board, leaves, cardboard, or any other flammable liquids.**

**WARNING!!!** All installations and operations of your furnace must follow STATE, PROVINCIAL and LOCAL LAWS pertaining to operations, wiring, plumbing, and building codes. The installation must be performed by a qualified installer.

**WARNING!!!** Only burn coal or corn as the primary fuels in this unit.

**WARNING!!!** Do not install this unit on a combustible surface.

**WARNING!!!** All models operate at atmospheric pressure. DO NOT obstruct, block or plug the overflow vent tube in any way, which is located on top of the furnace.

**WARNING!!!** You must open the chimney flue before opening the furnace door.

**WARNING!!!** This unit can not be hooked to a chimney already serving another appliance. When installing a chimney that is higher than twelve feet, guide lines must be used.

**WARNING!!!** This unit must never be pressurized.

**WARNING!!!** Do not use an automatic stoker with this unit.

**WARNING!!!** Risk of Fire: Do not operate with fuel loading and / or ash removal doors open. Do not store fuel or other combustible materials within marked installation clearances. Inspect and clean flues and chimney regularly.

**CAUTION!!!** Hot Surfaces: Keep children away. Do not touch during operation.

**CAUTION!!!** Do not start or operate furnace without checking heating fluid.

**CAUTION!!!** Check for buried cables and utility lines before digging trench.

**CAUTION!!!** For safety and proper temperature control, keep fuel door closed tightly during operation.

**CAUTION!!!** Do not fire up boiler until filled with water.

**CAUTION!!!** Do not to start the unit during a prolonged power failure.

**CAUTION!!!** Load fuel carefully to avoid injury to hands, fingers and other body parts that may come in contact with the unit's loading door opening.

**CAUTION!!!** Cleaning of the heat exchanger, flue pipe, chimney and draft inducer if used, is especially important at the end of the heating season to minimize corrosion during the summer months caused by accumulated ash.

**CAUTION!!!** When installing the heat exchanger, be sure none of the existing system safety controls are disabled.

**CAUTION!!!** When installing heat exchangers do not tamper with existing controls. Wiring to existing blower can be done with a line voltage or low voltage thermostat.



## **PRE-INSTALLATION TIPS**

**ALL INSTALLATIONS AND OPERATIONS MUST FOLLOW FEDERAL, PROVINCIAL, STATE, AND LOCAL CODES FOR WIRING, PLUMBING, INSTALLING CHIMNEY. ALL WORK MUST BE PERFORMED BY QUALIFIED PERSONAL ONLY.**

### **Location**

When choosing the location of your furnace you should consider prevailing wind direction, distance from home for refueling and storage, and give consideration for any effect of your neighbors. Check with your homeowner's insurance company to ensure they will approve the location relative to the distance from building and combustibles. We recommend a minimum of 20 feet from any building being heated with his unit.

Maintain all certification clearances as follows:

- Front of the fuel door 60"
- Sides of the stove 36"
- Back of the stove 36"
- Chimney 60"

Determine how many buildings are to be heated with this unit; this will help with the calculations of distance to your buildings that you are going to heat.

**WARNING!!! Do not store fuel or other combustible materials within marked installation clearances.**

### **Block or Pad Supports**

Under normal conditions, four cement blocks are all that is required to support the furnace. Blocks should be at least 24 inches wide, 24 inches long, 3 inches thick. Under very soft conditions a concrete pad may be needed, and thickness should be no less than 4 inches.

### **Trenches**

The trench must be 24 inches deep and 6 to 12 inches wide, it can be dug with a shovel or backhoe. Place all the dirt to one side of the trench to allow room for working on the other side.

### **Chimneys**

The size and height all depends on the unit you have purchased and where the unit will be located. If the furnace is located within 300 feet of any residence, than the chimney stack must be at least two (2) feet higher than the peak of the tallest roof. It is recommended that only a double insulated, stainless steel, Class A chimney pipe to be used. RS 7200 & RS 7300 use a six (6) inch diameter pipe, RS 7400 uses a eight (8) inch diameter pipe, RS 7500 uses a ten (10) inch diameter pipe. Contact your local dealer or Greentech Manufacturing, Inc for chimney purchase information.

## INSTALLATION GUIDE

**ALL INSTALLATIONS AND OPERATIONS MUST FOLLOW FEDERAL, PROVINCIAL, STATE, AND LOCAL CODES FOR WIRING, PLUMBING, INSTALLING CHIMNEY. ALL WORK MUST BE PERFORMED BY QUALIFIED PERSONAL ONLY.**

**CAUTION!!!** Hot Surfaces: Keep children away. Do not touch during operation.

**WARNING!!!** Risk of Fire: Do not operate with fuel loading and / or ash removal doors open. Do not store fuel or other combustible materials within marked installation clearances. Inspect and clean flues and chimney regularly.

**WARNING!!!** Do not install this unit on a combustible surface.

**WARNING!!!** This unit can not be hooked to a chimney already serving another appliance.

1. Inspect the ground conditions that you intend to install your furnace on. If the area is unstable or has a history of staying wet, you may have to improve the soil with gravel as well as raising the elevation. A cement pad of 4" - 6" inches should then be used. The furnace in most cases can be placed on four cement blocks and they should not be less than 24 inches wide, 24 inches long, 3 inches thick. Obtain the footprint of the model of furnace you have purchased. Place your blocks so that the legs will be in the center of them. For a pad, the width need not be greater than the outside width of furnace. The length of pad should be as long as the outside length dimension and an added length is desirable as a work area at the loading door. A four-foot extension is most commonly used.

**DANGER!!!** Do not start fire with chemicals, volatile fluids, rubber, plastics or garbage. Some processed wood contain resins and should be avoided. Only competent persons with a sound understanding of this heating method should operate this furnace. Improper firing could result in personal injury and/or damage to unit, and void warranty. **Do not burn garbage, gasoline, drain oil, naphtha, engine oil, railroad ties, particle board, leaves, cardboard, or any other flammable liquids.**

2. Select a tubing product of at least one inch inside dimension, which is rated at 180 degrees F 100 PSI continuous flow. Plan to have no joints, couplings, unions, etc. joining the tube between the building being heated and the stove. The chance for a leak is too great. The pipe should have a construction of polyethylene and an oxygen barrier. Also, mark your feed and return lines prior to covering and allow enough pipe above ground at both ends for a relaxed connection.

3. The supply and return tubing needs to be insulated to prevent heat loss. It is recommended that at least ½" of insulating material be used. Both the return and supply pipes can be insulated together so that the temperature drop is minimized.

4. All wiring must conform to local codes. Use an electrical wire rated and approved for underground installations. This wiring can be placed in the same trench below the water lines. Use 12-2 UF wire with ground to provide power to the draft inducer blower, aqua stat, night light, etc. at the stove. This is satisfactory for most applications but a state certified electrician must be consulted.

5. There are some products that incorporate the supply and return pipe, insulation, and moisture shield into one product. This is fine, but do not select solid black drain tile, it will eventually crack causing moisture to seep through the insulated pipe and heat loss into the ground. The critical issue is to keep the insulated pipes from coming into contact with the soil, ground water, etc. We recommend using Insul-Seal, which is available in 3" and 4". This product is water tight and resists heat loss.

6. The trench must be 24" deep and 8" - 12" wide. If possible have a gradual slope in your trench to allow drainage away from lines and out of the trench bottom. Place electrical supply in bottom of trench and cover with 6" of gravel or dirt. At this point a water barrier is required. Several methods are possible, but the most important factor is; if ground water comes in contact with your heating lines, it will be the greatest heat loss to your system. A minimum of R10 insulation value is recommended, and a water-tight vapor barrier such as a continuous poly tube of plastic PVC pipe to encase your insulation is a must. NOTE: If you need to bury lines under an area where vehicles will cross, you should increase the depth of trench to three feet or place planks over the trench in that area to spread the load and reduce the pressure generated on the lines.

7. The supply and return tubing and the power wire can be lowered in the trench, brought through the buildings being heated, and extended a minimum of 36" out of the soil where the stove is to be placed. Seal the openings around the tubing where it enters the building and seal the tubing where it extends out of the ground at the location where the stove is to be placed.

8. Connections to the furnace are clearly marked. The installation of isolation valves at both ends of the pump is recommended as well as a valve at the return line. This will allow you to shut off water supply for repair or if additional heating components are added to the system. It is recommended that piping used is able to withstand 100 PSI at 180 F, and is at least 1" (inch) in diameter. 1 1/4" (Inch) piping is recommended for larger systems. A single junction box at the rear of the furnace is included for your power supply, and should be connected by a qualified person.

9. A hole large enough to accommodate two lines and insulation is required and attention to sealing this point of entry is very important. Be sure to bring pipes, insulation and vapor barrier completely through wall and seal from both sides.

10. You will require either water-to-water (tube and shell or plate) or water-to-air exchanger (rad) to transfer or extract heat energy from the hot water your furnace has produced. Your local authorized dealer or certified plumber can design and install a system to best suit your requirements.

11. The Class A stainless steel chimney pipe comes in various lengths, spanning from eighteen (18) inches to forty eight (48) inches. Install each section of piping by placing male and female sections together then twisting them to lock sections together. When installing your chimney piping, it is recommended by the chimney manufacture that it must be laterally braced every eight (8) feet. It is also recommended by the chimney manufacture that the height of the piping does not exceed a total of forty (40) feet.

If additional height is needed, contact your local dealer or Greentech Manufacturing, Inc.

**CAUTION!!!** Hot Surfaces: Keep children away. Do not touch during operation.

**WARNING!!!** Risk of Fire: Do not operate with fuel loading and / or ash removal doors open. Do not store fuel or other combustible materials within marked installation clearances. Inspect and clean flues and chimney regularly.

**WARNING!!!** Do not install this unit on a combustible surface.

**WARNING!!!** This unit can not be hooked to a chimney already serving another appliance.

## **MAKING WATER AND ELECTRICAL CONNECTIONS AT THE STOVE**

**ALL INSTALLATIONS AND OPERATIONS MUST FOLLOW FEDERAL, PROVINCIAL, STATE, AND LOCAL CODES FOR WIRING, PLUMBING, INSTALLING CHIMNEY. ALL WORK MUST BE PERFORMED BY QUALIFIED PERSONAL ONLY.**

1. After the stove has been placed on the concrete or pads, remove the panel at the back of the stove.
2. The return (cold water) pipe must be connected to the fitting at the upper position and the supply (hot water) at the fitting toward the bottom of the stove. If multi-pole locations are to be heated, tees must be added on both the supply (hot) and return (cold). It is necessary to use brass fittings between the stainless and other metals.
3. The stove has been pre-wired at the factory; therefore it is only necessary to connect the common from the wire from the trench to the common from the stove, neutral to neutral, ground to ground. Ensure that the connections are water tight.
4. Return the panel to the back of the stove.

## **PIPING INSIDE THE BUILDING**

**ALL INSTALLATIONS AND OPERATIONS MUST FOLLOW FEDERAL, PROVINCIAL, STATE, AND LOCAL CODES FOR WIRING, PLUMBING, INSTALLING CHIMNEY. ALL WORK MUST BE PERFORMED BY QUALIFIED PERSONAL ONLY.**

It is recommended that piping used is able to withstand 100 PSI at 180 F, and is at least 1" (inch) in diameter. 1 1/4" (Inch) piping is recommended for larger systems.

1. For each building, a circulation pump is needed. The pump can be located on the supply side (hot water).
2. Before each pump, a filtering device must be installed. This filter will minimize the contaminants in the water and maximize the life of the circulation pump.
3. If the central heating system in the building is a forced air furnace, it is important to select the appropriate water to air exchanger. Contact your heating contractor for proper size. The coil is to be installed in the furnace plenum. If there is an air conditioning evaporator coil in the plenum, install the water to air coil after the a/c coil.
4. If the central heating system is a hot water boiler system, a water to water heat exchanger is needed. The water from an open system will contaminate the closed system if the waters are mixed together.
5. It is advisable to install ball valves, isolation flanges, etc. to make the removal and the replacement components easier.

## **WIRING INSIDE THE BUILDING**

**ALL INSTALLATIONS AND OPERATIONS MUST FOLLOW FEDERAL, PROVINCIAL, STATE, AND LOCAL CODES FOR WIRING, PLUMBING, INSTALLING CHIMNEY. ALL WORK MUST BE PERFORMED BY QUALIFIED PERSONAL ONLY.**

1. The electrical wiring must be done by an experienced HVAC technician to ensure the system will operate as desired and is safe.
2. It is recommended that the circulation pump or pumps run continuously.
3. The existing forced air circulation blower needs to be wired through the circuit board to a 24 volt wall thermostat which is dedicated for this purpose. The other wall thermostat which is for the forced air (Oil, LP, NG or Electric) is left intact. The new 24 volt wall thermostat will cause the circulation blower to run without the burners coming on. An experienced HVAC technician needs to perform the wiring.
4. The electrical for a boiler system is more complicated because the existing boiler wall thermostat is used but the burners on the (Oil, LP, NG or Electric) boiler are not to operate when the water from the water stove is to provide heat. It is necessary to have an experienced HVAC technician wire this configuration.
5. If air conditioning is used you must add a relay DPDT to prevent the condenser from turning on when the fan is energized.

## **ELECTRICAL REQUIREMENTS**

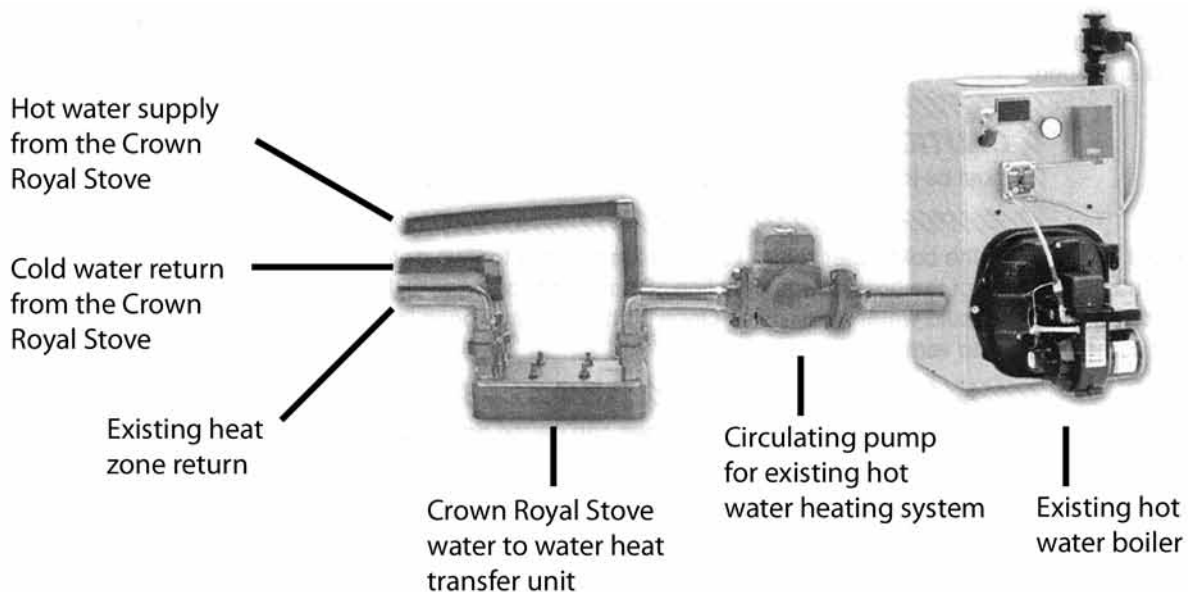
**ALL INSTALLATIONS AND OPERATIONS MUST FOLLOW FEDERAL, PROVINCIAL, STATE, AND LOCAL CODES FOR WIRING, PLUMBING, INSTALLING CHIMNEY. ALL WORK MUST BE PERFORMED BY QUALIFIED PERSONAL ONLY.**

Electrical Rating: 120 AV Volts, 6 AMPS, 60 Hz. Wire must be rated and approved for direct burial if it is to be buried in the same trench as the water lines. Boiler power connection box is located at rear of boiler inside back cover. Minimum supply 15 AMPS. Maximum device 15 AMPS. **USE COPPER CONDUCTORS ONLY.**

## EXISTING HOT WATER HEAT

**ALL INSTALLATIONS AND OPERATIONS MUST FOLLOW FEDERAL, PROVINCIAL, STATE, AND LOCAL CODES FOR WIRING, PLUMBING, INSTALLING CHIMNEY. ALL WORK MUST BE PERFORMED BY QUALIFIED PERSONAL ONLY.**

It is recommended that piping used is able to withstand 100 PSI at 180 F, and is at least 1" (inch) in diameter. 1 1/4" (Inch) piping is recommended for larger systems.



The Crown Royal Stove shall be installed without interfering with the normal delivery of heated water from the original boiler.

The Crown Royal Stove shall be installed without affecting the operation of the electrical and mechanical safety controls of the original boiler.

The Crown Royal Stove shall provide a changeover from one fuel to the other without requiring manual adjustment of any controls or components other than the thermostats.

The Crown Royal Stove shall have provisions for preventing, or adequate water capacity within the boiler to prevent damage from loss of circulation due to electrical power failure.

The Crown Royal Stove shall be installed without changing the function of the controls or rewiring the original boiler. A wiring interconnection is permitted. The electrical system of both boilers shall be powered from a single branch circuit without exception.

### **FOR UNITS USED IN CANADA THE FOLLOWING IS RECOMMENDED:**

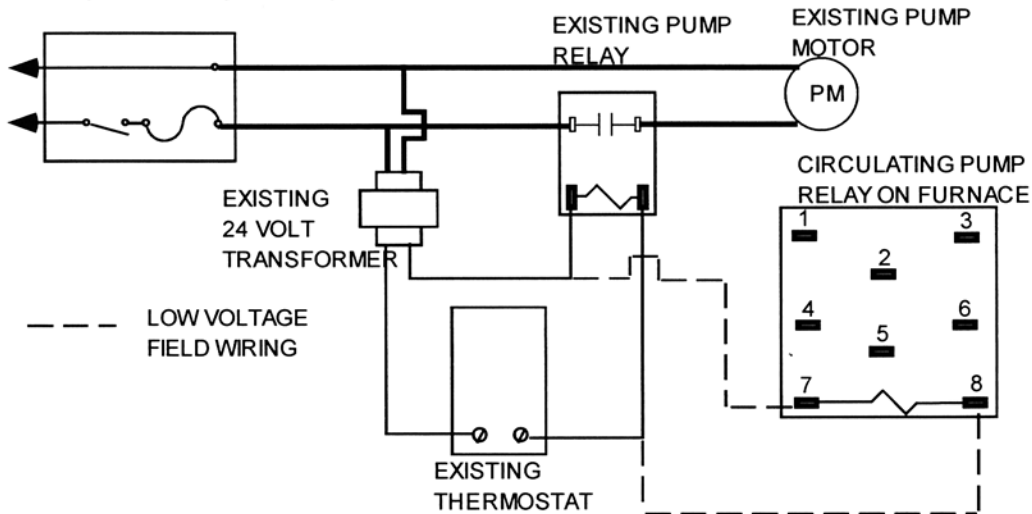
- 1: Operate the existing boiler periodically to ensure that it will operate satisfactorily when needed.
- 2: Do not relocate or bypass any of the safety controls in the existing boiler installation.
- 3: The operation of the existing gas boiler must be verified for acceptable operation before and after installation of the Crown Royal Stove by a gas fitter who is recognized by the regulatory authority.
- 4: Do not connect to any chimney or vent serving a gas appliance.
- 5: Ensure the installation complies with the requirements of CAN/CSA-B365. Any changes to the installation should comply with CSA B139 (for oil-fire), C22.1 (for electric), or CAN/CGA-B149.1 or CAN/CGA-B149.2 (for gas-fired).

# WIRING DIAGRAM FOR GAS BOILER

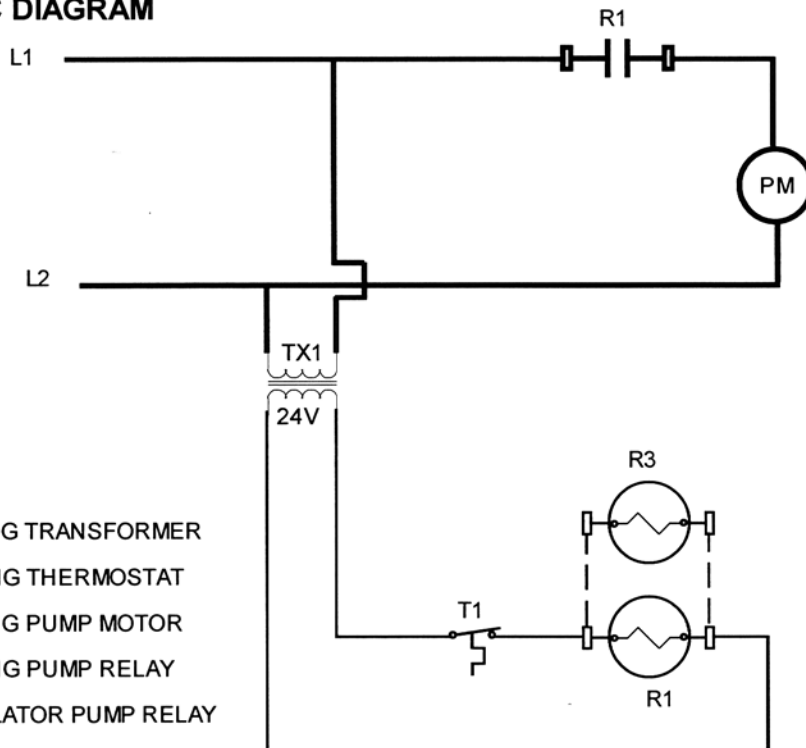
Put 'strap on Aquastat' on the supply side of the water-line from outdoor furnace. Run thermostat wire from the 'strap on Aquastat' to R and G of fan control center. Run 115V power to white and black wire of fan center coil. Break one wire of gas boiler Aquastat. Hook one side of wire to brown wire of fan control center contact. Hook other side of gas boiler Aquastat wire to black on fan control center contact. Set 'strap on Aquastat' to close at 100-120 degree.

## Connection to Hydronic System with existing 24 Volt Transformer

### CONNECTION DIAGRAM



### SCHEMATIC DIAGRAM



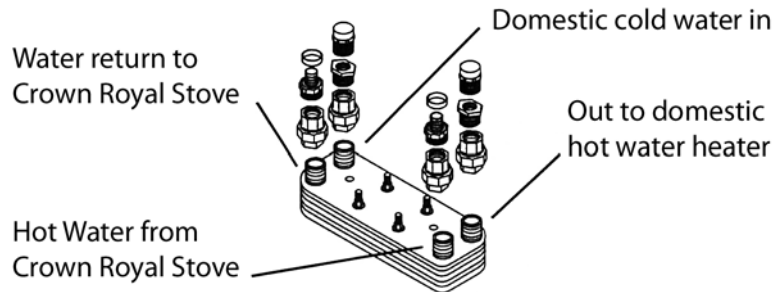
#### LEGEND

- TX1    EXISTING TRANSFORMER
- T1    EXISTING THERMOSTAT
- PM    EXISTING PUMP MOTOR
- R1    EXISTING PUMP RELAY
- R3    CIRCULATOR PUMP RELAY

**ALL INSTALLATIONS AND OPERATIONS MUST FOLLOW FEDERAL, PROVINCIAL, STATE, AND LOCAL CODES FOR WIRING, PLUMBING, INSTALLING CHIMNEY. ALL WORK MUST BE PERFORMED BY QUALIFIED PERSONAL ONLY.**

## **DOMESTIC HOT WATER**

The Domestic Hot Water Flatplate Kit consists of a Water to Water Heat Transfer unit and the fittings needed to hook it up. The unit goes on top of the domestic hot water heater and is connected as shown below.



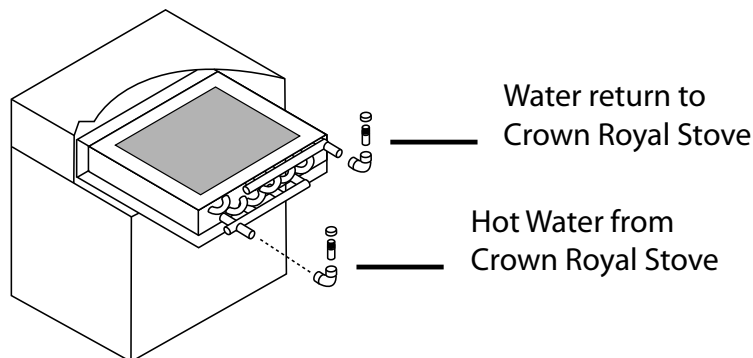
## **EXISTING FORCED AIR**

A water to air heat exchanger is inserted in the existing plenum. In most cases the heat exchanger is placed in a horizontal position, keeping all four sides level. The air must be forced through the finned area of the heat exchanger evenly. The hot water line coming from the hot - water tube enters the bottom fitting of the heat exchanger and exits the top fitting, which returns to the furnace. If the plenum is too large or too small, it must be altered to fit the heat exchanger properly.

After installation of the add-on water to air exchanger, the air flow must be increased to fuel the furnaces, electric furnaces, and electric/gas furnaces. Methods of doing this are:

**BELT DRIVE SYSTEM:** Blower pulleys and motor pulleys may be changed but the electric current flowing through the motor shall not exceed the nameplate rating. (A blower motor or larger power may be used.)

**DIRECT DRIVE SYSTEM:** The motor shall not be changed, however the speed of the motor may be increased.



**THE HEAT EXCHANGER:** Air blows through the heat exchanger's grill taking the heat from the water heated grill and blowing it into your existing ductwork.

**CAUTION!!!** When installing heat exchangers do not tamper with existing controls. Wiring to existing blower can be done with a line voltage or low voltage thermostat.

**NOTE:** Wire thermostats according to directions provided by the manufacturer.



## FLAT PLATE SETUP

● If using 1" tubing, open ball valve 1/3.  
● If using 3/4" tubing, close valve.

**Wood Stove Inlet**  
(water line from wood stove)

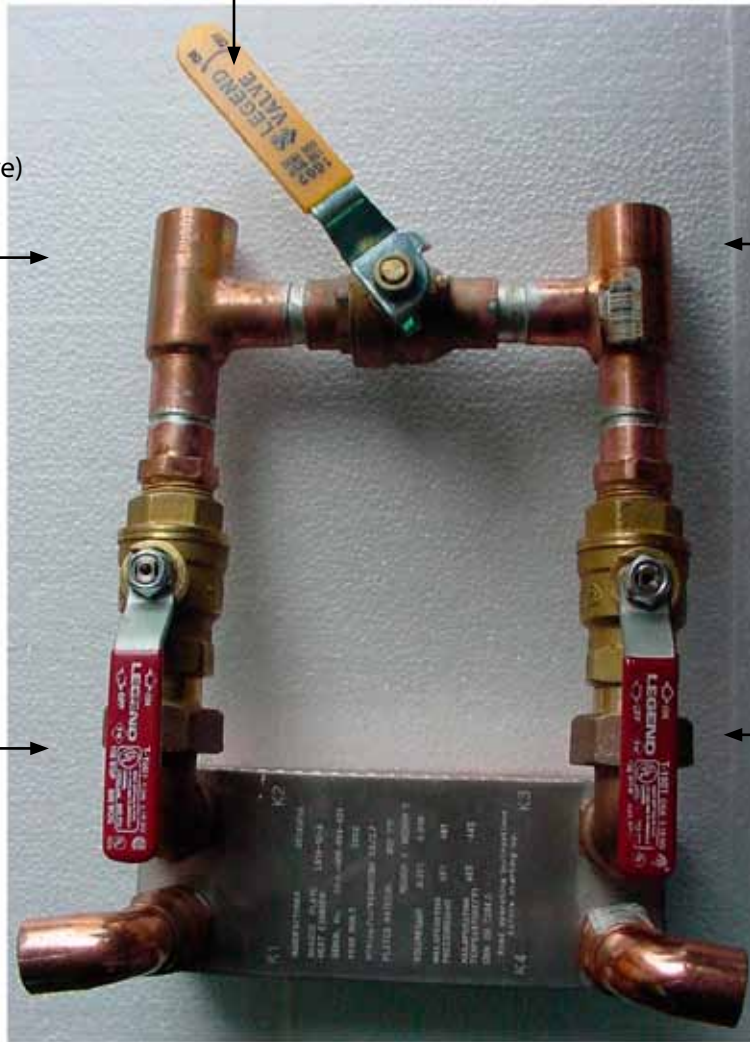
**Wood Stove Outlet**  
(Connect to gas furnace  
or boiler exchanger)

**Ball Valve 101-024**

**101-024 Ball Valve**

**Hot Water Outlet**  
(domestic to faucets)

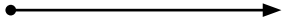
**Hot Water Inlet**  
(hot side of water heater)



The Flat Plate Heater can be installed on either the cold side or the hot side of the hot water heater. If installed on the cold side, the hot water heater needs to be left on to maintain the temperature in the hot water heater. If installed on the hot side, the hot water heater needs to be turned off and the hot water heater is now a reservoir.

## WATER TO AIR SETUP

**Water to Air Exchanger**



**Boiler Drain**



**Ball Valve 101-024**



**Kitec Fitting**



## ELECTRICAL, PRESSURE, TEMPERATURE COIL COMPONENTS



Aqua Stat



Aqua Stat Well



Limit Switch



Blower Fan

## ROCKER GRATE ASSEMBLY



## THE CONTROL PANEL

The control panel is to be kept shut when fueling the fire box and at all other times except when using the controls.

The aqua stat powers the inducer draft blower to maintain the desired water temperature. The aqua stat is set at 150 degrees F at the factory, which means the inducer will run until the water in the jacket reaches 150 degrees F. As the outside air temperature drops as the season progresses into the winter the setting can be raised to a high of 180 degrees F. The reason the aqua stat is set lower is that it is not necessary to have the high temperature in the fall and spring. Therefore, the stand by heat lost is reduced.

The limit switch is a normally closed circuit, but when the water temperature reaches 190 degrees F the circuit opens thereby shutting the inducer off. The limit is to prevent the water from over heating.

The on and off switch is to shut the power off to the inducer blower when the fire box is being filled. The outside light is wired so it can be turned on and off at a remote location. In the sight tube the water level in the jacket can be seen. Add water so that there is water in the entire tube.

The temperature gauge is for information purposes. If the water temperature reaches 200 or above, make sure the inducer is off, the doors are shut tightly, the circulation pump is on and the furnace (forced air) in the building (house) has its circulation blower on to take the heat away from the exchanger and if the system in the building (house) is hydronic (boiler) has its pump circulating the water throughout the zones.

**CONTROLLER:** This unit controls the water temperature inside the water jacket. It is factory set to cut-in at 150 degrees and cut-out at 180 degrees. When cut-in occurs the fan will run until the temperature reaches 180 degrees then the fan will turn off. Only qualified personal should adjust the temperature control. For hooking into the hot water heating systems your settings should be 170 to 190 degrees.

**HI-LIMIT:** This unit will turn off the boiler fan if the water temperature exceeds the 190 degree preset temperature. Beware that this control will automatically start if 'hi-temp' is corrected.

**FAN / LIGHT SWITCH:** This switch controls both the fan and light. Ensure switch is in the light position before opening fuel door. This shuts the fan off and turns the light on. Always put the switch in the fan position after refueling.

**REOSTAT:** This controls the main blower speed and is used to introduce air under the grates.

## **FILLING THE WATER JACKET**

Your outdoor furnace has a vent pipe that protrudes through the roof and is behind the chimney. By placing a garden hose in this pipe you can fill your furnace to the proper water level. Because this furnace is an open-to-atmosphere system, it is normal that water will have to be added annually. Depending on circumstances, 5 or 10 gallons is not unusual. To make this procedure more convenient, a boiler drain valve (tap, faucet) can be installed into the return furnace line allowing you to connect a double female (automatic washing machine hose) between it and your domestic supply line.

On your initial filling of your furnace make sure to inspect all connections in your system for leaks. In your system a bleeder valve should have been installed at the highest point. This will allow you to remove any air from the system. CAUTION, do not fire furnace until it is filled with water.

Allow furnace to run for two days and check water levels and fittings for leaks. If all is okay, you now should add the manufacturer's recommended water treatment.

## **FIRING THE FURNACE**

Storage of your solid fuel must be in a debris free, dry environment that is at least sixty (60) inches from the front of the stove and thirty six (36) inches from the sides or back of the stove.

On starting an initial fire the use of less coarse wood and paper is required. Add heavier fuel gradually until a suitable fire is achieved. The furnace will continue to feed an air supply to the fire until your aqua-stat shut off temperature is reached (180F). On this initial start up the water jacket will reach what is called the dew point. This creates sweat inside the fire box which may last a couple of days and is normal.

Although everyone has different methods of firing. Filling your furnace to capacity reduces the efficiency of the furnace. It is better to load twice a day with less wood than once a day filling to capacity. Smaller fuel loads burn hotter, cleaner and more thoroughly. By burning off more of the gases (smoke), which is wood broken down, you enhance the overall efficiency of your system by reducing creosote and increasing heat transfer to the water. This furnace will burn poor quality wood (green, rotten), but for best results and efficiency proper seasoning and storage of wood is highly recommended.

Do not fill the unit higher than as stated below.

RS 7200 : 14" (inches) from the bottom of the door opening.

RS 7300 : 14" (inches) from the bottom of the door opening.

RS 7400 : 16" (inches) from the bottom of the door opening.

RS 7500 : 24" (inches) from the bottom of the door opening.

## **STARTING A FIRE**

1. Pull the smoke bypass damper rod out.
2. Open the control panel door and turn the inducer switch off and then close the control panel door.
3. Open the fuel door and insert crumpled paper. Pile a few pieces of dry kindling on the paper. Do not use chemicals or fluids to start the fire.
4. When the kindling wood is well ignited, add larger pieces of wood.
5. Shut the fuel door.
6. Push the smoke bypass damper rod in.
7. Open the control panel to turn the inducer on, then close the panel door.
8. When firing the stove the first time in the season, the water jacket will sweat as the fire warms the cold water. This could last for 48 hours and does not indicate the stove is leaking water.

Do not fill the unit higher than as stated below.

RS 7200 : 14" (inches) from the bottom of the door opening.

RS 7300 : 14" (inches) from the bottom of the door opening.

RS 7400 : 16" (inches) from the bottom of the door opening.

RS 7500 : 24" (inches) from the bottom of the door opening.

## **DAILY FUELING & FIRING ROUTINE**

Prior to opening the fuel door, pull the damper plate rod out, open the control panel, turn the inducer fan switch off and wait 60 seconds. After the 60 seconds has passed, open the fuel door slowly and stand behind the door so that the door is between you and the fire box. Allow another 60 seconds to pass before raking the coals, shaking down the ashes and filling the fire box. Failure to wait may cause an injury from a fire flare back.

Since the inducer blows air into the ash pan area it is critical to remove the ashes daily even though the ash pan area is not full. Store ashes in a covered metal container until all cinders have thoroughly cooled prior to dispersal.

Do not load the fire box more than seventy five percent (75%) with wood, or more than thirty percent (30%) with coal or corn. If additional fuel is added you will not maintain a hot enough burn and your efficiency rate will deteriorate. Only add enough wood, coal, or corn to provide heat until the next fueling time. Overfilling the fire box will cause the fire to smolder, create excessive creosote and result in more fuel being consumed.

## **OFF SEASON MAINTENANCE**

**CONTACT YOUR LOCAL DEALER FOR ANY QUESTIONS REGARDING MAINTENANCE.**

At the end of the heating season, shut off the pump, empty the fire box of all wood and ash, remove the creosote, clean the damper plate and clean the chimney. Remove and clean the inducer blower, clean the ash pan area, check the door gaskets and replace as necessary.

Drain the system, refill to the top, treat the water, turn on the circulation pump for at least four hours to mix the treatment thoroughly, check for leaks and then shut the pump off.

Care for the exterior of your furnace is minimal. The unit may be washed using water and a mild non-abrasive cleaner suitable for painted surfaces. Avoid direct water pressure to electrical components and connections.

**CAUTION!!!** Make certain that all electrical power to the furnace and components are shut off before washing.

# **MAINTENANCE**

## **CONTACT YOUR LOCAL DEALER FOR ANY QUESTIONS REGARDING MAINTENANCE.**

The # 1 Rule for long life of your furnace is Proper PH Level, maintain between 8-10. Yes, even high grade stainless steel can corrode in the right acidic conditions. Contact your local dealer for PH test paper.

It is recommended to have a rain cap so that moisture doesn't come in contact with the ashes in the firebox, which is highly corrosive.

The furnace will require cleaning frequently due to the accumulation of soot, creosote, and ash. Check weekly for creosote build-up until experience shows how often cleaning is necessary.

Be aware that the hotter the fire and dryer the wood, the less creosote is deposited, and the monthly cleanings may be necessary in the winter months. Have a clear understanding how to handle a fire.

### **Daily**

- Check water level and add as necessary.
- Check for adequate fuel supply.
- Remove collected ash from the shaker grates and ash pan.
- Check if temperature setting corresponds to thermometer.
- Check for ash buildup in firebox and clean as necessary (Use a metal container to empty ashes into.)

Note : Unit must be shut down in order to fill up and clean the ash pan!

### **Weekly**

- Check air bypass tubes and chimney, remove any creosote, soot or ash build-up that may have occurred.
- Check fan and solenoid to ensure proper air velocity is happening at ejection points.

### **Monthly**

- Check the water fill pipe, add water till excess flows over the top.
- Check PH level of the water and add rust inhibitor as required.

### **Annually**

- Lubricate fan, solenoid shaft and shaker grate.
- Check fan and solenoid to ensure proper air velocity is happening at ejection points.
- Check the door gasket and replace if needed.
- Clean out any ash buildup from back.
- Check blower motor bushings and oil as needed.
- Check air bypass tubes and chimney, remove any creosote, soot or ash build-up that may have occurred.
- At the end of the season, thoroughly clean out all the ashes in the firebox and chimney.

Place a chimney cap on the chimney in order to keep rain from entering the firebox.

Remember : Your preventive maintenance program will give you years of trouble free service.

## **COAL AS FUEL & BUYING COAL**

Coal is a very interesting fuel. Don't be misled into thinking all coals are alike, they're not. You have to understand the coal you're using to take advantage of the highest heat value.

Anthracite Coal: is a highly carbonated form of clean-burning coal, this is different from the more commonly known bituminous (soft) coal. Anthracite coal can provide continuous heat for your buildings and has many distinct advantages. Anthracite is 82 - 86 percent carbon and burns at roughly 25 million BTUs per ton, making it a very cost efficient fuel. Anthracite coal produces 14,000 - 15,000 BTUs per pound while other coals produce 6,000 - 10,000 BTUs per pound.

## **STARTING A COAL FIRE**

1. All coal fires should be started with wood. This is needed to get the fire hot enough to ignite the coal. Softwoods make good kindling because of the resin they contain and the fact that they split easily. Hardwoods are better on top of the kindling to give a longer-lasting fire until the coal gets started.
2. After wood fire is burning good, place the larger pieces of wood on the fire so that they are slightly separated and for a level bed for the coal. It will take 10 to 20 minutes before they are thoroughly ignited and ready for the coal. Adding the coal too soon could cut the air supply and smother the fire.
3. Add a thin layer of coal, preferably smaller chunks (coal), to the wood fire, being careful not to disturb it too much or cut off the draft.
4. After the coal is ignited and burning well, add a second heavier layer. Be sure to leave a red spot of glowing coals visible after adding new layer to be sure you haven't smothered the fire. This will also help ignite the gases given off by the new charge. A deep charge will give a more even heat and a longer burn time. It may take one to two hours before the whole bed is ignited.

Do not fill the unit with more coal than as stated below.

RS 7200 : 60 LBS.

RS 7300 : 60 LBS.

RS 7400 : 80 LBS.

RS 7500 : 100 - 150 LBS.

## **STARTING A EAR CORN FIRE**

1. Pull the smoke bypass damper rod out.
2. Open the control panel door and turn the inducer switch off and then close the control panel door.
3. Open the fuel door and insert crumpled paper. Place paper on grates, then lay fine dry 3/4" kindling on paper. Layer kindling in a criss-cross fashion to allow a good air flow. (Do not use chemicals or fluids to start the fire.)
4. Turn on the blower and ignite the paper inside the door and close the loading door and allow the kindling to catch fire. After a few minutes open the loading door and add a small amount of hard wood on top of the burning kindling. Then close the door.
5. When a good bed of red coals is built up you may now add your ear corn to the fire box. Continue to add small amounts of ear corn until there is a solid bed of burning coals.
6. It is better to add smaller loads of corn and do it twice a day than to over load the fire box. Typically a third of the fire box full of ear corn.
7. Push the smoke bypass damper rod in.
8. Open the control panel to turn the inducer on, then close the panel door.
9. When firing the stove the first time in the season, the water jacket will sweat as the fire warms the cold water. This could last for 48 hours and does not indicate the stove is leaking water.

Do not fill the unit higher than as stated below.

RS 7200 : 14" (inches) from the bottom of the door opening.

RS 7300 : 14" (inches) from the bottom of the door opening.

RS 7400 : 16" (inches) from the bottom of the door opening.

RS 7500 : 24" (inches) from the bottom of the door opening.

## **SAFETY**

Whenever the loading door is to be opened, it should always be cracked slightly to allow oxygen to enter and burn off any combustion gases that are present before fully opening. Failure to do this could result in sudden ignition of the unburned gases when the door is opened.

A stove should never be filled with excess coal, corn or wood so that the flue gas exit is blocked or impeded in any way. Burning coal, corn or wood generates carbon monoxide and if the flue gas exit is blocked the carbon monoxide can be forced into the area the stove is heating and have fatal consequences.

Do not fill the unit higher than as stated below.

RS 7200 : 14" (inches) from the bottom of the door opening.

RS 7300 : 14" (inches) from the bottom of the door opening.

RS 7400 : 16" (inches) from the bottom of the door opening.

RS 7500 : 24" (inches) from the bottom of the door opening.

## **STARTING DURING A PROLONGED POWER FAILURE**

**CAUTION!!!** Do not to start the unit during a prolonged power failure.

During a prolonged power failure, where no power is being sent to the furnace, do not load with new fuel or try to start a new fire. It is recommended that you contact your local dealer or Greentech Manufacturing, Inc to find out what size of generator is needed to keep your furnace running. Once an approved generator is connected to the stove, the unit may be started normally.



## **ASH REMOVAL, ROTATION & DISPOSAL**

**CAUTION!** Ashes should never be allowed to accumulate above the top of the pan. Ashes in contact with the bottom of the grates act as an insulator, thus intensifying the heat on the grates and could cause warpage. With an excessive ash buildup, primary combustion air is restricted and the unit's output will be reduced. Warped grates are easily recognized by the extreme damage.

Ash removal should be done weekly to maintain a good ash rotation. Remove ashes when the furnace is low on wood. This is done by shaking the rocker grates so the ashes will fall through the grate into the ash pan below. Open the ash pan door and remove the ash pan and place ashes into a metal container with a metal lid.

This closed metal container of ashes should be placed on a noncombustible floor or on the ground, well away from all combustible materials until final disposal. Ashes should remain in the closed container until all cinders have cooled, in an area that is at least sixty (60) inches from the front of the stove and thirty six (36) inches from the sides or back of the stove.

**CAUTION:** Hot coals can last for days. Disposing of them improperly or too soon can cause a fire.

## **WARNING!!! RISK OF FIRE**

With the exception of the start-up and ash removal periods, the ash pan and loading doors should never be left open. This unit should never be left unattended with any of the doors left open.

**CAUTION:** Always close the ash pan door or serious overheating will occur and damage the unit.

## **CREOSOTE FORMATION & REMOVAL**

When wood is burned, organic vapors and tar combine with expelled moisture forming creosote, which clings to the interiors of the stove. Creosote vapors condense in the relatively cool chimney of a slow burning fire, as a result creosote accumulates on the flue lining. When creosote ignites it creates an extremely hot fire and can cause damage to the stove and / or persons. The chimney and its connectors should be inspected at least twice a month, during the heating season, to determine if a buildup is occurring. If creosote has accumulated it should be removed to reduce the risk of a chimney fire.

## **RUNAWAY CHIMNEY FIRE**

To avoid a chimney fire, ensure that daily, weekly, month and annual maintenance techniques are being followed.

If a fire is to occur, close the dampers, shut down the power to the unit, and ensure the firebox & ash pan doors are securely shut. This will eliminate new oxygen from being introduced into the firing chamber, thus killing both the chamber and chimney fires.

## **TROUBLESHOOTING**

### **If the furnace fails to heat up:**

1. Check fire.
2. Check fan for operation.
3. Check that solenoid damper is open to allow air velocity.
4. Check water level of furnace.
5. Check for creosote blockage at chimney and bypass trough.
6. Check temperature setting.
7. Check for power at furnace.

### **If furnace water is hot, but buildings do not have heat:**

1. Check pumps and check for closed valves.
2. Check filter or Y-Strainer for flow blockage.
3. Check for air in system at exchanger by bleeding off.

### **If furnace boils:**

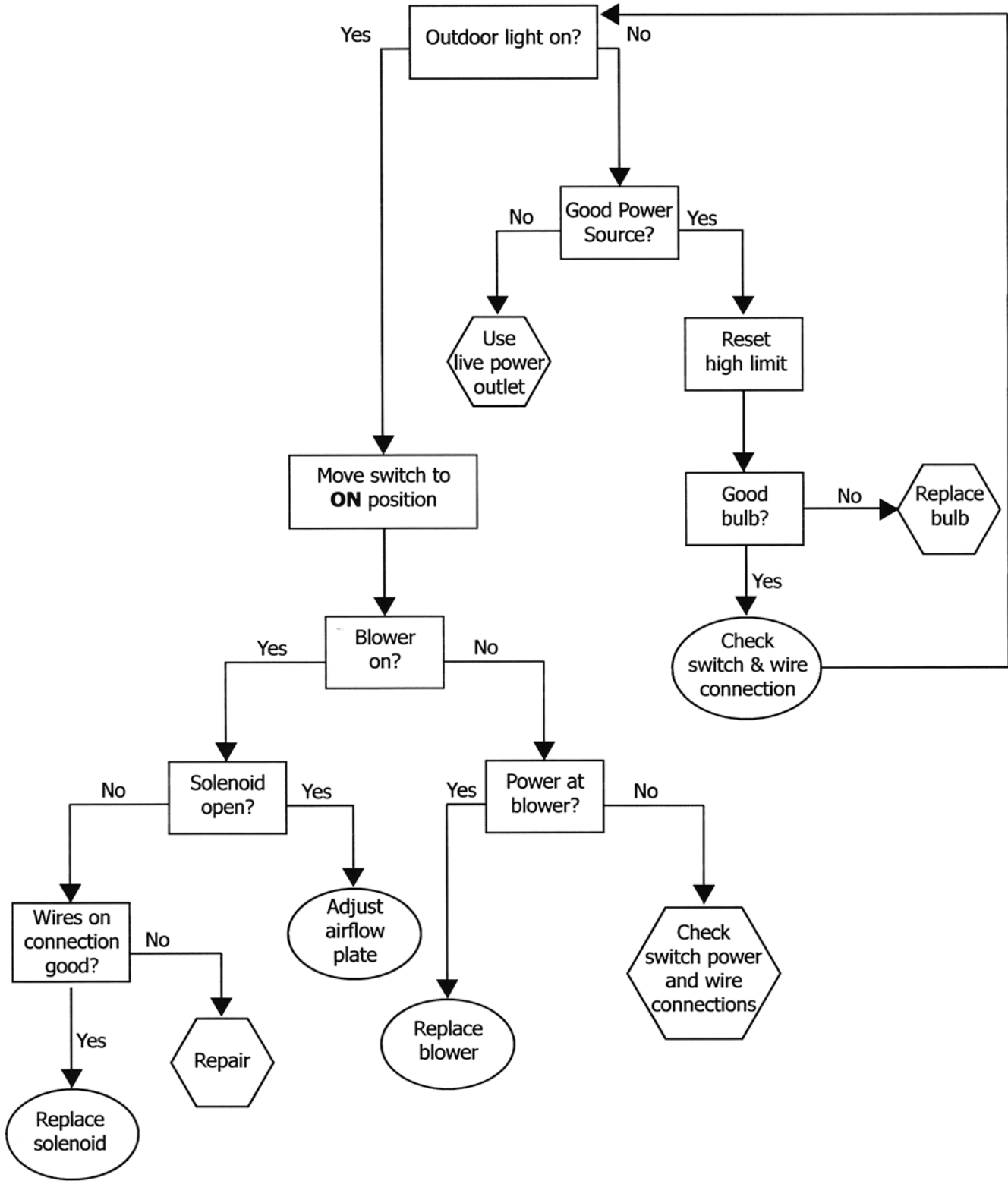
1. Check that door is closing properly and that door gasket is completely sealed.
2. Check that the ash pan door is properly closed and the gasket is completely sealed.
3. Check that the solenoid damper plate is opening and closing without hang-ups.
4. Check that the flexible air duct is connected to the blower and the bottom elbow of the furnace.
5. Check that the temperature settings are correct and water levels.

### **If furnace has shut down:**

1. Check to ensure that the unit has power (does the outside light work).
2. Check the water temperature (furnace has a high temperature cut-out of 190 degrees F.).
3. If all the checks have not corrected the problem, have a qualified technician check the control panel.

# Electrical Trouble Shooting Flow Chart

Begin Diagnostic test with light/blower switch in **OFF** position





## Water Treatment      January 1, 2007

Greentech Manufacturing, Inc requires that the CERTIFIED LABS. PRODUCT – WOOD BURNING FURNACE TREATMENT be added to the water in the furnace. Premature corrosion in a hot water wood furnace is a result of not treating the water with the correct corrosion resistant inhibitor or with the wrong dosage.

Instructions for the proper start-up mixture and for the yearly additional amount to maintain proper treatment-to-water balance are on the container label and on an attached document.

Upon installation of the furnace:

- Add the recommended dose of treatment to the water when filling the furnace
- Retrieve a sample of the treated water in to the provided container
- Provide the information requested on the container label provided by the dealer/distributor
- The sample is to be sent with the completed furnace registration form
- Return this package to your dealer/distributor for analysis and warranty registration
- Water sample to be analyzed by authorized personnel
- If the water sample is not suitable, an additional treatment will be recommended

NOTE: This sample needs to be of the water that is in your furnace AFTER THE TREATMENT HAS BEEN ADDED TO IT. The sample is to be sent to the address provided on the sample container label.

### Wood Burning Furnace Treatment

**READ THE ENTIRE LABEL BEFORE USING THIS PRODUCT.**

Specifically designed to treat water that is contained in a closed-loop, heated by wood fired furnaces that provide heat to buildings.

- Helps protect the system from scale, sludge, and corrosion
- Vapors help prevent corrosion throughout the furnace
- Economical - one gallon/3.78 liters treats 300 gallons/1134 liters of system capacity

#### **DIRECTIONS FOR USE**

##### **NOTE**

1. KEEP CONTAINER CLOSED WHEN NOT IN USE
2. DO NOT MIX WITH ANY OTHER CHEMICALS

#### **INITIAL DOSAGE**

1. Consult the owner's manual or contact the manufacturer to determine the water volume of the furnace.

##### **Furnace Water Capacities in US Gallons:**

RS 7200 contains 150 gal.

RS 7300 contains 200 gal.

RS 7400 contains 380 gal.

RS 7500 contains 620 gal.

2. Determine the entire volume of water to be treated by adding the water volume of the furnace with the estimated volume of water contained in all of the piping of the system\*.

3. Before adding product, add water until the system is 1/4 full.

4. Add 1 to 1.5 gallon(s)/3.78 to 5.67 liters for each 300 gallons/1134 liters of system water volume.

Do not exceed 2 gallons/7.56 liters per 300 gallons/1134 liters volume

5. Add water until the system is full. To avoid collecting a heated sample, circulate the water for at least 24 hours before firing up the furnace. Collect a sample for testing.

\*Water volume is about 4 gallons/15.2 liters of water for every 100 ft/3048 cm of 1 in/2.54 cm diameter piping; 16 gallons/60.48 liters for every 100 ft/3048 cm of 2 in/5.08 cm piping. If unable to make a reliable estimate, consult your furnace manufacturer or plumber.

## **MAINTENANCE DOSAGE**

### **NOTE**

1. Treatment should be maintained at all times, even when unit is not in operation. If the unit will be out of operation for an extended time, follow the owner's manual for extended out of service storage.

2. If the system experiences leaks or requires any make-up water to be added, add product at the rate of 1/2 ounce per gallon (14.8 ml per 3.78 liters) of water\*\*.

\*\* Locate and repair leaks as early as possible as per manufacturers owner's manual.

## **SYSTEM TESTING**

**DANGER – HOT WATER AND SURFACES MAY CAUSE BURNS.**

**USE EXTREME CARE WHEN COLLECTING A WATER SAMPLE.**

1. Samples should be tested at least once per season or after any flushing, refill, etc. Turn off the furnace and circulate for 24 hours prior to collecting the sample.
2. Collect a sample from the drain line or other convenient location.
3. Allow 30 seconds of draining then fill the container provided with the unit.
4. Submit the sample for analysis using the mailing tube and mailer label provided.
5. If testing reveals that levels are low, additional product should be added.
6. If testing reveals that levels are too high, some of the treated water should be drained and replaced with fresh, untreated water.

**KEEP FROM FREEZING:** If this product is stored in cold or freezing temperatures, it may separate or thicken. This will not harm the performance. Before using, warm to room temperature and stir thoroughly.

**WARNING:** Contains Sodium Nitrate and Potassium Hydroxide. Avoid contact with skin, eyes and clothing. Undiluted product causes severe skin and eye irritation. Wash thoroughly after handling. Do not swallow. Swallowing may cause nausea, vomiting, weakness and lowered blood pressure.

MADE IN THE U.S.A.

## **IMPORTANT**

**On each anniversary of the furnace installation 1/4 of the amount of treatment should be added to keep the treatment-to-water balance in line and a sample of the water sent in for re-testing. Contact your dealer. The receipt of the water sample and the furnace registration within 30 days of purchase validates your warranty.**

# **EMERGENCY FIRST AID PROCEDURES FOR WOOD BOILER CHEMICAL**

## **EMERGENCY PHONE NUMBER** **1-800-424-9300**

### **INHALATION:**

Remove from the area to fresh air. If not breathing, clear the airway and start mouth to mouth artificial respiration. GET IMMEDIATE MEDICAL ATTENTION.

### **EYE CONTACT:**

Immediately rinse the eyes with water. Remove any contact lens and continue flushing for at least 15 minutes. Hold the eyelids apart to ensure rinsing of the entire surface of the eyes and lids with water.

GET IMMEDIATE MEDICAL ATTENTION.

### **SKIN CONTACT:**

Wash affected areas with large amounts of soap and water for 15 minutes. Remove contaminated clothing and shoes. GET IMMEDIATE MEDICAL ATTENTION.

### **INGESTION:**

Give 3 to 4 glasses of water, but do not induce vomiting. If vomiting occurs, give fluids again.

GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON.

### **NOTE TO PHYSICIAN:**

Introduction into the body may lead to the formation of Methemoglobin which in sufficient concentration, causes Cyanosis. Since reversion of the Methemoglobin to Hemoglobin occurs spontaneously after termination of exposure, moderate degrees of Cyanosis should be treated only by supportive measures such as bed rest and oxygen inhalation. Thorough cleansing of all contaminated areas of the body including scalp and nails is of utmost importance. If Cyanosis is severe, intravenous injection of Methylene blue, 1 MG/KG of body weight may be of value. Cyanocobalamin (Vitamin B-12), 1 MG Intramuscularly, will speed recovery. Intravenous fluids and blood transfusion may be indicated in very severe exposures.

## **20 YEAR LIMITED WARRANTY**

Thank you for choosing your new Crown Royal Stove. We are pleased you have researched and chosen our product, and we know you will have great satisfaction with its ongoing reliability and performance. At Greentech Manufacturing, Inc we believe that when you buy an outdoor furnace you are making an investment not a purchase. That's why it's been our commitment to build the best performing and longest lasting furnace on the market.

Greentech Manufacturing, Inc warrants this outdoor furnace, to the original owner, to be free of defects in material and workmanship for a period of twenty (20) years from the date of purchase.

**One Year Warranty On Electrical Components - Parts Only :** The 20 year warranty excludes the electrical components in the stove such as aquastats, thermostats, fans and pumps, as they are guaranteed by the manufacturer for a period of one (1) year from the date of purchase. Parts will be replaced on an even exchange, excluding shipping charges and labor.

**Shaker Grates :** The cast iron rocker grates are warranted for five (5) years 100%. This warranty excludes any warping or deterioration from ash corrosion.

The loading door, ash pan door gaskets and ash pan are warranted for a period of one (1) year from date of purchase. Greentech Manufacturing, Inc does not warranty parts damaged by freezing, overheating, pressurization, warping and use of unauthorized fuels or abuse. The Crown Royal Stove is designed to be the least susceptible to corrosion; therefore corrosion is covered under this warranty. (Excluding ash corrosion on the inside fire drum. Rotation of ashes must be taken care of as displayed in the manual.) The chimney must be covered when the unit is not in use. It is recommended that a chimney cap be installed before operation of the unit.

If there is a leak in your Crown Royal Stove in the first (1 st) year, Greentech Manufacturing, Inc will replace the unit at no cost to the original owner. The owner is liable for the un-installation of the old unit and the installation of the replacement unit. (Meaning of Leak: A leak in the fire box or water jacket.) If the unit is to be replaced in years two to five (2 - 5), the customer shall pay the difference between the original purchase price of the old unit and the new purchase price of the replacement unit, plus freight and installation. After six (6) years Greentech Manufacturing, Inc will pay a percentage of the total cost of the fire box and outer drum. The percentage paid by Greentech Manufacturing, Inc is as follows: year 6 –70%, year 7 – 50%, years 8-9 – 30%, years 10-20 – 20%. After the twentieth (20 th) year Greentech Manufacturing, Inc assumes no liability. If warranty requires replacement of any part, Greentech Manufacturing, Inc will take responsibilities for the actual cost of the replacement parts only. **If an on site repair is made the customer is responsible for the transportation costs and labor.** If the furnace needs to be repaired at the factory it is the responsibility of the homeowner to pay all shipping charges to and from the factory. No other warranty is expressed or implied. Greentech Manufacturing, Inc is not responsible for the costs of plumbing, replacement of antifreeze, shipping costs or any other cost other than the replacement of the part or furnace. (Unless otherwise noted.) Outdoor furnaces are not intended to be the only source of heat. Therefore, it is recommended that a back-up system is in place to prevent damages caused by lack of heat. **No unauthorized adjustments or repairs will be covered by warranty.**

Greentech Manufacturing, Inc specifically disavows any other representation, warranty, or liability related to the condition or use of this product.

## **NOT WARRANTED**

Greentech Manufacturing, Inc does not warrant exterior paint or finish, any damage caused due to negligence and deterioration due to lack of proper ongoing maintenance, overheating, physical damage caused by abuse or freeze up, unauthorized work or modifications done to the furnace, damage to the fire-box due to ash corrosion, power surges or damage caused by burning fuels other than wood, coal, ear corn and wood pellets.

Greentech Manufacturing, Inc is not liable for any damage or cost which may occur from or during the operation of the furnace, or damage incurred due to any heating system failure. The purchaser assumes all responsibility for the care, maintenance and safe operation of the furnace including the monitoring and adding of an approved boiler treatment. All instructions must be followed in the operator's manual, and the warranty registration must be on file at Greentech Manufacturing Inc to qualify for warranty. Greentech Manufacturing Inc always has the right to decide if a part or the stove will be repaired or replaced. To validate this warranty, registration must be completed within thirty (30) days of purchase date and mailed to:

**Greentech Manufacturing Inc • P.O. Box 1237 • International Falls, MN 56649**

Owners Name \_\_\_\_\_

Owners Signature \_\_\_\_\_

Dealers Name \_\_\_\_\_

Dealer Signature \_\_\_\_\_

This Warranty is subject to change.  
For updated warranty information contact  
Greentech Manufacturing Inc.

Revised: January 2012





# **WARRANTY CLAIM**

(For Defective Parts)

Date: \_\_\_\_\_ Boiler Serial No: \_\_\_\_\_

Defective Part No: \_\_\_\_\_ Date of Purchase: \_\_\_\_\_

Customer Name: \_\_\_\_\_ Dealer Name: \_\_\_\_\_

Customer Address: \_\_\_\_\_

Telephone:(daytime) \_\_\_\_\_ (evening) \_\_\_\_\_

## **Description of Defective Part:**

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I hereby acknowledge receipt of the above parts

Customer's Signature \_\_\_\_\_

### **Dealers:**

To serve customers better and avoid problems please familiarize yourself with the conditions of the limited warranty policy and the conditions of sale (see price list) to you by Greentech Manufacturing, Inc. All decisions pertaining to warranty acceptance are the sole responsibility of Greentech Manufacturing, Inc. No other person or representative is authorized to make any warranty decisions or assume any liability. Your original dated bill of sale is required to receive warranty service. Warranty work pertaining to furnaces is outlined in the warranty policy and will be strictly adhered to. Electrical components, door rope and gauges are warranted by the specific manufacturer and are subject to terms as set by that manufacturer. Creosote buildup on electrical parts causing failure is preventable and will exclude warranty. Transportation and installation of replacement parts are the responsibility of the customer and as such are not covered under warranty. Under the terms of the sale dealers are responsible for customer service work as may be required and as outlined on the price list. Before the new part is installed, attempt to determine the cause of failure to prevent additional failures.

Dealers – please note that warranty claim credit will not be forthcoming until:

1. We receive this completed form.
2. We determine if the part is indeed covered under warranty .
3. We verify with the customer, by telephone or mail, that the part replacement was carried out.
4. We receive the defective part.

Repairs must be accepted and preauthorized in writing by Greentech Manufacturing, Inc before repairs are commenced. Greentech Manufacturing, Inc reserves the right to decide on repairing or replacing the furnace at our discretion.

Special Note: The ultimate warranty decision rests with the parts manufacturer. If we accept a part as under warranty and then have the warranty rejected by the manufacturer, the credit we issued for the part will be charged back.



# Greentech Manufacturing Inc

Mail: P.O. Box 1237 / Ship: 2716 Crescent Drive International Falls, MN 56649

Ph: 218-283-3416 | Fax: 218-283-5786 | crownroyalstoves.com

## CONDITIONAL WORK ORDER

The following conditions apply and cannot exceed Warranty Claims and Procedures Policy.

Equipment Serial Number \_\_\_\_\_

Warranty Application Number \_\_\_\_\_ has been approved on

\_\_\_\_ / \_\_\_\_ / \_\_\_\_ and repairs are to be made within 30 days there after. The total amount payable for these repairs are \$ \_\_\_\_\_.

Repairs by:

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Work Performed by: \_\_\_\_\_

Date Started: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Work Completed Satisfactory:

Date: \_\_\_\_\_

Dealer Signature: \_\_\_\_\_

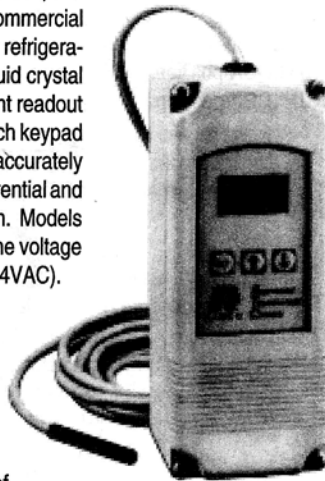
Customer Signature: \_\_\_\_\_



# ETC SINGLE STAGE ELECTRONIC TEMPERATURE CONTROL

## PRODUCT DESCRIPTION

The Ranco ETC is a microprocessor-based family of electronic temperature controls, designed to provide on/off control for commercial heating, cooling, air conditioning and refrigeration. The ETC is equipped with a liquid crystal display (LCD) that provides a constant readout of the sensed temperature, and a touch keypad that allows the user to easily and accurately select the set point temperature, differential and heating/cooling mode of the operation. Models are available that operate on either line voltage (120/208/240 VAC) or low voltage (24VAC).



## APPLICATIONS

With its wide temperature setpoint range and selectable heating or cooling modes, the ETC can be used for a wide variety of applications including refrigerated display cases, walk-in and reach-in refrigerators, milk coolers, refrigerated warehouses, chillers, beer and beverage coolers, tank heating, space and return air temperature control and condenser fan cycling.

## FEATURES

- Wide setpoint temperature range (-30°F to 220°F) and differential adjustment (1°F to 30°F).
- Simple keypad programming of setpoint temperature, differential and cooling/heating modes.
- LCD readout of sensor temperature, control settings, relay status and onboard diagnostics.
- Remote temperature sensing up to 400 feet.
- SPDT output relay.
- User-selectable Fahrenheit/Celsius scales.
- Lockout switch to prevent tampering by unauthorized personnel.
- Choice of line voltage and low voltage models available.
- Optional 0 to 10 volt analog output available for remote temperature indication.

## SPECIFICATIONS

Input Voltage	120 or 208/240 VAC (24 VAC optional), 50/60 Hz
Temperature Range	-30°F to 220°F
Differential Range	1°F to 30°F
Switch Action	SPDT
Sensor	Thermistor, 1.94 in. long x 0.25 in. diameter with 8 ft. cable
Power Consumption	120/208/240 VAC: 100 Milliamps 24 VAC: 2 - 6 VA

## Relay Electrical Ratings

	120V	208/240V
<b>NO Contact</b>		
Full-load amps	16 A	8 A
Locked rotor amps	96 A	48 A
Resistive amps	15 A	8 A
Horsepower	1 hp	1 hp
<b>NC Contact</b>		
Full-load amps	5.8 A	2.9 A
Locked rotor amps	34.8 A	17.4 A
Resistive amps	5.8 A	2.9 A
Horsepower	1/4 hp	1/4 hp

Pilot Duty: 125 VA at 120/208/240 VAC

## Control Ambient Temperature

Operating	-20°F to 140°F (-29°C to 60°C)
Storage	-40°F to 176°F (-40°C to 80°C)
Ambient Humidity	0 to 95%, RH, Non-condensing
0 to 10 V Output Impedance	1K
Enclosure	NEMA 1, Plastic
Agency Approvals	UL Listed, File E94419, Guide XAPX CSA Certified, File LR68340, Class 4813 02

## ETC ORDERING INFORMATION

Code Number	Input Voltage	No. of Stages	0 - 10 V Output
ETC-111000-000	120/240	1	No
ETC-111100-000	120/240	1	Yes
ETC-112000-000	24	1	No
ETC-112100-000	24	1	Yes

## OPERATION

### Liquid Crystal Display (LCD)

The LCD display provides a constant readout of the sensor temperature and indicates if the output relay is energized. When the S1 annunciator is constantly illuminated during operation, the relay is energized. The display is also used in conjunction with the keypad to allow the user to adjust the setpoint temperature, differential and heating/cooling modes.

### Control Setup

The temperature setpoint refers to the temperature at which the normally open (NO) contacts of the output relay will open. Determine the load (s) to be controlled and the operating mode required, cooling or heating. Refer to Figure 1 for a visual representation.

- When the cooling mode is chosen, the differential is above the setpoint. The relay will de-energize as the temperature falls to the setpoint.
- When the heating mode is chosen, the differential is below the setpoint. The relay will de-energize as the temperature rises to the setpoint.

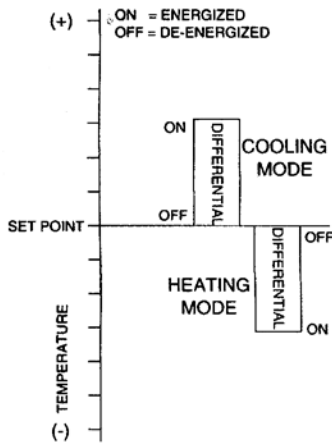


Figure 1: Setpoint and Differential Settings. Diagram indicates relay on and off points in either the heating or cooling modes.

### Programming Steps and Display

The ETC can be programmed in four simple steps using the LCD display and the three keys on the face of the control.

- Step 1- To start programming, press the **SET** key once to access the Fahrenheit/Celsius mode. The display will show the current status, either **F** for degrees Fahrenheit or **C** for degrees Celsius. Then press either the up or down arrow key to toggle between the **F** or **C** designation.
- Step 2- Press the **SET** key again to access the setpoint. The LCD will display the current setpoint and the **S1** annunciator will be blinking on and off to indicate that the control is in the setpoint mode. Then press either the up key to increase or the down key to decrease the setpoint to the desired temperature.
- Step 3- Press the **SET** key again to access the differential. The LCD will display the current differential and the **DIF 1** annunciator will be blinking on and off to indicate that the control is in the differential mode. Then press either the up key to increase or the down key to decrease the differential to the desired setting.
- Step 4- Press the **SET** key again to access the cooling or heating mode. The LCD will display the current mode, either **C1** for cooling or **H1** for heating. Then press either the up or down key to toggle between the **C1** or **H1** designation. Press the **SET** key once more and programming is complete.

Step	Annunciator	Description	Display
1	<b>F</b> or <b>C</b>	Fahrenheit or Celsius Scale	
2	<b>S1</b> (blinking)	Setpoint Temperature	
3	<b>DIF 1</b> (blinking)	Differential Temperature	
4	<b>C1/H1</b>	Cooling or Heating Mode	

**NOTE:** The ETC will automatically end programming if no keys are depressed for a period of thirty seconds. Any settings that have been input to the control will be accepted at that point.

All control settings are retained in non-volatile memory if power to ETC is interrupted for any reason. Re-programming is not necessary after power outages or disconnects unless different control settings are required.

### Lockout Switch

The ETC is provided with a lockout switch to prevent tampering by unauthorized personnel. When placed in the **LOCK** position, the keypad is disabled and no changes to the settings can be made. When placed in the **UNLOCK** position, the keypad will function normally.

To access the lockout switch, disconnect the power supply and open the control. The switch is located on the inside cover about 2 inches above the bottom. (see Figure 2). To disable the keypad, slide the switch to the left **LOCK** position. To enable the keypad, slide the switch to the right **UNLOCK** position. All ETC controls are shipped with this switch in the **UNLOCK** position.

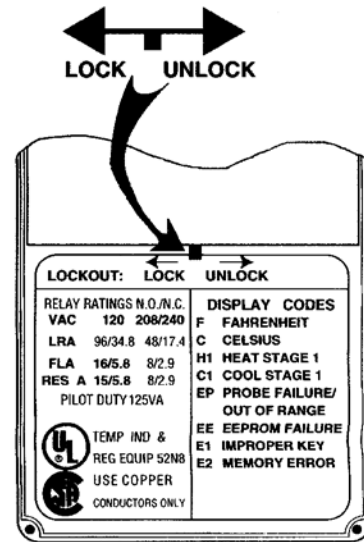


Figure 2: Lockout Switch

## TROUBLESHOOTING ERROR MESSAGES

### Display Messages

- E1** - Appears when either the up or down key is pressed when not in the programming mode.  
**To correct:** If the E1 message appears even when no keys are being pressed, replace the control.
- E2** - Appears if the control settings are not properly stored in memory.  
**To correct:** Check all settings and correct if necessary.
- EP** - Appears when the probe is open, shorted or sensing a temperature that is out of range.  
**To correct:** Check to see if the sensed temperature is out of range. If not, check for probe damage by comparing it to a known ambient temperature between -30°F and 220°F. Replace the probe if necessary.
- EE** - Appears if the EEPROM data has been corrupted.  
**To correct:** This condition cannot be field repaired. Replace the control.
- CL** - Appears if calibration mode has been entered.  
**To correct:** Remove power to the control for at least five seconds. Reapply power. If the **CL** message still appears, replace the control.









# OWNER'S MANUAL

Models: RS7200 • RS7300 • RS7400 • RS7500

