

# WOOD MASTER<sup>®</sup> CleanFire

OUTDOOR WOOD FURNACE

## OWNER'S MANUAL

CLEANFIRE 900



**WARNING:** If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **WHAT TO DO IF YOU SMELL GAS**
  - Do not try to light any appliance.
  - Do not touch any electrical switch.
  - Immediately call your gas supplier. Follow the supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.



**SAVE THESE  
INSTRUCTIONS**

(p/n 9001005) - REV. C



WoodMaster, Inc. • 20502 160th Street • Greenbush, MN 56726  
WoodMaster.com

The CleanFire outdoor hydronic heater by WoodMaster is listed by OMNI-Test Laboratories to the applicable portions of the following standards: UL 2523-2018 Solid Fuel-Fired Hydronic Heating Appliances, Water Heaters and Boilers, CAN/CSA B415.1-10 (R2015) Performance Testing of Solid-Fuel-Burning Heating Appliances, CSA-B366.1-11 (R2015) Solid-Fuel-Fired Central Heating Appliance, ASTM E2618-13 Standard Test Method for Measurement of Particulate Emissions and Heating Efficiency of Solid Fuel-Fired Hydronic Heating Appliances, ASTM E2515-11 Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel.

The CleanFire includes two 4-foot stainless steel insulated chimney sections (8" in diameter, p/n 10508 - CleanFire 900). Use only stainless steel solid fuel chimneys specified by WoodMaster. Maximum draft is marked on nameplate.

French Owner's Manual is available upon request from your dealer  
(Manuel d'installation en français disponible sur demande auprès de votre revendeur)

CleanFire 900                      Annual Efficiency Rating\*: 92.3% (lower heating value), 85.6% (higher heating value)  
                                            Manufacturer's Rated Heat Output Capacity: 400,000 Btu/hr | Range\*\*: 0 to 378,339 Btu/hr.  
                                            Water Capacity: 420 gal. | Weight: 2,714 lbs

\*Performance is a product of the combustion rate, combustion efficiency and heat exchange efficiency with a single fuel load without refueling. Results vary based on wood species, wood quality, wood quantity and moisture content. Efficiencies are determined under the same test conditions using higher heating value, lower heating value and annual fuel utilization efficiency (AFUE).

- This heater meets the 2020 U.S. Environmental Protection Agency's cord wood emission limits for wood heaters sold after May 15, 2020. Under specific test conditions this heater has been shown to deliver heat at rates shown for the respective model above\*\*.
- This wood heater has a manufacturer-set minimum low burn rate that must not be altered. This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.
- DO NOT OVERFIRE THIS HEATER. Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater.
- Any person(s) operating a hydronic heater must comply with all applicable laws, including but not limited to local ordinances.
- Improper use or failure to maintain the hydronic heater may cause nuisance conditions. The person(s) operating a hydronic heater is/ are responsible for operation in a manner that does not create a nuisance condition. Meeting the setback distance and stack height recommendations from the manufacturer and requirements in applicable State and local regulations may not always be adequate to prevent nuisance conditions in some areas due to terrain or other factors.
- Operating an outdoor furnace may not be suitable to some individuals' abilities or lifestyles. Be sure to review the Owner's Manual for the appliance with your dealer.

**- Register at time of purchase for 25 Year Limited Warranty -**

**Verify your warranty and check status of water samples at: [WoodMaster.com/w25](http://WoodMaster.com/w25)**

For parts and accessories, service or repairs, call your authorized WoodMaster dealer or heating contractor. Record the information below for future reference.

|                 |               |                   |
|-----------------|---------------|-------------------|
| Model           | Serial Number | Installation Date |
| Dealership Name |               | Phone Number      |
| Owner Name      |               |                   |

# Contents

|                                                                                    |           |
|------------------------------------------------------------------------------------|-----------|
| WoodMaster Online Resources .....                                                  | iv        |
| EPA Resources .....                                                                | iv        |
| Labeling and Terminology .....                                                     | 1         |
| <b>Important Precautionary Information .....</b>                                   | <b>2</b>  |
| Foundation .....                                                                   | 4         |
| Access to Ports on Outdoor Furnace .....                                           | 5         |
| Ground Rod Kit .....                                                               | 6         |
| Furnace Installation - Connecting to Your Existing System .....                    | 6         |
| Outdoor Wood Furnace Best Burn Practices .....                                     | 8         |
| Chimney Installation .....                                                         | 8         |
| <b>WATER QUALITY AND MAINTENANCE .....</b>                                         | <b>11</b> |
| 1. Test Supply Water .....                                                         | 11        |
| 2. Check the Vent Cap .....                                                        | 11        |
| 3. Check Heating System for Leaks .....                                            | 11        |
| 4. Cover Supply and Return Lines .....                                             | 12        |
| 5. Add MolyArmor through Vent Pipe .....                                           | 12        |
| 6. Fill Outdoor Furnace with Water and Purge Air .....                             | 12        |
| 7. Immediately Start the Pump(s); then Heat the System Water to 185°F (85°C) ..... | 13        |
| 8. Test the Treated System Water .....                                             | 14        |
| <b>Send in Initial Water Sample .....</b>                                          | <b>15</b> |
| Initial Water Sample .....                                                         | 15        |
| Deferred Installation .....                                                        | 15        |
| Check Status of Water Sample .....                                                 | 15        |
| Annual Water Sample .....                                                          | 15        |
| <b>System Maintenance .....</b>                                                    | <b>16</b> |
| Water Test Kits and Test Results .....                                             | 16        |
| Flushing the System .....                                                          | 18        |
| Adding Antifreeze to Outdoor Furnace System .....                                  | 19        |
| <b>Wood Selection and Preparation .....</b>                                        | <b>20</b> |
| <b>Operating Instructions .....</b>                                                | <b>21</b> |
| FIRESTAR COMBUSTION CONTROLLER .....                                               | 21        |
| How the CleanFire Works .....                                                      | 21        |
| Initial Fire Up - Start of Heating Season .....                                    | 23        |
| Adding Heat Load .....                                                             | 26        |
| Ash Removal Frequency .....                                                        | 26        |
| Adding Wood .....                                                                  | 26        |
| <b>Maintenance Schedule .....</b>                                                  | <b>31</b> |
| Control Locations .....                                                            | 32        |
| Routine Maintenance .....                                                          | 32        |
| Maintenance Sections .....                                                         | 33        |
| <b>Serviceable Items .....</b>                                                     | <b>45</b> |
| Firebox Door Hinge / Latch Bearing Adjustment .....                                | 45        |
| Firebox Door Seal .....                                                            | 45        |
| Reaction Chamber Door Seal .....                                                   | 47        |
| Heat Exchanger Door Seal .....                                                     | 48        |
| Circuit Breaker .....                                                              | 49        |
| Airbox Seal .....                                                                  | 50        |
| Air Tube And Refractory Modules .....                                              | 51        |
| Thermocouple .....                                                                 | 52        |
| Heat Exchanger Door Insulation .....                                               | 53        |
| Heat Exchanger Access Cover Insulation .....                                       | 54        |
| Combustion Air Tube / Front Air Channel .....                                      | 55        |
| <b>Troubleshooting .....</b>                                                       | <b>57</b> |
| <b>General Information .....</b>                                                   | <b>66</b> |
| <b>Wiring Diagram .....</b>                                                        | <b>67</b> |
| <b>Water Sample Information - CleanFire Models .....</b>                           | <b>68</b> |

## How to Use This Guide

The guide is divided into sections to help with the operation and maintenance of the outdoor furnace. If questions arise that are not answered with this manual, consult with your authorized WoodMaster dealer.

## WOODMASTER ONLINE RESOURCES

Enter **WoodMaster.com** in your browser or scan the code using any QR code reader app on your smartphone to access WoodMaster's library of information to help with installation, operation and maintenance of your WoodMaster outdoor furnace.

**Detailed Furnace Installation Variations** - <https://www.woodmaster.com/furnace-installation/>

View and/or download PDFs to assist in installation of your outdoor furnace. Information and examples regarding pumps, foundations, chimneys and support structures, ThermoPEX piping, and example configurations for a variety of heating configurations.



### Online Support Center

<https://support.woodmaster.com>

Enter your furnace serial number and find articles, answers, parts and more information.

*WOODMASTER*

## Online Support Center

### support.WoodMaster.com

Enter your serial number for information specific to your furnace.

Write your *serial number* here for future reference.



Videos to supplement the Owner's Manual are available at [www.youtube.com/@Wmfurnaces](http://www.youtube.com/@Wmfurnaces)  
Watch tips on initial startup, testing system water and more.

## EPA RESOURCES

**EPA's Burnwise Program** - <https://www.epa.gov/burnwise>

**How to Use a Moisture Meter Video** - <http://www.youtube.com/watch?v=jM2WGgRcnm0>

EPA offers tips on how to properly use a moisture meter to test firewood before using in a wood-burning stove or fireplace. Wet wood can create excessive smoke which is wasted fuel.

**Split, Stack, Cover and Store Video** - <http://www.youtube.com/watch?v=yo1--Zrh11s>

EPA offers four simple steps to properly dry firewood before using in a wood-burning stove or fireplace. Wet wood can create excessive smoke which is wasted fuel. Burning dry, seasoned firewood with a moisture content of 20% or less can save money and help reduce harmful air pollution.

**Resources to Help Burn Wood the Right Way** - <https://www.epa.gov/burnwise/resources-help-you-burn-wood-right-way-and-promote-burn-wise-program>. Find tip sheets, brochure and flyers, and more information.

**NOTE: The warranty can be voided by operating a residential hydronic heater in a manner inconsistent with the Owner's Manual.**

### INSTALLATIONS IN MASSACHUSETTS:

1. All installation components must be products approved in the Commonwealth of Massachusetts by the Gas and Plumbing Board.
2. The maximum run of tubing from the water heater to a fan coil is 50 linear feet.
3. Persons operating this hydronic heater are responsible for operation of the hydronic heater so as not to cause a condition of air pollution as defined in 310 CMR 7.01(1).

## Labeling and Terminology

The outdoor furnace and this installation guide use the following terms and symbols to bring attention to the presence of hazards of various risk levels and important information concerning the use and maintenance of the outdoor furnace.

### ⚠ DANGER

This symbol and text indicate an imminently hazardous situation which, if ignored, will result in death or serious injury.

### ⚠ WARNING

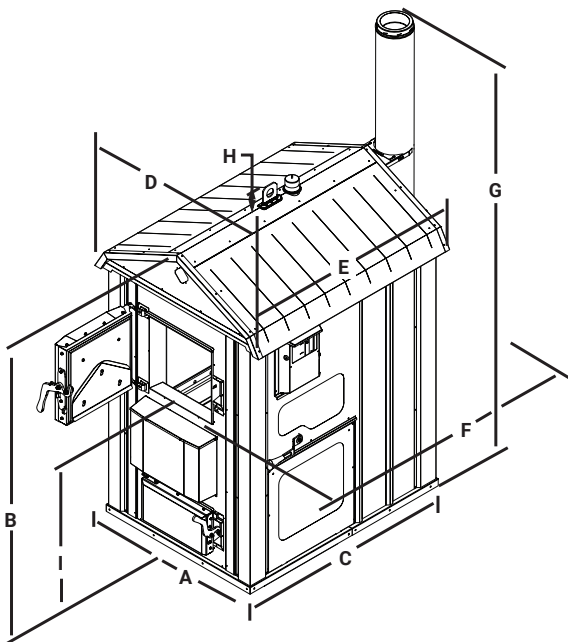
This symbol and text indicate the presence of a hazard which can cause severe personal injury or death to an operator or bystander, or substantial property damage if ignored.

### ⚠ CAUTION

This symbol and text indicate the presence of a hazard which can cause minor personal injury or property damage if ignored.

**NOTE:** Indicates supplementary information worthy of particular attention relating to installation, operation, or maintenance of the outdoor furnace but is not related to a hazardous condition.

Be sure to follow all instructions and related precautions as they are meant for your safety and protection. Store this manual in a readily accessible location for future reference.



### CleanFire 900 Measurements

|     | A   | B    | C   | D     | E   | F    | G   | H  | I  |
|-----|-----|------|-----|-------|-----|------|-----|----|----|
| in. | 56  | 87.5 | 69  | 58.5  | 70  | 89.5 | 163 | 5  | 39 |
| cm  | 142 | 222  | 175 | 148.5 | 178 | 227  | 414 | 13 | 99 |

- Measurement (F) is from firebox door to chimney inspection cover.
- Measurement (G) includes two 4 ft (1.2 m) chimney sections.
- All measurements are approximate

## Important Precautionary Information

Be sure to read carefully and understand these precautions before, during and after the installation, operation and maintenance of the furnace.

**NOTE:** All operations must be in accordance with local and state codes which may differ from the information in this manual.

### ⚠ CAUTION

This outdoor furnace is not intended to be the only source of heat. In the event of a prolonged power failure, a generator may be used to prevent lines from freezing. Should the outdoor furnace be left unattended, run out of fuel or require service, an alternate heating source in the building being heated should be in place to prevent damage caused by freezing.

### ⚠ WARNING

This outdoor furnace and/or chimney is not intended or safety tested to be used or installed in a building where contents of that building could be damaged or where a financial loss could occur from smoke, soot, fire or water.

### ⚠ WARNING

The outdoor furnace vent cap must fit loosely on the vent opening. Do not force the cap down or try to seal it tightly onto the vent pipe. Do not extend or restrict the vent pipe or opening. **DO NOT ALLOW THE OUTDOOR FURNACE TO BE PRESSURIZED.**



Vent Cap Must Fit Loosely



### ⚠ WARNING

Be sure the outdoor furnace is filled with water before firing. Never fire the outdoor furnace when the water level is more than 1" (2.5 cm) below the FULL mark on the sight gauge. MolyArmor 350 must be added before the initial fill (see Water Quality and Maintenance).

### ⚠ WARNING

Disconnect the electrical power to the outdoor furnace before replacing an electrical component.

### ⚠ WARNING

Do not attempt service inside the electrical control panel without first disconnecting the electrical power at the main power source.

**NOTE:** Any electrical installation should be done by a qualified installer in accordance with applicable codes.

### ⚠ WARNING

Allow the outdoor furnace to thoroughly cool and completely clean out the firebox before draining water from the outdoor furnace. If the water in the outdoor furnace ever boils, be sure to check the water level and restore to full. If water is added, the proper level of MolyArmor 350 (p/n 2900631) must be maintained.

### ⚠ WARNING

When cleaning the outdoor furnace, be careful not to spill any coals.

### ⚠ WARNING

**ALWAYS** store ash in a covered non-combustible container.

### ⚠ WARNING

Maintain the following clearances from combustibles for the furnace installation:

- 44" (112 cm) from the back
- 12" (30.5 cm) from the sides
- 48" (122 cm) from the front
- 18" (46 cm) from chimney inspection cover
- The foundation must be noncombustible

### ⚠ WARNING

Do not allow combustible materials (straw, hay or wood) near the outdoor furnace. Keep the perimeter of the outdoor furnace clear and clean.

**⚠ WARNING**

For fire safety, keep all combustible materials at least six feet (two meters) away from the outdoor furnace, especially around the door area. Debris of wood chips and other combustibles in the area may be easily ignited if a hot coal is spilled out of the firebox and left unnoticed.

**⚠ WARNING**

The firebox door must be closed and latched at all times except when filling the firebox with wood. Leaving the firebox door open may lead to a runaway fire. In the event of a runaway fire, close the firebox door. In the event of a chimney or soot fire, close the firebox door and make sure power is off to the outdoor furnace.

**⚠ WARNING**

All covers must be maintained at all times except during maintenance, inspection and service.

**⚠ WARNING**

When opening the firebox door, the door switch will shut off the primary air actuator motor while the firebox door is open. Do NOT disable the door switch.

**NOTE:** The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax and similar substances for the purpose of starting a fire in an affected wood heater.

**NOTE:** Do not use chemicals or fluids to start the fire. Use kindling or gas-fired wood ignition option to start an initial fire.

**NOTE:** The sight gauge valve should always be closed, except when checking water level. Water will automatically drain from the sight gauge tube when the valve is closed. Remember that this type of valve requires only 1/4 turn to open or close.

**⚠ WARNING**

This heater is designed to burn natural wood only. **DO NOT BURN:** unseasoned wood, treated wood, colored paper, cardboard, trash or garbage.

**NOTE:** Chloride or sulfurous gases can be generated if plastic or rubber is burned and will mix with the moisture from the wood and form hydrochloric or sulfuric acids in the firebox, creating corrosion.

**NOTE:** This outdoor furnace is not to be used with an automatic stoker.

**⚠ CAUTION**

This outdoor furnace is not to be connected to a chimney flue serving another appliance.

**⚠ WARNING**

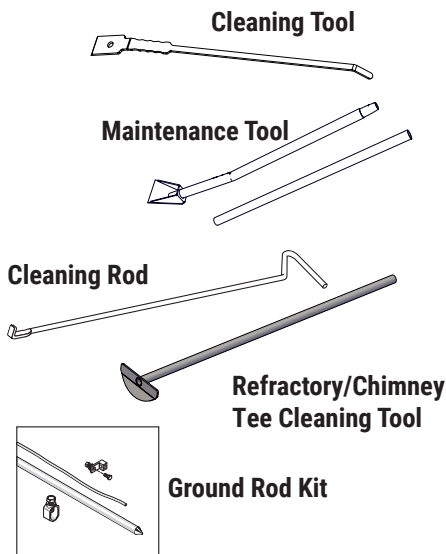
When adding wood to the firebox, be careful not to get pinched between the wood and the door frame, or any part of the outdoor furnace. Use extreme care with large pieces of wood that may be difficult to handle.

**NOTE:** At least one circulation pump must run continuously to ensure proper operation of the outdoor furnace.

## Tools/Ground Rod Kit

Included with each new furnace are tools that are invaluable for maintenance and cleaning and a Ground Rod Kit for electrically grounding the furnace. Use the **maintenance tool** to clean the firebox and to remove ash from the Reaction Chamber. Use the **cleaning tool** to clean the heat exchangers. The maintenance tool and cleaning tool are also used for cleaning the firebox and door frame. The **cleaning rod** can be used to break up heavy or solidified ash in the firebox. It is also used to clean the heat exchangers. The **Refractory/Chimney Tee cleaning tool** is used to clean ash from the Reaction Chamber and to clean the chimney tee.

Refer to the Maintenance section for more information.



## Foundation

The outdoor furnace may be installed directly on stable, level ground without the necessity of a foundation, although installing the outdoor furnace on a foundation offers many advantages. The outdoor furnace is less likely to move due to frost heaving. A foundation keeps the area directly around the outdoor furnace free of standing water and can help to keep unwanted pests out. It can also raise the furnace up to provide a more comfortable height of the firebox door opening.

If the ground is unstable, one option is to use patio blocks under the perimeter of the base. Another option is to pour a concrete foundation.

To install the outdoor furnace on a concrete foundation, refer to the illustration for dimensions and for the location of the hollowed-out area for each model. A 4" to 6" (10 to 15 cm) thick concrete slab works well; however, a thicker slab may be used to obtain the desired door opening height.

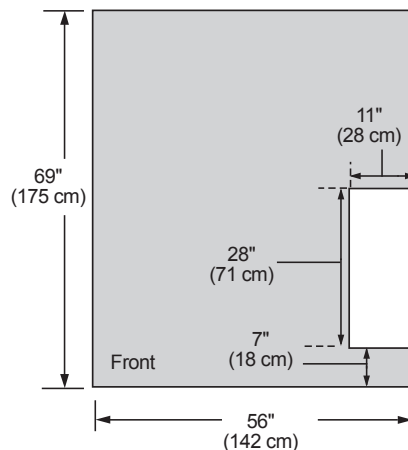
If the area for the concrete slab is unstable and/or affected by frost heaving, consider installing 2" closed-cell insulation beneath the front portion of the slab and under the area of the ground used for walking.

### ⚠ CAUTION

Do not use any combustible materials for the foundation.

**NOTE:** The installation surface or foundation must be noncombustible. The hot supply and return lines must also be protected from possible exposure to sunlight, fire or physical damage that may be caused by an occurrence outside the outdoor furnace enclosure. Foundations may consist of concrete, crushed rock or patio blocks.

**CleanFire 900**  
(Foundation Optional)



### ⚠ CAUTION

Do not use any combustible materials for the foundation.

Outdoor furnace must be installed on a noncombustible surface or foundation that incorporates an enclosure that will prevent supply and return lines from possible exposure to sunlight, fire, or physical damage that may be caused by an occurrence outside the outdoor furnace enclosure. Foundation may consist of concrete, crushed rock, or patio blocks.

## Access to Ports on Outdoor Furnace

Ports are provided that allow mounting circulation pumps on the outdoor furnace. Refer to the illustrations in this section for proper supply and return line and pump installations for your model.

**NOTE:** The Installation Guide provides more information on pump selection. For even more detailed information, see the Hydronic Component Selection Guide (p/n 2482), available from your WoodMaster dealer.

**NOTE:** At least one circulation pump must run continuously to ensure proper operation of the outdoor furnace.

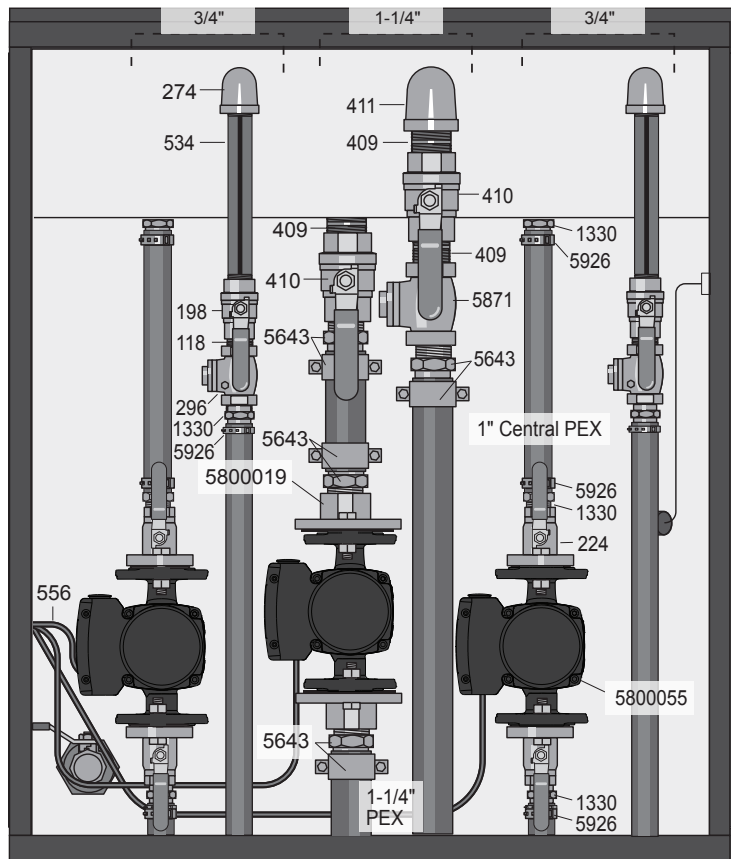
### CleanFire 900 Model – 3-Pump Configuration

#### 3 - Pump Parts List\*

| 3/4" Supply |         |                                       |
|-------------|---------|---------------------------------------|
| Qty         | p/n     | Description                           |
| 6           | 1330    | MPT to PEX, 3/4" x 1"                 |
| 6           | 5926    | Clamp Crimp Ring, 1"                  |
| 2           | 224     | Isolation Flange Kit, 3/4"            |
| 2           | 5800055 | Pump, UPMS 20-58 F                    |
| 2           | 556     | Power Supply Cord, 32" 1" Central PEX |

| 3/4" Return |      |                         |
|-------------|------|-------------------------|
| Qty         | p/n  | Description             |
| 2           | 274  | 90° Street Elbow, 3/4"  |
| 2           | 534  | Nipple, 3/4" x 7"       |
| 2           | 198  | Ball Valve, 3/4"        |
| 2           | 118  | Close Nipple, 3/4"      |
| 2           | 296  | Swing Check Valve, 3/4" |
| 2           | 1330 | MPT to PEX, 3/4" x 1"   |
| 2           | 5926 | Clamp Crimp Ring, 1"    |

| 1-1/4" Supply & Return |         |                           |
|------------------------|---------|---------------------------|
| Qty                    | p/n     | Description               |
| 3                      | 409     | Close Nipple, 1-1/4"      |
| 2                      | 410     | Ball Valve, 1-1/4"        |
| 4                      | 5643    | Brass Clamp, 1-1/4"       |
| 1                      | 5800019 | Pump Flange Kit, 1-1/4"   |
| 1                      | 5871    | Swing Check Valve, 1-1/4" |
| 1                      | 5800055 | Pump, UPMS 20-58 F        |
| 1                      | 556     | Power Supply Cord, 32"    |
| 1                      | 411     | 90° Street Elbow, 1-1/4"  |



\*Parts and accessories sold separately.  
Pump size may vary.

For illustration purposes only.

**NOTE**  
The Ground Rod Kit (p/n 6593), included with the outdoor furnace, must be installed with every furnace.

### Detailed Furnace Installation Variations

Visit [WoodMaster.com](http://WoodMaster.com) to access a library of detailed illustrations for connecting to a wide variety of existing heating systems and for other heating options.

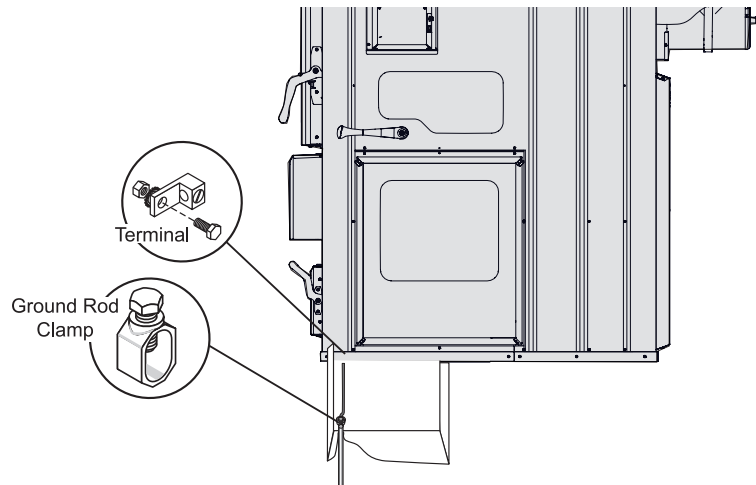
## Ground Rod Kit

The outdoor furnace must be electrically bonded to ground in accordance with the requirements of the authority having jurisdiction or, in absence of such requirements, with the National Electrical Code, ANSI/NFPA 70 and/or the Canadian Electrical Code Part 1, CSA C22.1 Electrical Code.

Install the Ground Rod Kit (p/n 6593) included with the outdoor furnace and connect it to the outdoor furnace.

1. In the water line trench near the outdoor furnace, drive the ground rod into the ground until the top of the ground rod is below the ground surface.
2. Route the ground wire from the ground rod under the outdoor furnace base and over to the frame of the outdoor furnace.
3. Secure the ground terminal with a cap screw (1/4" x 3/4"), star washer and nut. Secure the ground wire to the terminal; then secure the ground wire to the ground rod with the clamp. Tighten all hardware securely.

**NOTE: A hole for the ground terminal has been pre-punched in the outdoor furnace base near the pumps.**

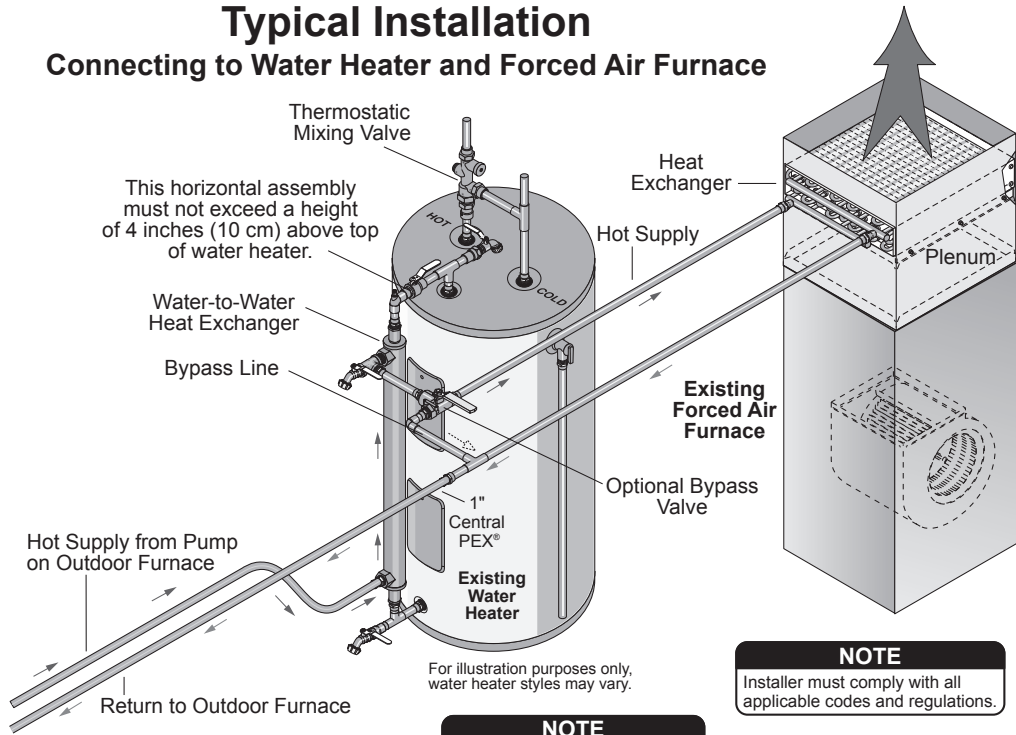


## Furnace Installation - Connecting to Your Existing System

A common installation is to connect the outdoor furnace to an existing water heater and then to an existing forced air system. A water-to-air heat exchanger is mounted in the plenum or duct work of the existing furnace. Heated water from the outdoor furnace either continuously flows through the water-to-air heat exchanger or is diverted through a 3-way zone valve. When the thermostat senses the need for heat, the fan on the existing furnace forces air through the heat exchanger, transferring heat throughout the existing ductwork.

**NOTE: There are numerous ways to connect to your heating system. Refer to the Outdoor Furnace Installation Guide for other installations.**

## Typical Installation Connecting to Water Heater and Forced Air Furnace

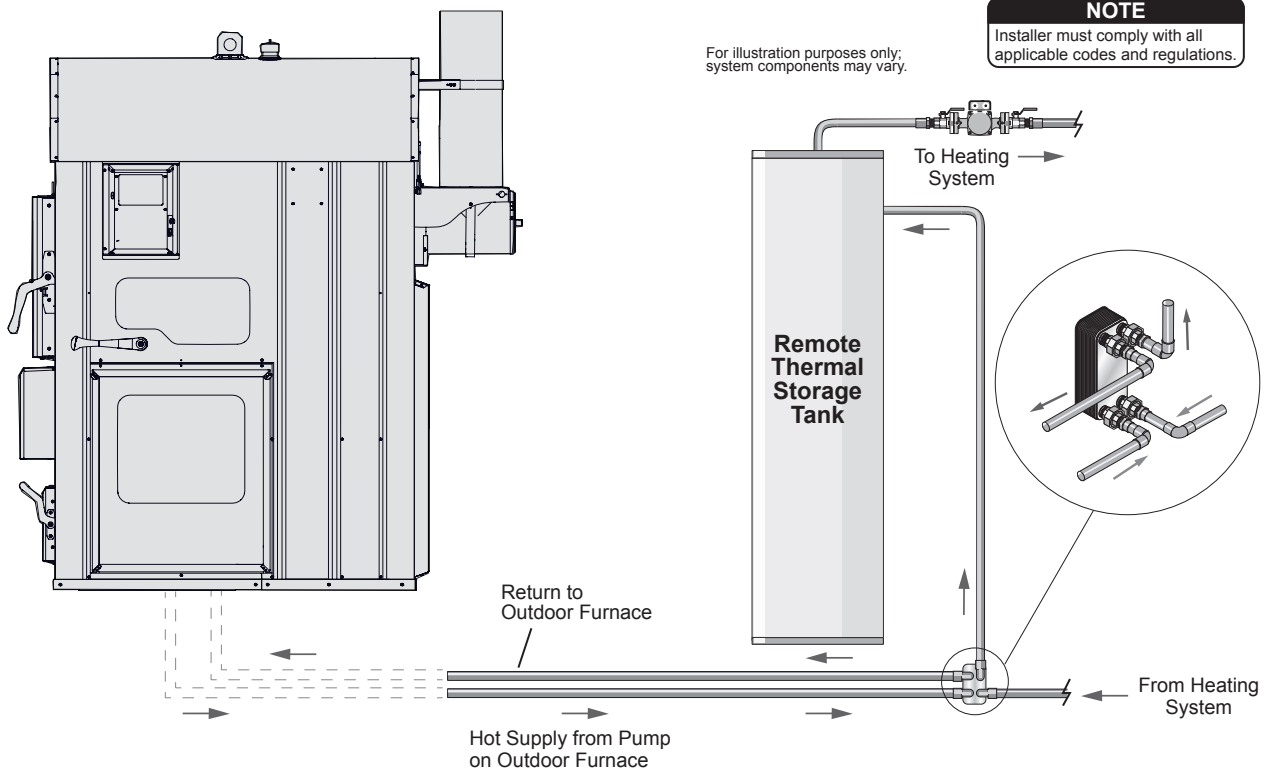


**NOTE: A certified electrician must do the electrical installation.**

**NOTE**  
Any electrical installation should be done by a qualified installer in accordance with applicable codes.

**NOTE**  
Installer must comply with all applicable codes and regulations.

## Remote Thermal Storage Installation Connecting to Remote Thermal Storage Tank



**NOTE**  
Installer must comply with all applicable codes and regulations.

## 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. **CHIMNEY RECOMMENDATIONS:** In higher populated areas, extend the chimney to a height above the roofs of surrounding buildings.
6. Always remember to comply with all applicable state and local codes.

Be considerate of neighbors when operating your furnace. If you use your furnace in the summer months, be certain your chimney exhaust is not adversely affecting neighbors with open windows.

## Chimney Recommendations

In higher populated areas, extend the chimney to a height above the roofs of surrounding buildings. Use WoodMaster Chimney Extensions when extending the chimney. When only the standard eight feet (2.4 m) of chimney are used, the sections must be secured at the connection joint with four (4) screws to stabilize the extension.

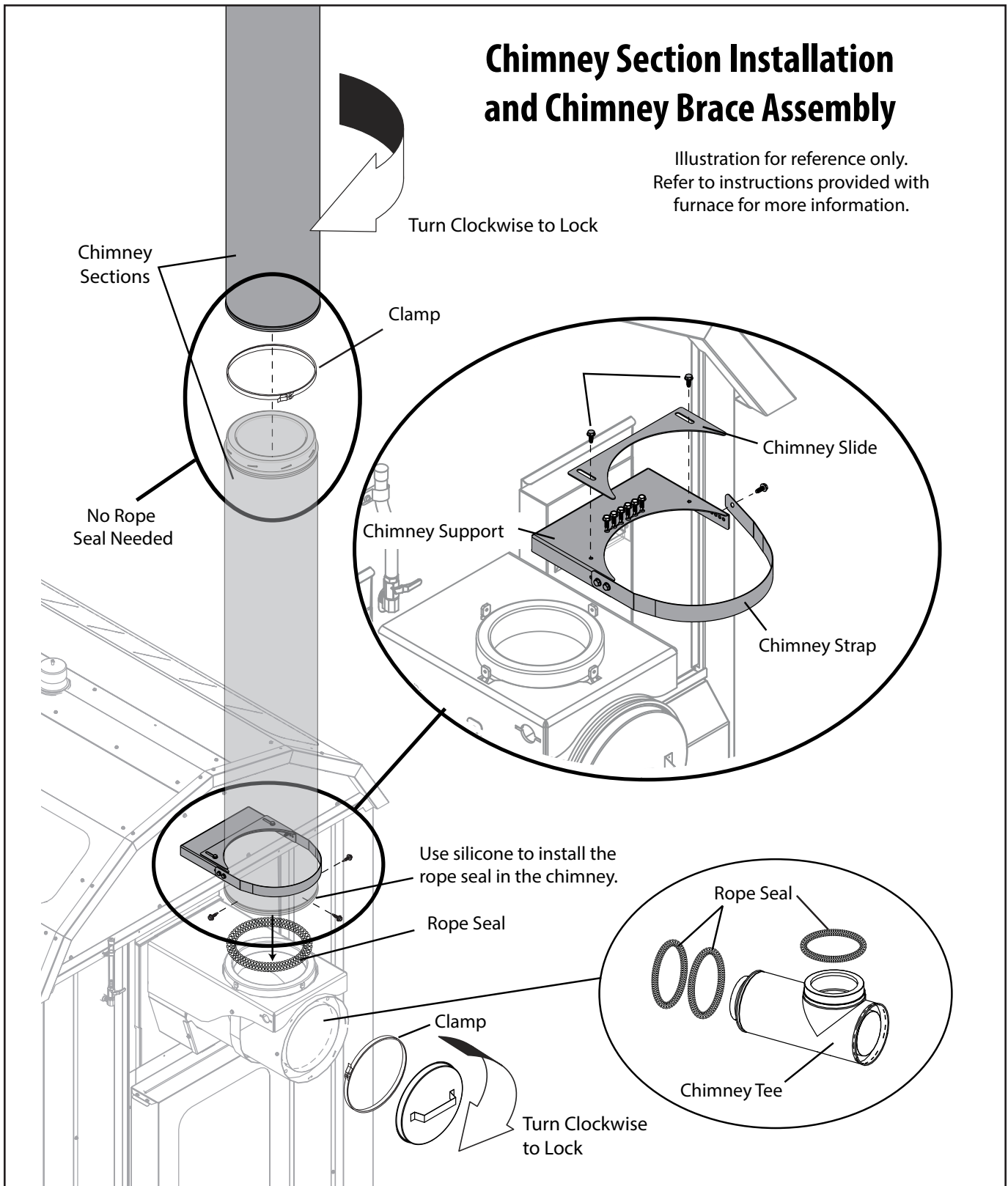
## Chimney Installation

**NOTE: Instructions for installing chimney sections and the chimney brace assembly are also provided with the furnace.**

1. Remove the two slotted hex screws securing the Chimney Slide to the Chimney Support.
2. Remove the six self-tapping screws from the slot in the Chimney Brace Support. These screws are used to assemble the chimney sections.
3. Remove the single slotted hex screw securing the Chimney Strap to the Chimney Brace Support.
4. Install the rope seal at the bottom of the first chimney section; then assemble the chimney as shown.
5. Mount the Chimney Slide to the Chimney Support with two slotted hex screws. Do not tighten completely to allow the Chimney Slide to move.
6. Level the chimney front to back; then position the Chimney Slide against the chimney and completely tighten the two slotted hex screws.
7. Wrap the Chimney Strap around the chimney and secure with a slotted hex screw.
8. Secure the base of the chimney with three self-tapping screws.
9. Secure the joint between the first two chimney sections with the clamp.

## Chimney Section Installation and Chimney Brace Assembly

Illustration for reference only. Refer to instructions provided with furnace for more information.



If extensions are added to the standard eight feet (2.4 m) of chimney, the chimney should be reinforced appropriately. The illustration shows chimney support recommendations when three or more sections are used. When adding sections of chimney, make sure that there is nothing within the fall zone of the chimney that could be damaged. If something is located within the fall zone and cannot be removed, guy wires or braces may need to be installed to prevent a falling chimney from causing damage.

**NOTE: If more than three 4-foot (1.2-m) sections of chimney are used, a support (e.g., a pole, pipe or other structural support) may be installed from the ground that can withstand wind. Other reinforcement recommendations are shown.**

**NOTE: For chimney extensions or chimney replacement, use only genuine WoodMaster chimney components. Parts are available from an authorized WoodMaster dealer.**

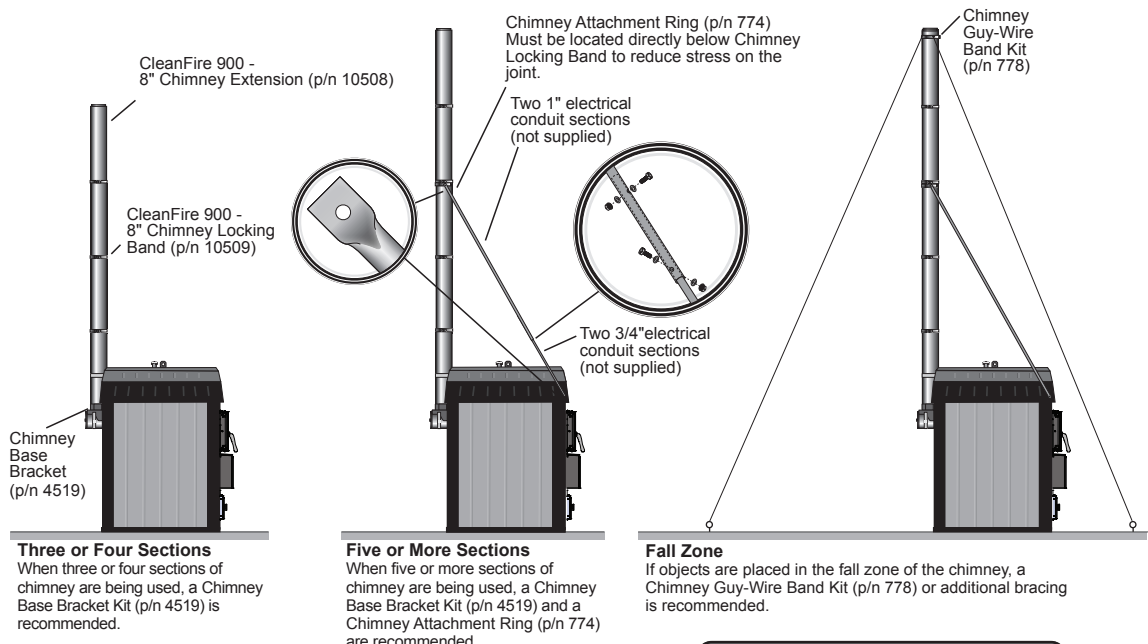
The installation of a spark arrestor is recommended, particularly where there are dry conditions or where there is combustible material near the unit, unless the installation of a spark arrestor is prohibited by local requirements.

**NOTE: If the screen is left on the chimney cap, the spark arrestor should be inspected and cleaned as needed.**

Use common sense to avoid potential fires, including exercising caution when disposing of ashes, cleaning and refueling. Keep all highly combustible materials (e.g., gasoline, propane, leaves, pine needles, etc.) away from an operating unit at all times. Take special precautions in windy conditions.

**NOTE: You may need to increase the chimney height if conditions occur that force exhaust to low levels.**

## Chimney Reinforcement Recommendations



### NOTE

- Additional bracing may be necessary in certain areas such as those subject to severe weather, winds, freezing rain, etc.
- Inspect all bracing bi-annually for integrity.

## WATER QUALITY AND MAINTENANCE

Follow the steps provided here to add MolyArmor 350 and to fill the outdoor furnace system for the first time, or any time the system has been completely drained and needs to be refilled.

Before you fire the outdoor furnace for the first time, it is very important to perform the following important steps in order.

### 1. Test Supply Water

Test a sample of the supply water (makeup water) that will be used to fill the outdoor furnace (softened water is recommended). Test strips for testing pH are included in the water test kit which is provided with the outdoor furnace.

1. Collect a small sample of the water to be used to fill the outdoor furnace in a clean container.
2. Dip a test strip from the test kit in the water sample for **1 second** and remove. Shake off excess liquid (very important to prevent water bleed from one pad to the other). Compare the pH test pad to the color chart at **30 seconds**.
3. If the pH level is between 6.5 and 8.0 and there are no other known water quality problems, then the outdoor furnace may be filled with this water.
4. Water that has a pH level of less than 6.5 or greater than 8.0, or that has other known water quality problems, should not be used to fill the furnace. Instead, water should be supplied from a different source.

### 2. Check the Vent Cap

If the vent cap has been secured with a wire tie-down, the wire tie-down **MUST** be removed before operating the furnace. If the vent cap is held in place by a spring retainer, the spring retainer can be left in place. The vent cap must fit loosely over the outdoor furnace vent.

### 3. Check Heating System for Leaks

Close the valves on the outdoor furnace before checking the heating system for leaks.

#### **⚠ CAUTION**

**Do not pressurize the outdoor furnace or damage could occur. Isolate the furnace when pressure testing by closing all of the valves on the outdoor furnace.**

Pressure-test the entire plumbing heating system. Apply 50 psi (3.5 kg/cm<sup>2</sup>) of air pressure for thirty minutes and closely monitor for any pressure loss. Inspect all fittings and hose ends for any signs of leakage using leak detection solution (leak soap); repair as necessary.

Release the pressure from the entire plumbing heating system and open the valves on the outdoor furnace.

## 4. Cover Supply and Return Lines

Backfill the trench for the supply and return lines. Enclose the area where the supply and return lines enter the outdoor furnace. Do not leave the PEX hot supply and return lines exposed to sunlight as exposure to UV rays will damage them.

## 5. Add MolyArmor through Vent Pipe

### ⚠ CAUTION

**Avoid damaging your furnace and voiding your warranty. Add water treatment BEFORE adding water to the system. Water treatment in your outdoor furnace is just as important as the oil in a car's engine.**

MolyArmor 350 Corrosion Inhibitor (p/n 2900630) gives optimum protection for the furnace water jacket and system parts when it is used to initially treat the water and is maintained at a minimum of 350 ppm of moly and pH level between 8.0 and 9.5.

**NOTE: The recommended minimal treatment amounts are based on an average heating system with less than 50 feet of ThermoPEX, one heat exchanger in a forced-air furnace and a heat exchanger on a domestic water heater.**

**NOTE: If the system has a larger than normal water capacity, more MolyArmor 350 should be added at a recommended rate of 6.5 oz. (190 ml) per 10 gallons (37.8 liters) of system water. One gallon (3.78 liters) of MolyArmor 350 Corrosion Inhibitor will treat 200 gallons (757 liters) of system water.**

| MOLYARMOR 350 MINIMAL TREATMENT AMOUNTS |             |
|-----------------------------------------|-------------|
| CleanFire 900                           | 3.5 gallons |

1. Add the recommended amount of MolyArmor 350 Corrosion Inhibitor (or more depending on the water capacity of the heating system) through the vent pipe on the outdoor furnace.

**NOTE: Be sure to add enough MolyArmor 350 to obtain at least 350 ppm moly. There are no negative effects from adding more than the recommended amount of MolyArmor 350.**

## 6. Fill Outdoor Furnace with Water and Purge Air

**NOTE: If adding antifreeze to the system, refer to Adding Antifreeze to Outdoor Furnace System section for important information.**

### ⚠ CAUTION

**If using antifreeze, use only a nontoxic boiler-type antifreeze. It is imperative that the entire system contain at least 30% antifreeze concentration mixed with water that is 6.5 to 8.0 pH. Softened water is recommended, if available. Do not use reverse osmosis or deionized water that has very low pH. Be sure to adhere to all warnings and precautions on the antifreeze label.**

**NOTE:** If the outdoor furnace is being filled with water when the temperature is below freezing, circulate the water immediately after filling to prevent freezing the water lines.

**NOTE:** The circulation pump(s) must be installed in the hot supply line(s).

**NOTE:** All air must be purged from the water lines when filling the system. Be sure to purge the air from each pump circuit from the outdoor furnace.

**NOTE:** All valves in the outdoor furnace system should be opened before starting this procedure.

1. Connect a garden hose to the water source to be used to fill the outdoor furnace. Purge the garden hose of any impurities by running water through it until the water is clear.
2. Connect the hose to the drain valve on the outdoor furnace. Open the drain valve and fill with water to thoroughly mix the MolyArmor 350, which is heavier than water.

## 7. Immediately Start the Pump(s); then Heat the System Water to 185°F (85°C)

### **⚠ CAUTION**

Be sure the outdoor furnace is filled with water before firing. Never fire the outdoor furnace when the water level is more than 1" (2.5 cm) below the FULL mark on the sight gauge.

**NOTE:** The sight gauge valve should always be closed except when checking water level. Water will automatically drain from the sight gauge tube. Remember that this type of valve requires only 1/4 turn to open or close.

1. Start the pump(s). Refer to Initial Fire Up - Start of Heating Season in the Owner's Manual to start the outdoor furnace. Bring the water temperature up to operating temperature (185°F or 85°C) for hours with the system circulating; then add water to the full mark. Continue to run the pump and circulate the water for 24 hours. If a multi-speed pump is used, set the pump on high.

**NOTE:** It is important to bring the water in the system up to operating temperature (i.e., 185°F or 85°C) immediately after filling the system and to circulate for at least 24 hours to kill bacteria. This also applies any time water is added to the system.

### **⚠ CAUTION**

The water in the system may be hot. Use caution and the appropriate personal protective equipment (PPE) when checking for leaks.

2. Check the system for leaks. Inspect all fittings and hose ends for any signs of leakage. Use several dry paper towels and wrap them around and squeeze each fitting, valve and pipe connection. The paper towels will get wet even if there is a very small leak. Immediately repair any leaks to eliminate the need for adding water. If a screw-type clamp has been used, it may be possible to stop a very slow leak at a hose clamp by tightening the clamp after the system has warmed up and the poly becomes more pliable. It might also be necessary to install a second hose clamp with the screw positioned on the opposite side.

**NOTE: After a week of operating, use the procedure in step 2 to check the system for leaks again.**

**NOTE: If water is ever added, it is important to bring the water in the system up to operating temperature (i.e., 185°F or 85°C) immediately. Refer to Water Quality and Maintenance in the Owner's Manual for water testing procedures. If indicated by test results, add MolyArmor 350 as required. Deterioration due to improper operation and/or maintenance is not covered by warranty.**

## 8. Test the Treated System Water

After circulating the heated water in the system for 24 hours, test the treated system water for the recommended moly (at least 350 ppm) and pH level (between 8.0 and 9.5).

### **⚠ CAUTION**

**The water in the sight gauge may be hot. Use caution when obtaining a sample.**

1. To obtain a system water sample, bend the sight gauge tube away from the outdoor furnace. Before collecting the sample, open the valve and drain about a quart of water from the sight gauge tube; then carefully fill the sample container without contaminating the sample. **Be sure to properly install the sight gauge tube and close the valve when finished.** The water in the sight gauge valve and tube will drain when the valve is closed.
2. Dip a test strip from the test kit in the water sample for **1 second** and remove. Shake off excess liquid (very important to prevent water bleed from one pad to the other). Compare moly test pad to the color chart within 10 seconds. The moly level must be **350 ppm or more**.
3. Compare pH test pad to the color chart at **30 seconds**. The pH of the treated water should be **between 8.0 and 9.5**. If the pH is higher than 10.0, dilute the water in the furnace by draining approximately 1/4 of the water from the furnace. Add MolyArmor 350 and refill with water that has a pH between 6.5 and 8.0. After refilling, circulate the water with furnace at operating temperature for at least 24 hours and test to confirm the moly is **350 ppm or more and the pH is between 8.0 and 9.5**.

## Send in Initial Water Sample

**NOTE: It is your responsibility as owner to ensure that your water sample information is accurate and that you submit your samples on a timely basis as required by the warranty for your stainless steel outdoor furnace. Failure to do so will result in a one year warranty.**

Your owner's packet contains a Water Sample Kit for submitting an initial water test and an informational sheet entitled Submitting Water Samples for Your Titanium Series Outdoor Furnace. Follow the instructions to collect and submit your initial water sample. Additional Water Samples Kits are available from your WoodMaster dealer.

**NOTE: Your water sample will be tested and must indicate acceptable levels of water treatment to qualify for the 25 year warranty.**

### Initial Water Sample

You are required to submit an initial water sample within 30 days of purchase of your outdoor furnace.

### Deferred Installation

If your outdoor furnace is not being installed within 30 days of purchase, you must email [service@woodmaster.com](mailto:service@woodmaster.com) with your name and your furnace serial number. When the furnace installation is complete, send the water sample **within 10 days of the initial fill**.

### Check Status of Water Sample

If you have provided an email address, you will receive an email with the results of your water test.

If you did not provide an email address, you will be notified by mail **ONLY** if your water sample test is NOT ACCEPTABLE. If your water sample test is acceptable, you will NOT be notified with a mailed letter. You can however check the status of your water test online.

Check the status of your water sample at:

**[WoodMaster.com/w25](http://WoodMaster.com/w25)**

You will need your serial number and postal code. Please allow 2-3 weeks for results to be available. For a deferred installation, your status will be available approximately 10 days after you email the deferred installation message.

### Annual Water Sample

You are required to submit a water sample yearly prior to the anniversary date of your initial installation. Record the anniversary date below:

\_\_\_\_\_  
**DATE OF INSTALLATION**

## System Maintenance

Maintaining the corrosion inhibitor at a proper level is imperative to preventing corrosion failures. To qualify for the 25 year warranty, you must follow the instructions in the Owner's Manual concerning initial water treatment and maintenance. When the outdoor furnace is initially put into service, and once a year after that, you are required to submit a water sample to confirm proper maintenance and water treatment. No warranty claim can be approved unless the outdoor furnace registration and the acceptable levels of water treatment are on file at WoodMaster.

Test the pH and moly levels after the first three months and every six months thereafter, and after adding water to furnace.

**NOTE: If using antifreeze, test the pH and Moly levels once each month. If the bacterial issues occur, the pH will decrease.**

## Water Test Kits and Test Results

| DATE | pH LEVEL | MOLY LEVEL |
|------|----------|------------|
|      |          |            |
|      |          |            |
|      |          |            |
|      |          |            |
|      |          |            |

Record the results of pH and Moly level tests in the table above. If additional space is needed, record on a separate sheet of paper.

It is very important to keep record of water test results (including the date, pH and Moly level). The pH and Moly test strips and indicator have a shelf life of approximately two years that can affect their accuracy. Test kits should be stored in a dry area at room temperature to obtain maximum accuracy over a longer period of time.

Biological contamination can occur if the furnace is not heated up to 185°F immediately after filling it with inhibitor and water as directed.

**NOTE: It should not be necessary to add water to the outdoor furnace more frequently than once every twelve months. If it is more frequent, either there is a leak in the system or the outdoor furnace is boiling because of improper operation or maintenance (see Troubleshooting Section in the Owner's Manual). Be sure to locate and repair the problem immediately. Frequently adding water can cause deterioration in the water jacket. ANY time water is added to the system, it is extremely important to bring the water temperature up to operating temperature (185°F) as soon as possible, even if it is during the off-season. Failure to bring the water in the system up to operating temperature immediately after filling the system can allow bacteria present in the water to multiply and may increase the potential for corrosion in the system.**

If the test indicates a significantly lower-than-recommended pH level (below 8.0), add MolyArmor to increase the pH level.

## **POST HEATING SEASON MAINTENANCE**

The water should be left in the outdoor furnace if the outdoor furnace is not being used for an extended period of time.

1. Refer to the Preventive Maintenance Schedule for a list of operations to perform.
2. Shut off the power supply to the outdoor furnace.
3. Place a cover over the chimney to keep rain from entering the outdoor furnace. Clean and oil the chimney flue to the firebox.

## Draining Treated System Water

MolyArmor 350 is composed of common materials. Molybdenum compounds characterized as nontoxic in US Public Health Bulletin 293, by the Federal Hazardous Substances Labeling Act, and by the Occupational Safety and Health Act. However, in keeping with good safety and environmental practices, dispose furnace water in accordance with federal, state and local regulation. Unless regulation prohibits, you may drain the outdoor furnace to a home septic system. If doing so, however, be careful not to overflow the septic system.

Do not drain the outdoor furnace in such a manner that the drain water could in any way contact surface water, stream, river, estuary (where a river meets a sea), lake, pond, ocean or other types of waters.

Do not drain to any location within 50 feet (15 meters) of any water well.

## Flushing the System

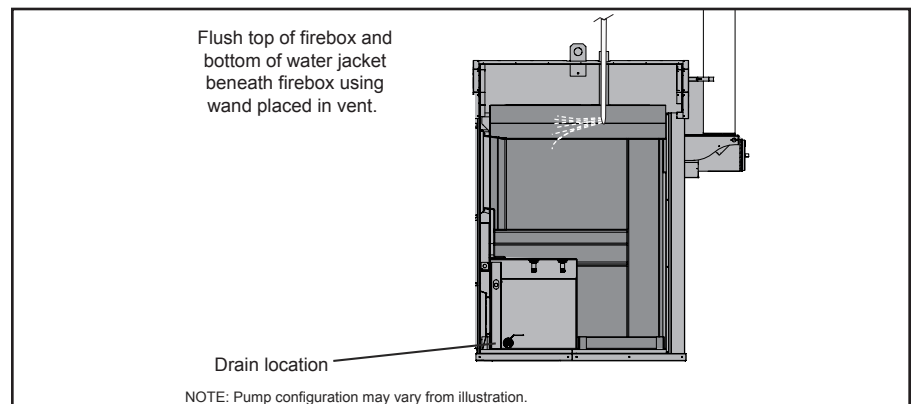
If the system water is brown or orange, it is an indication that the corrosion inhibitor level has not been maintained correctly and corrosion is present in the water jacket. Sludge Conditioner (p/n 166) can be used by circulating the recommended amount through the furnace **for one week** to help clean some of the corrosion from inside the water jacket before flushing, draining and refilling with water and the correct amount of MolyArmor 350.

**NOTE: Use one unit of Sludge Conditioner per 200 gallons of system water.**

1. De-energize the pump(s) and close the supply and return valves on the outdoor furnace. Remove the inspection panel and insulation covering the drain to gain access to the drain valve. Remove the cap and connect a hose to the drain.
2. Open the drain to drain the system; then flush the top of the firebox and bottom of the water jacket beneath the firebox using a wand placed in the vent.

### ⚠ CAUTION

**Completely clean out the firebox before draining water from the outdoor furnace.**



3. Close the drain valve securely and replace the cap on drain after flushing the outdoor furnace.
4. Add recommended amount of MolyArmor 350.
5. Fill the outdoor furnace following the procedure in Finalizing the Installation in the Installation Guide. Start the pump(s) and bring the water temperature up to operating temperature (185°F) for 24 hours with the system circulating to thoroughly mix the MolyArmor 350.

**NOTE: ANY time water is added to the system, it is extremely important to bring the water temperature up to operating temperature (185°F) as soon as possible, even if it is during the off-season. Failure to bring the water in the system up to operating temperature immediately after filling the system can allow bacteria present in the water to multiply, which may increase the potential for corrosion in the system.**

6. Insulate the area using a mat of fiberglass insulation.
7. Install the inspection panel and secure with self-tapping screws.

## Adding Antifreeze to Outdoor Furnace System

**If using antifreeze, use ONLY uninhibited, undyed, "raw" PGI (shorthand for Propylene Glycol Industrial grade) with softened water and add the correct amount of MolyArmor 350 to achieve 350 ppm moly and 8.0 to 9.5 pH levels.**

Most outdoor furnaces are installed **without** antifreeze when an existing heating system is in place and there is no anticipation of leaving the outdoor furnace unattended for extended periods of time (10 days or more). If the building being heated has an alternate heat source, system water may be kept from freezing by running the circulating pump(s) and drawing heat from the existing furnace or boiler in the home or building.

To prevent freezing if the outdoor furnace is not fired for extended time periods or if lengthy power outages are anticipated during cold weather, a nontoxic propylene glycol may be used in the system. Some types of antifreeze that contain various inhibitors have been known to create problems like coagulation and jelling. To prevent potential problems, **do not use propylene glycol that is premixed with inhibitors**. MolyArmor 350 is compatible with (raw) propylene glycol. It is important to use MolyArmor 350 with straight propylene glycol for corrosion protection. If adding antifreeze to the system, it is imperative that the entire system contain **at least 30% antifreeze concentration mixed with water that is 6.5 to 8.0 pH. Softened water is recommended, if available. Do not use reverse osmosis or deionized water** that has very low pH. Bacterial growth is likely to occur with low antifreeze concentrations and can cause corrosion in the furnace water jacket and/or clogging of heat exchangers. To confirm the antifreeze solution is adequate and to kill bacteria, immediately heat the system up to 185° F, allow the pumps to circulate for at least 24 hours and then obtain a sample of the system water. Using an antifreeze tester, the solution must be protected to 10°F (-12°C) or below.

**NOTE: If using antifreeze, test the pH and Moly levels once each month. If the bacterial issues occur, the pH will decrease.**

**NOTE: Be sure to adhere to all warnings and precautions on the antifreeze label.**

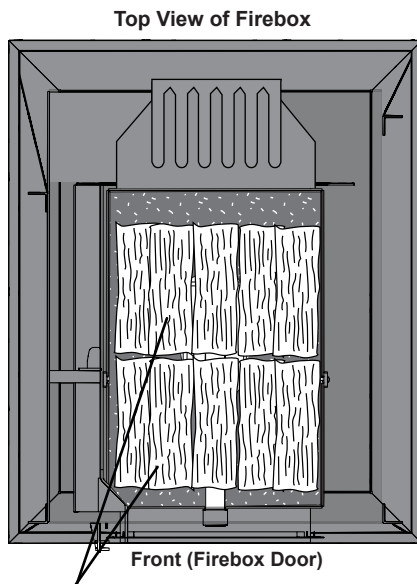
**NOTE: Do not use automotive or RV types of antifreeze.**

## Before You Start Operating Your CleanFire Outdoor Wood Furnace

Be sure to read carefully and observe all of the information in the entire Owner's Manual.

If any questions arise that cannot be answered by the information in this manual, be sure to contact your dealer.

**NOTE: If wood supply is mostly shorter pieces (e.g., 14"-16" long), it may be necessary to load pieces end-to-end (see example below).**



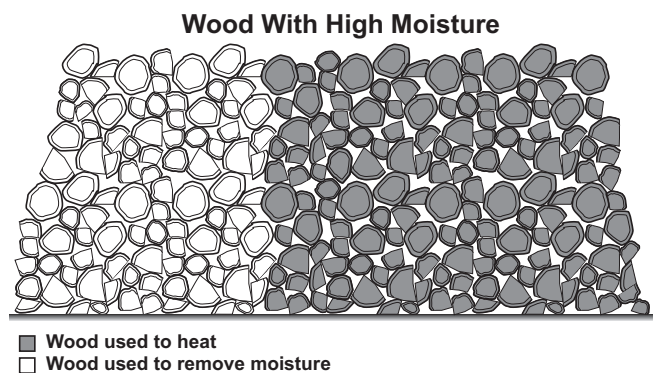
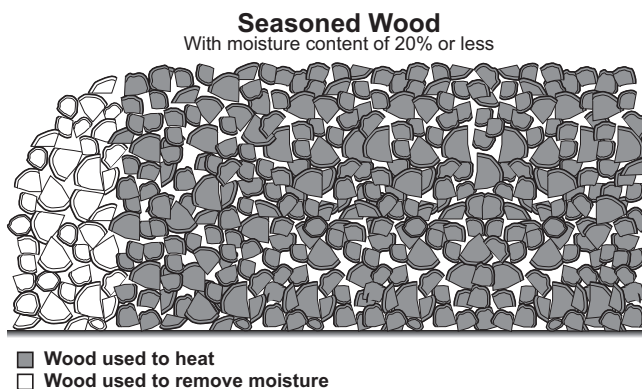
Load shorter wood pieces (14"-16") end-to-end

## Wood Selection and Preparation

For the best results, it is best to burn seasoned split wood. However, it may be possible to burn some unsplit wood with the split wood depending on quality, size, moisture content and wood type. Properly seasoned wood has a moisture content of 20% or less. It is darker, has cracks in the end grain, and sounds hollow when smacked against another piece of wood. Most wood needs to be split to dry down to 20% within a year. Wood between 4" and 8" (10 and 20 cm) in diameter works well in most cases. Pieces of wood that are too large can reduce output capacity because they burn slower.

- Wood that works well in most cases:
  - Is between 4" and 8" (10 and 20 cm) in diameter
  - Is approximately 60-70% of the length of the firebox
  - Typically weighs 10-15 pounds per cubic foot for heavy heat loads
- Pieces of wood that are too large can reduce output capacity because they burn slower. Wood that is too long can cause bridging.
- Seasoned wood burns more efficiently, minimizes the amount of creosote formation and reduces emissions.
- Maintain a quantity of smaller, drier pieces of wood for relighting the fire if the wood load is burned very low or becomes completely empty.
- Green wood contains about 50% moisture by weight. Energy is required to heat the wood and evaporate the moisture - energy which could have been used to provide heat for the home. The illustration below shows that burning drier, seasoned wood provides more energy for heating your home compared with burning green, unseasoned wood that uses more energy to evaporate the moisture and provides less energy for heating your home.

**NOTE: Do not store wood within the outdoor furnace installation clearances or within the spaces required for fueling, ash removal and other routine maintenance operations.**



# Operating Instructions

## FIRESTAR COMBUSTION CONTROLLER

Refer to the FireStar Combustion Controller Operation Manual for information about the combustion controller.

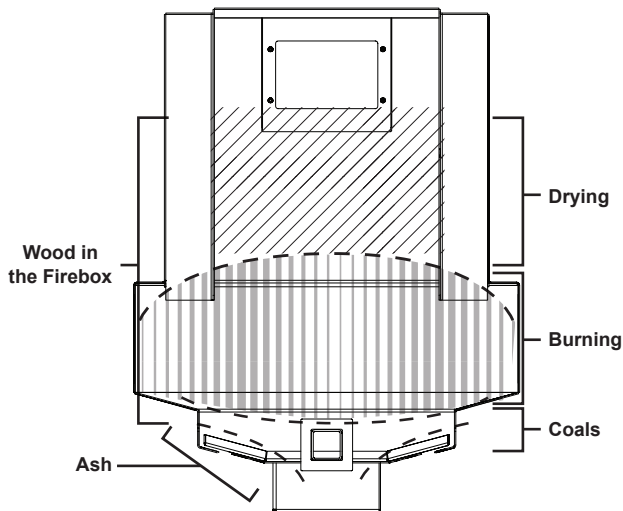
### How the CleanFire Works

Because of its highly efficient and clean-burning design, the CleanFire operates differently than other types of wood-burning devices. Understanding a few basic principles will help you operate the CleanFire as it was designed, maximizing its performance, heat transfer and longevity.

**NOTE: For proper operation, the fuel must match the heat load, the furnace must be maintained to ensure proper air flow, and the water temperature must be kept above 150°F (66°C).**

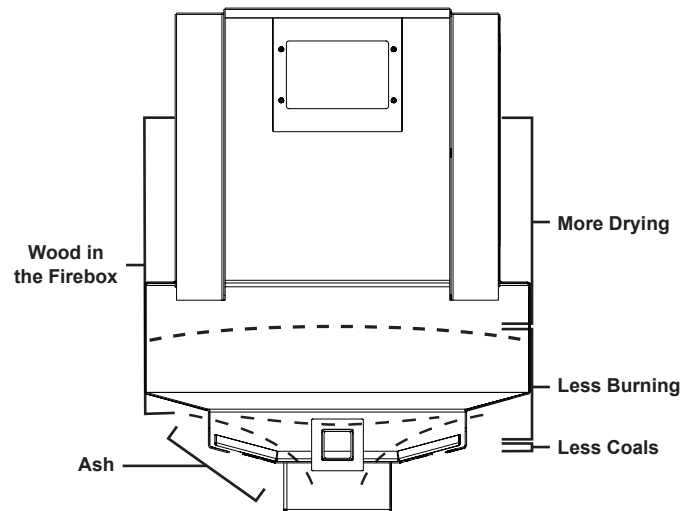
1. The combustion air fan pressurizes the airbox located at the front of the outdoor furnace. Primary air flow, regulated by an actuator motor, flows into the firebox through combustion air inlets located on the front and sides near the bottom. Secondary air is regulated by a second actuator motor that allow air flow through the air tube. Combustion starts in the firebox near the bottom of the wood load.

Operating with Properly Seasoned Wood



- Burns more efficiently
- Minimizes amount of wood used
- Reduces emissions
- Extends life of furnace
- Reduces bridging

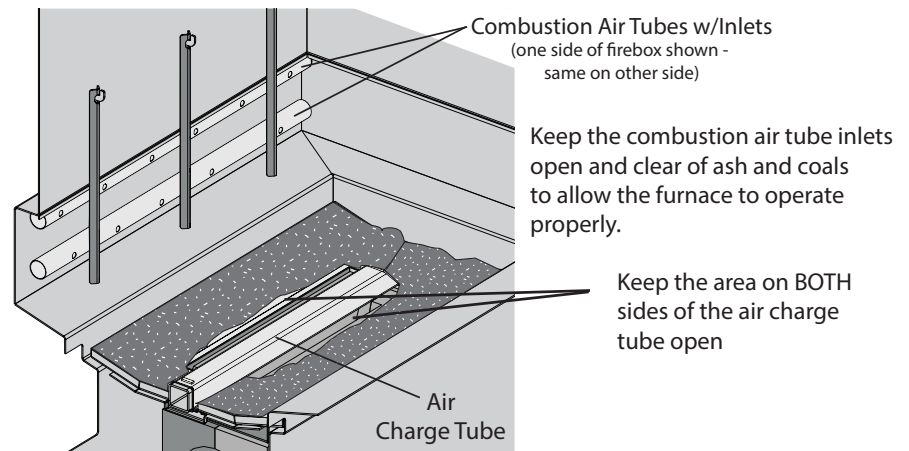
Operating with Wood with Too Much Moisture



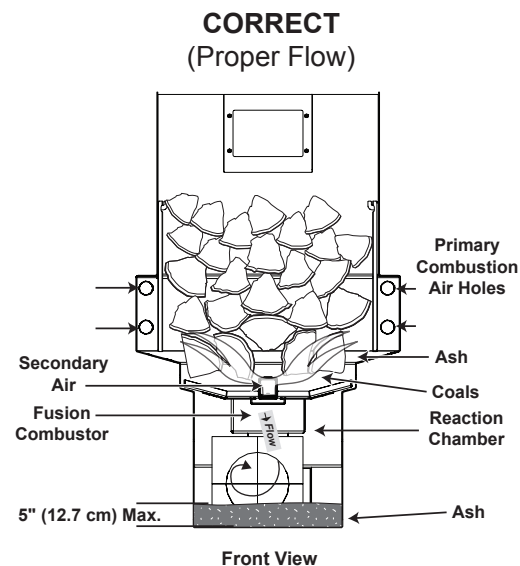
- Burns less efficiently
- Increases amount of wood used
- Lowers combustion rates
- Increases maintenance requirements
- Increases bridging

**NOTE: When the volume of burning wood is greater than the volume of drying wood, the outdoor furnace operates more efficiently.**

**NOTE: The combustion air inlets must be visible (i.e., ash must be kept below the combustion air inlets as shown).**



2. Gasified fuel exits the bottom of the firebox alongside and under the air tube, down to the Fusion Combustor and Reaction Chamber. Final combustion occurs in the Reaction Chamber where extremely high temperatures aid in complete combustion. The chimney creates a draft (negative pressure) which helps to draw exhaust gases from the furnace.
3. Heat is transferred to the water from the hot gases as they move through the firebox, the Reaction Chamber and the heat exchanger.



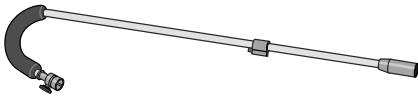
**NOTE: The illustration shows the CleanFire operating correctly with proper combustion air flow and with the wood properly loaded.**

**NOTE: A key point to remember about the operation of the CleanFire is that as wood burns, the combustion gases flow down through the bottom of the firebox so the proper flow must be maintained as shown.**

**NOTE: Refer to the General Troubleshooting Information for more information on outdoor furnace operation and for conditions to avoid.**

## Initial Fire Up - Start of Heating Season

**NOTE:** These procedures apply to initial firing from at the start of the heating season.



### Outdoor Torch

The optional Outdoor Torch (p/n 2900325) is an excellent tool for starting a fire. Attaches quickly to an external propane tank and can be directed at the bottom of a wood pile for quicker, easier combustion.

### ⚠ CAUTION

Do not burn plastic, garbage, treated wood or fuels not listed for this outdoor furnace.


**NOTE:** Before firing the outdoor furnace for the first time, make sure the proper amount of MolyArmor 350 has been added and the water level is 1" below the full mark on the sight gauge, as the water will expand when heated.

Two options are provided for a clean, easy startup. Using lump charcoal is the easiest and fastest method. Be sure the wood (including the kindling) is dry for the best results.

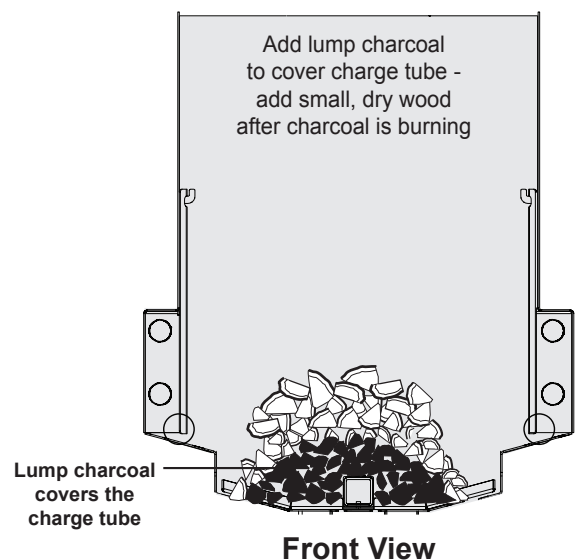
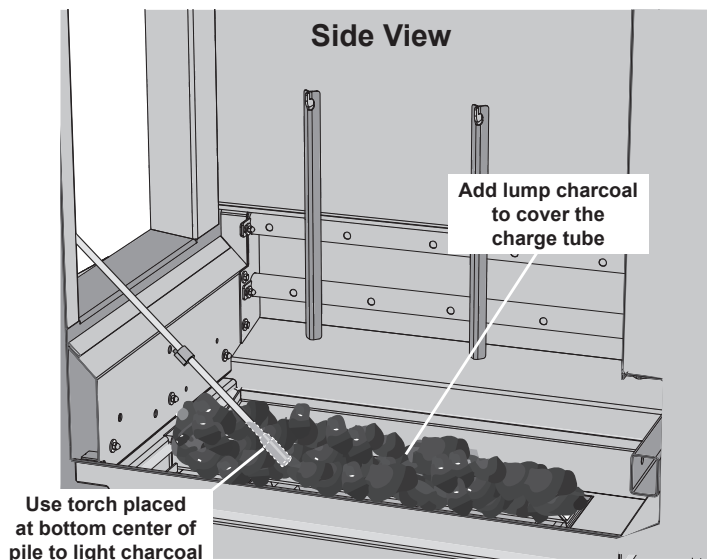
**NOTE:** During startup, the Reaction Chamber percentage will increase as the combustion process ramps up. Optimum burn occurs when the Reaction Chamber percentage is maintained between 70% and 100%. The drier the wood that is used during startup, the faster these percentages can be reached.

### Startup Option A - Lump Charcoal

**NOTE:** Keep the bypass door closed for this procedure.

1. Disconnect the heat load draw by turning off the pump(s).
2. Open the firebox door and add 10 pounds of lump charcoal to cover the charge tube.
3. Turn the controller on by pressing the **Power**  button; then press the Ignition Air button to turn on the primary combustion air for the initial fire up process when the firebox door is open.

## Initial Fire Up with Lump Charcoal



4. Ignite the lump charcoal making sure that the charcoal on both sides of the charge tube is burning.
5. Add small pieces of dry wood to a level just above the primary air tubes on the sides of the firebox.
6. Close and latch the firebox door.

### ⚠ CAUTION

**Do not leave the firebox door open while the fire is burning. Damage to the door seal and paint on the front of the outdoor furnace will result and it could cause a dangerous build-up of gas in the firebox.**

7. Allow the wood load to burn until the water temperature reaches 175°F (79°C). Turn on the pump(s) and let run for 24 hours to circulate the system water. If this is the initial startup of the furnace, at this point a proper water sample can be taken.

### ⚠ WARNING

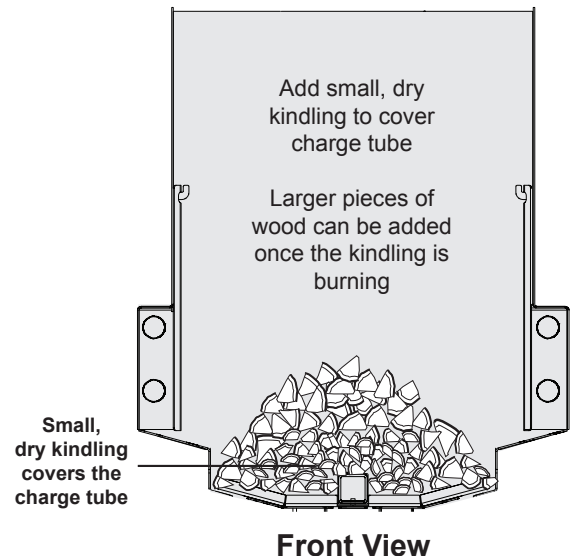
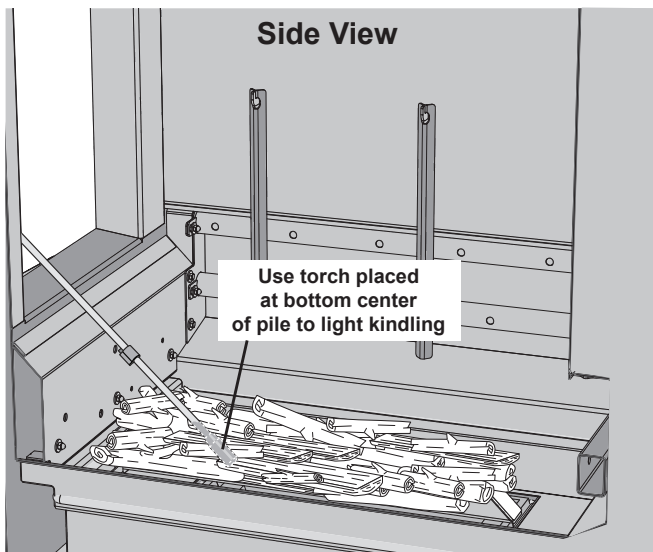
**When opening the firebox door, the door switch will shut off the primary air actuator motor while the firebox door is open. Do NOT disable the door switch.**


### Startup Option B - Dry Kindling

**NOTE: Keep the bypass door closed for this procedure.**

1. Disconnect the heat load draw by turning off the pump(s).
2. Open the firebox door and add small, dry kindling to cover the charge tube. Smaller kindling is preferred. It should be staggered and able to ignite and burn quickly for the initial fire. The intent is to make sure the combustion air will be able to flow past the charge tube and into the Reaction Chamber.

### Initial Fire Up with Dry Kindling



3. Turn the controller on by pressing the **Power**  button; then press the Ignition Air button to turn on the primary combustion air for the initial fire up process when the firebox door is open.
4. Ignite the bottom side of the kindling. Make sure the wood on both sides of the charge tube is burning. Once the kindling is burning, add larger pieces of dry wood to just above the primary air tubes.

**NOTE: Add enough wood to bring the water temperature up to 175°F (79°C).**

5. Close and latch the firebox door.

#### **CAUTION**

**Do not leave the firebox door open while the fire is burning. Damage to the door seal and paint on the front of the outdoor furnace will result and it could cause a dangerous build-up of gas in the firebox.**

6. Allow the wood load to burn until the water temperature reaches 175°F (79°C). Turn on the pump(s) and let run for 24 hours to circulate the system water. If this is the initial startup of the furnace, at this point a proper water sample can be taken.

#### **WARNING**

**When opening the firebox door, the door switch will shut off the primary air actuator motor while the firebox door is open. Do NOT disable the door switch.**

## Adding Heat Load

**NOTE:** During initial start-up, a considerable amount of moisture from condensation will collect inside the firebox and heat exchanger and may drip out of the Reaction Chamber door. This is normal and the moisture will evaporate after the first couple of fuel loads.

1. With no heat load draw in the system, monitor the operation of the outdoor furnace until the water temperature reaches the water temperature setpoint.
2. Turn on the pump(s); then start a heat load draw in the system by turning up the thermostat in the house. Monitor the outdoor furnace for one hour or until another cycle occurs (i.e., outdoor furnace goes from combustion to idle mode). If the water temperature drops and does not recover to the water temperature setpoint within one hour of starting the heat load draw, the heat load draw should be shut off, allowing the furnace to cycle to the idle mode again.

**NOTE:** The outdoor furnace will not operate satisfactorily if the heat load is higher than the output capacity of the outdoor furnace.

3. At this point, there should be glowing coals established in the bottom of the firebox. The firebox can be filled with dry, seasoned split wood.

## Ash Removal Frequency

During the first week of operation, check the level of ash in the Reaction Chamber every two days. Ash needs to be removed from the Reaction Chamber before it obstructs the combustion air flow for efficient operation. Clean the Reaction Chamber before it becomes 1/2 full of ash (approximately 5" or 13 cm deep in any area of the Reaction Chamber).

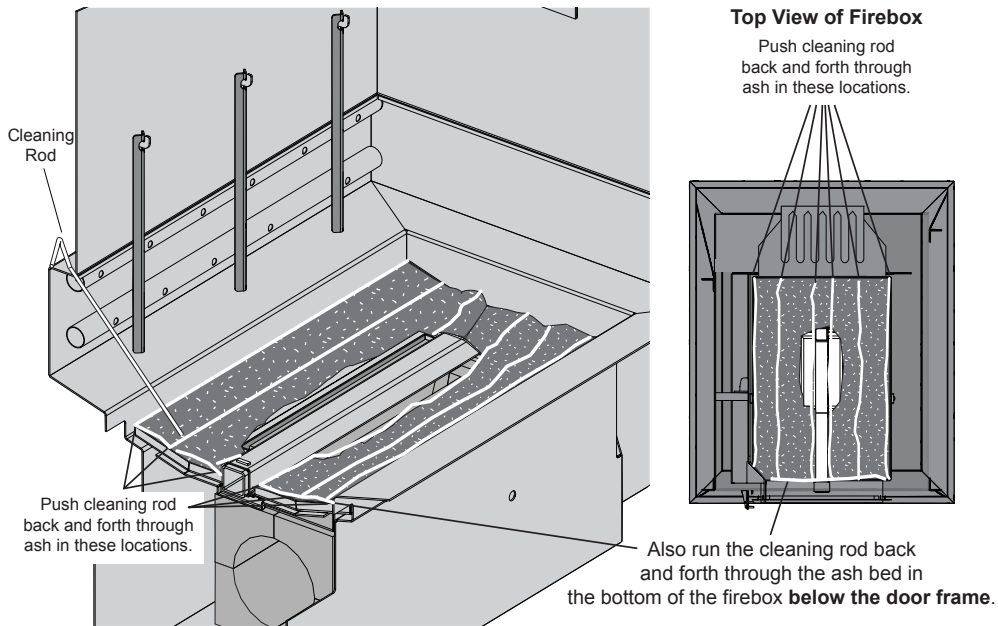
## Adding Wood

1. Slowly lift and push the bypass door handle toward the back of the outdoor furnace to open the bypass door; then wait for 15 seconds.

**NOTE:** The alarm is a reminder that the bypass door is open. During initial start, it will continue to sound.

### **⚠ WARNING**

**Keep your face away and stay as far away as possible from the firebox door area when opening the door.**



- Unlatch the firebox door; then slightly open the firebox door and wait 10 seconds. Stay as far away as possible as the firebox door is opened because smoke and hot gases escaping through the firebox door opening could ignite. From a safe distance, observe the fuel load.

### ⚠ WARNING

Use extreme care when adding wood when wood or coals are already present. Very hot gases may be coming out of the firebox door opening.



OPERATING  
TIP

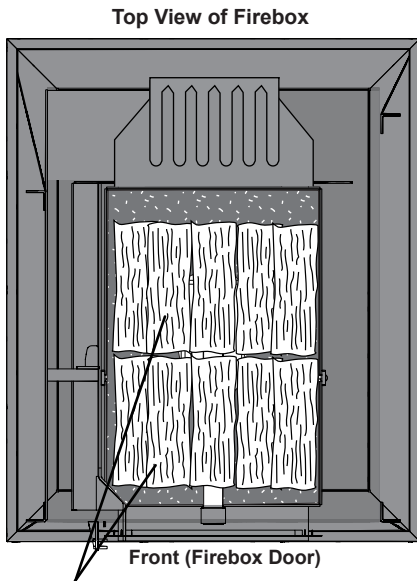
**Run the cleaning rod through the coal bed every time before loading wood to help maintain proper air flow and optimize combustion.**

- Using the illustration as a reference, push the cleaning rod through the ash, coals and remaining wood in the bottom of the firebox to loosen it up, including a pass on each side of the air tube. **Be sure the area on each side of the charge tube is open.** Also run the rod sideways on each side of the air charge tube in the bottom of the firebox below the door frame.

**NOTE:** Neglecting to push the cleaning rod through the ash and coals as described in Step 3 each time before wood is loaded can cause the ash bed to deepen and become compacted. This can result in poor heat output and combustion because of restricted airflow. Compacted ash will not fall into the Reaction Chamber; it will need to be removed with a shovel.

- Some ash in the bottom of the firebox (but not alongside the charge tube) is necessary for the proper operation of the outdoor furnace. Ash acts as an insulator, keeping the glowing coals in the bottom of the firebox hot enough to restart the fire. When using the cleaning rod, some of the ash will fall into the Reaction Chamber and some ash with coals will remain. The coals remaining around the area alongside the air tube will create a clean, efficient burn.

**NOTE:** If wood supply is mostly shorter pieces (e.g., 14"-16" long), it may be necessary to load pieces end-to-end (see example below).



Load shorter wood pieces (14"-16")  
end-to-end

- The combustion air inlets must be kept open and clear of ash and coals to allow the furnace to operate properly. If needed, remove enough ash to keep the combustion air inlets free of obstruction.

**NOTE:** It is important to understand that when the water temperature setpoint (185°F) is reached, the combustion air is shut off until the water temperature drops to the setpoint minus the differential setting. During this cycle-off time there will be no active fire in the firebox. If the firebox door is opened, the wood might begin to burn again but will be shut down when the door is closed if the water temperature is above the setpoint. If the door is opened and closed when the water temperature is below the setpoint the fan will cycle on again to achieve the setpoint even though the differential point has not been reached. If the combustion cycle is activated with the water temperature at least to the differential below setpoint and the fire is not actively burning when the door is closed, first confirm that proper operating and maintenance procedures are being performed before considering testing mechanical components.

- When refilling the firebox, the new wood load will ignite quickly and burn more efficiently if these instructions are followed. This will prevent creosote buildup in the heat exchanger, air channels or primary elbow. The operating procedures will maintain good air flow and very efficient combustion.

## DAILY

- Run the cleaning rod through the ash and coal bed and along both sides of the air tube as shown on previous page to keep ash loose. **Use care near the refractory.** This will allow excess ash to flow down into the Reaction Chamber. If the coal bed/remaining wood is more than 4 inches deep, it may be necessary to use the cleaning rod to open a passage through the coals on each side of the air tube. **Air flow down past the air tube is essential for a good combustion rate to be maintained. To confirm adequate air flow, cautiously open the Reaction Chamber door to visually identify the combustion air flow while the furnace is in a burn cycle with the fan on and the bypass closed.**
- To ensure the fire will maintain good combustion, it is important to refill the firebox when an adequate amount of the previous wood load is remaining (enough to provide enough heat and fire to dry and ignite the new wood load). If the coals burn out from under the new wood load and are unable to keep the fire going, there are not enough coals and wood left from the previous load. Enabling the Reserve Mode mode will help keep part of the wood load for a quicker, more efficient fire up after reloading. Reserve Mode is enabled as default setting on version 6.72 and later.
- Be sure to fill the firebox with enough wood so there is adequate wood left the next time you load to dry and ignite the new wood.
- Keep in mind that burning dry, well-seasoned wood requires less coals to ignite the new wood load.

- Burning higher moisture wood or larger, unsplit wood will require that a larger amount of the previous wood load remain in the firebox to adequately ignite the new wood load. If there are not an adequate amount of coals or enough of the previous wood load to achieve a good hot fire and efficient combustion with Reaction Chamber temperatures, open the bypass door for a long enough time to get the new wood load burning well; then close the bypass. Refer to Initial Fire Up - Start of Heating Season.
- If the furnace is being used in the fall and spring or on heat loads much lower than the main heating season, use a 25% wood load or whatever amount will be needed for the period of time between normal reloading.

## WEEKLY (or as needed)

- Clean the heat exchanger weekly (or as needed) to prevent air flow restriction. When the operating procedure outlined here is used, there will be no creosote formation in the Reaction Chamber or heat exchanger passage.
- Clean ash out of the Reaction Chamber channel as needed. It is best not to allow the Reaction Chamber to fill to a depth over 1/2 full.
- Inspect and clean the chimney tee as needed to prevent restriction.
- Clean and inspect the spark arrestor (if one is being used) as needed.
- Review the operation and maintenance, and refueling tips videos available on the Online Support Center.

**NOTE: If the furnace has been operated without adequate airflow and efficient combustion, it may be necessary to inspect and clean the primary combustion air inlets, air channels, primary air elbow, heat exchanger, and Reaction Chamber.**

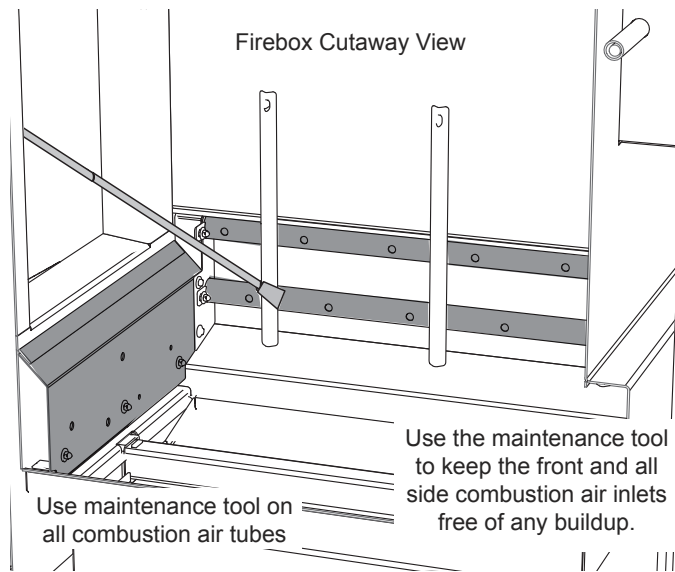
**NOTE: If the fire goes out or keeps going out, the pulse timer can be adjusted to a longer duration and shorter time periods between idle pulses.**

### **▲ WARNING**

**When adding wood to the firebox, be careful not to get pinched between the wood and the door frame or any part of the outdoor furnace. Use extreme care with large pieces of wood that may be difficult to handle.**

7. Inspect the firebox for crusty deposits on the walls and in the corners and use the maintenance tool or similar type of tool to scrape and remove. Use the maintenance tool to remove any thick deposits from the inside front corners of the firebox, down each side and across the top, as shown.

8. Use the maintenance tool to keep the front combustion air inlets, and the combustion inlets on both air tubes free of any buildup.



9. When loading, load the wood so that the combustion air inlets on the side of the firebox do not become blocked or restricted.
10. Close and latch the firebox door. **Do not use the firebox door to ram wood into the outdoor furnace. Do not operate the outdoor furnace with the firebox door open.** Combustion in the firebox cannot be controlled if the firebox door is left open or unlatched. If the firebox door is left open, an uncontrolled burn will result. To return to a controlled burn, close and latch the firebox door.
11. Wait for 15 seconds; then slowly pull the bypass door handle toward the front of the furnace and push down to close the bypass door.

### **⚠ WARNING**

**The firebox door must be closed and latched at all times except when filling the firebox with wood or damage to gaskets, paint, etc., may occur. Leaving the firebox door open may lead to a runaway fire. In the event of a runaway fire, close the firebox door.**

# Maintenance Schedule

## PREVENTIVE MAINTENANCE SCHEDULE

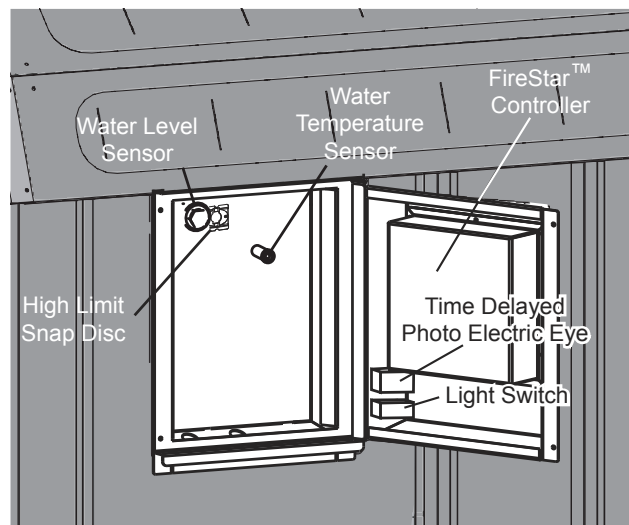
Regular maintenance and inspections can help extend the life of your outdoor furnace and prevent high-cost repairs. This table is meant to serve as a general guideline until you become acquainted with how the outdoor furnace operates with your specific application.

| OPERATION                                                            | SERVICE INTERVAL                 |       |        |         |               |             | See Section Number |
|----------------------------------------------------------------------|----------------------------------|-------|--------|---------|---------------|-------------|--------------------|
|                                                                      | Before first operation of season | Daily | Weekly | Monthly | Semi-Annually | Post Season |                    |
| Check water level.                                                   | ●                                | ●     |        |         |               |             | 1                  |
| Remove ash.                                                          |                                  |       | C      |         |               | ●           | 3                  |
| Scrape firebox door frame; use cleaning rod in ash.                  |                                  | A     |        |         |               | ●           | 8                  |
| Inspect firebox door seal.                                           |                                  | A     |        |         |               | ●           | 4                  |
| Inspect and lubricate door latch bushings.                           |                                  |       |        |         |               | ●           | G 4                |
| Inspect chimney and chimney tee.                                     | ●                                |       | ●      |         |               | ●           | 5                  |
| Check vent cap.                                                      | ●                                |       |        |         |               |             | 2                  |
| Clean heat exchangers.                                               | ●                                |       | C      |         |               | ●           | F 6                |
| Inspect rear access heat exchanger door latches, seal and insulation |                                  |       |        |         |               |             | H 6                |
| Inspect Reaction Chamber.                                            | ●                                |       | C      |         |               | ●           | 7                  |
| Inspect secondary air tube and refractory.                           |                                  |       |        |         |               | ●           | 11                 |
| Inspect firebox and firebox ash area.                                | ●                                | A     |        |         |               | ●           | 8                  |
| Inspect and clean combustion air inlets.                             | ●                                |       | C      |         |               | ●           | B 9                |
| Inspect and clean the combustion fan and inlet screen.               |                                  |       |        |         | D             |             | 10                 |
| Oil the combustion fan.                                              |                                  |       |        |         |               | ●           | 10                 |
| Check pH and moly levels of water.                                   | ●                                |       |        |         | D             | ●           | E                  |
| Inspect primary and secondary combustion air elbows.                 |                                  |       |        |         |               | G           | 12                 |
| Grease bypass door handle.                                           |                                  |       |        | F       |               | ●           | 13                 |
| Perform a complete cleaning.                                         |                                  |       |        | F       |               | ●           | 14                 |

**NOTE: Check daily for build-up of creosote in the lower corners and around the air outlets until experience shows how often cleaning is necessary.**

- A Daily, or as needed.
- B Twice a week.
- C Weekly until interval for your application can be determined.
- D When new, after three months, then every six months thereafter.
- E Refer to **Testing Treated Water in the Outdoor Furnace** (Installation and Initial Water Treatment Guide).
- F Frequency will vary depending on heat load requirements, type of wood used and the moisture content of the wood.
- G Or as needed.
- H Whenever rear access heat exchanger door is opened.

## Control Locations



## ROUTINE MAINTENANCE

### ⚠ CAUTION

Use only genuine WoodMaster Parts and Accessories if it ever becomes necessary to replace any component of the outdoor furnace.

Routine inspections and maintenance are essential to the proper operation and longevity of the outdoor furnace. The items indicated in the preventive maintenance schedule are intended to serve as a guideline. Actual intervals between inspections and maintenance may vary depending on a number of factors, including your heat load requirements, type of wood used, and outdoor temperatures.

**NOTE:** Proper maintenance of the firebox, Reaction Chamber, Fusion Combustor, heat exchanger, chimney transition box and chimney tee are essential for the outdoor furnace to function properly and for longevity.

### ⚠ CAUTION

Do not burn plastic, garbage, treated wood or fuels not listed for this outdoor furnace.

**NOTE:** Chloride or sulfurous gases can be generated if plastic or rubber is burned and will mix with the moisture from the wood to form hydrochloric or sulfuric acids in the firebox, creating corrosion.

*Creosote - Formation and Need for Removal.* When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this creosote makes an extremely hot fire.

**NOTE: If the outdoor furnace is operated correctly, creosote will not form in the chimney.**

The chimney connector and chimney should be inspected at least twice monthly during the heating season to determine if a creosote buildup has occurred, and to check for corrosion or condensation. If creosote has accumulated it should be removed to reduce the risk of a chimney fire.

### **⚠ WARNING**

**The chimney and chimney connector must be clean and in good condition.**

## **MAINTENANCE SECTIONS**

Refer to the Preventive Maintenance Schedule for the recommended intervals with which to perform these maintenance items.

### **Section 1 - Water Level**

Open the sight gauge valve. The sight gauge tube will fill to indicate the level of water in the outdoor furnace. Be sure to close the sight gauge valve after checking water level. The sight gauge valve and tube will drain when the valve is closed.

### **Section 2 - Vent Cap**

Check that the vent cap fits loosely on the vent opening. Check the vent cap copper tube for obstruction; clean with a pipe cleaner if needed.

### **⚠ WARNING**

**The outdoor furnace vent cap must fit loosely on the vent opening. Do not force the cap down or try to seal it tightly onto the vent pipe. Do not extend or restrict the vent pipe or opening. DO NOT ALLOW THE OUTDOOR FURNACE TO BE PRESSURIZED.**

### **Section 3 - Ash**

Refer to the Adding Wood section.

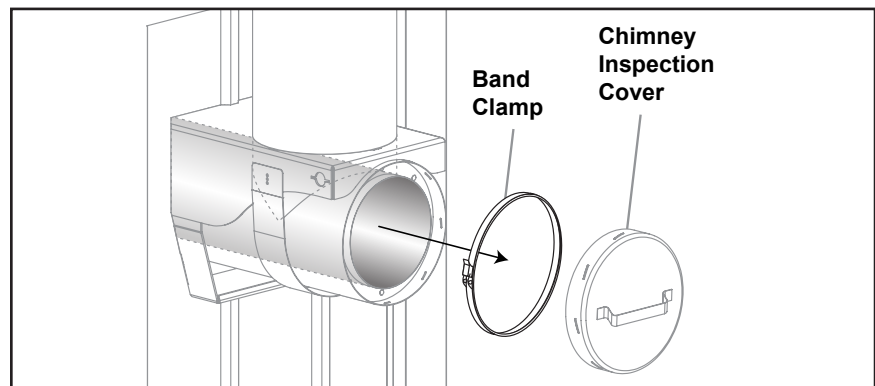
#### Section 4 - Firebox Door Seal and Bushings

Make sure the firebox door is properly latched and check the condition of the firebox door seal. If it is not sealing properly (indicated by a uniform indentation), replace the seal. If it is not sealing properly after replacing the seal, the firebox door may need to be adjusted. See Firebox Door Hinge/Latch Bearing Adjustment in Serviceable Items section.

#### Section 5 - Chimney Tee and Chimney

Remove the band clamp and chimney inspection cover. Inspect the chimney outlet and chimney for excessive creosote, ash or deposits and clean as necessary.


**NOTE: The chimney inspection cover must fit tightly. Check and clean if necessary the groove for the cover to prevent air from leaking out. Leaking air caused by an improperly fitting cover can cause corrosion.**



#### Section 6 - Heat Exchangers

**NOTE: Inspect the heat exchangers weekly, and clean as needed, until the interval for your application can be determined. Frequency will vary depending on a number of factors including heat load requirements, type of wood used and the moisture content of the wood.**

**NOTE: The best time to clean the heat exchangers is prior to loading with wood when all that remains in the firebox is a glowing coal bed.**

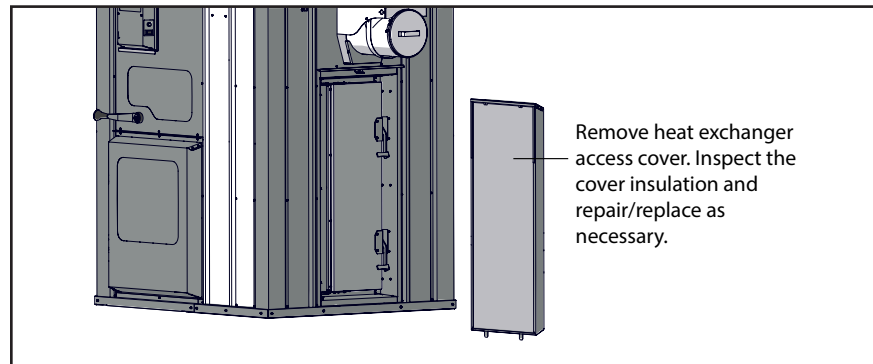
1. Press the **Power**  button on the FireStar combustion controller to turn it off.

#### **⚠ CAUTION**

**Be sure to turn off the FireStar combustion controller before doing this procedure.**

2. Remove the chimney inspection cover. Inspect the area above the heat exchangers for any excessive ash buildup. Clean and remove any excessive ash accumulation.

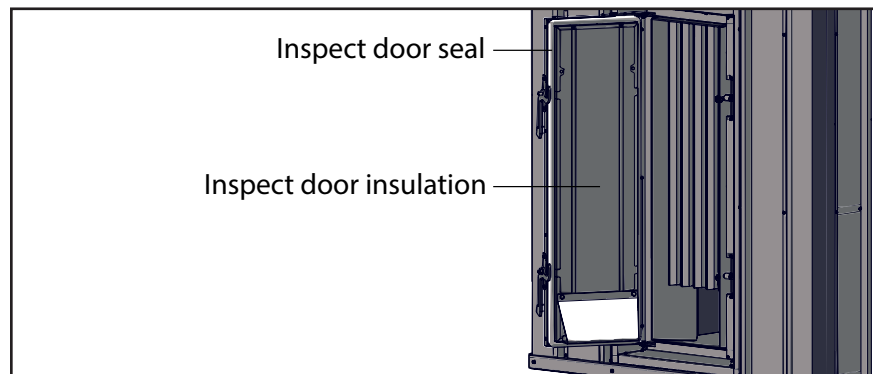
- Remove the heat exchanger access cover from the back of the furnace. Inspect the cover insulation and repair/replace as necessary.



- Carefully undo both latches on the hinged heat exchanger door. If any coals or wood remain in the firebox, slowly open the door making sure to stand off to the side when opening it.

### **⚠ CAUTION**

**Open the heat exchanger door slowly and stand off to the side when opening it.**

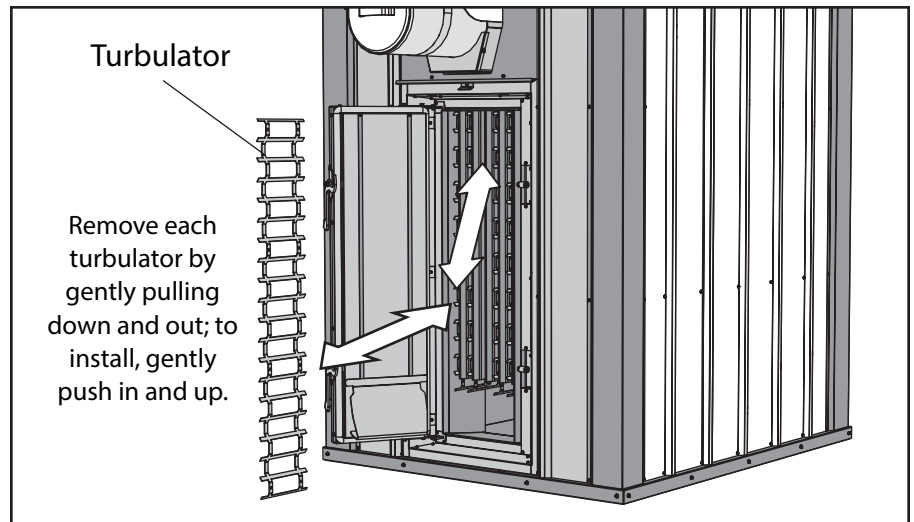


- Inspect the door insulation and door seal. Repair/replace any defective seal or insulation.
- Inspect the door frame edge for any buildup of creosote or ash. Use the maintenance tool to clean the door edges.

### **⚠ CAUTION**

**Always wear the appropriate personal protective gear when cleaning ash from the turbulators and the Reaction Chamber.**

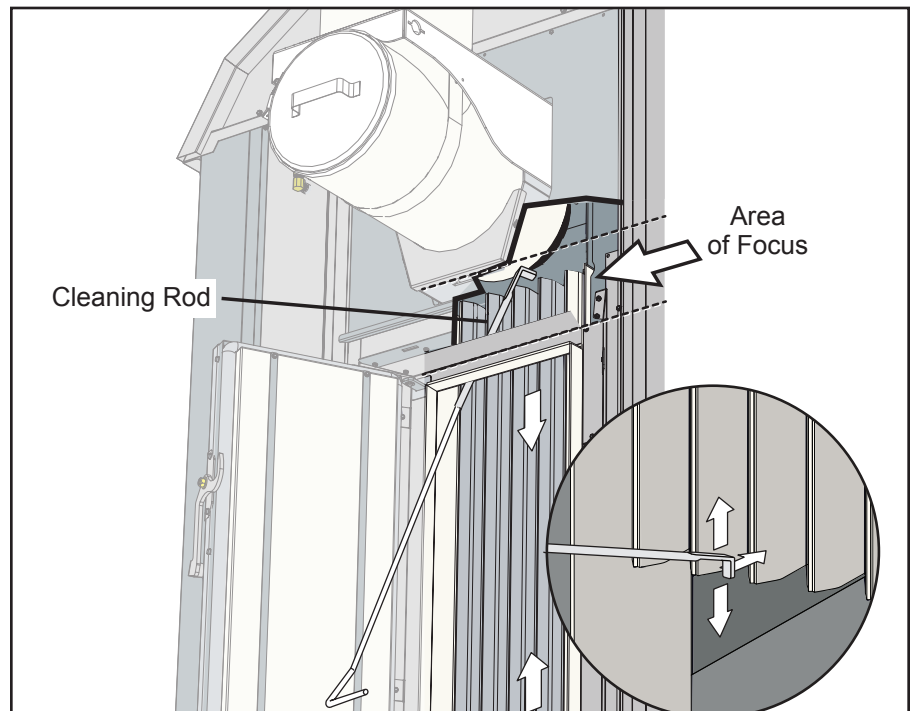
- Remove each turbulator by gently pulling down and out. Clean each turbulator to remove any ash or buildup; then inspect for damage.




8. Inspect the heat exchangers for excessive buildup of creosote or ash. Use the scraping end of the maintenance tool to clean any accumulations from the sides of the heat exchanger sections. Angle the cleaning rod up to clean from the top of the exchangers and then down to the bottom between each folder of the exchanger.

**NOTE: If there is creosote buildup in the heat exchanger, it is caused by operating the furnace incorrectly. It is important to follow the recommended operation and maintenance procedures (see Operating Instructions).**


The Flue Brush Kit (p/n 390) is an excellent option as an additional way to clean the exchangers.



9. Using the maintenance tool and a shovel, clean any accumulated ash from beneath the heat exchanger. Dispose of ash properly.

10. Ensure that the door seal and frame are still clean of any debris or ash; then install each turbulator by gently pushing in and up.
11. Close and latch the heat exchanger door; then install the heat exchanger access cover and chimney inspection cover.
12. Press the **Power**  button on the FireStar combustion controller to turn it on.

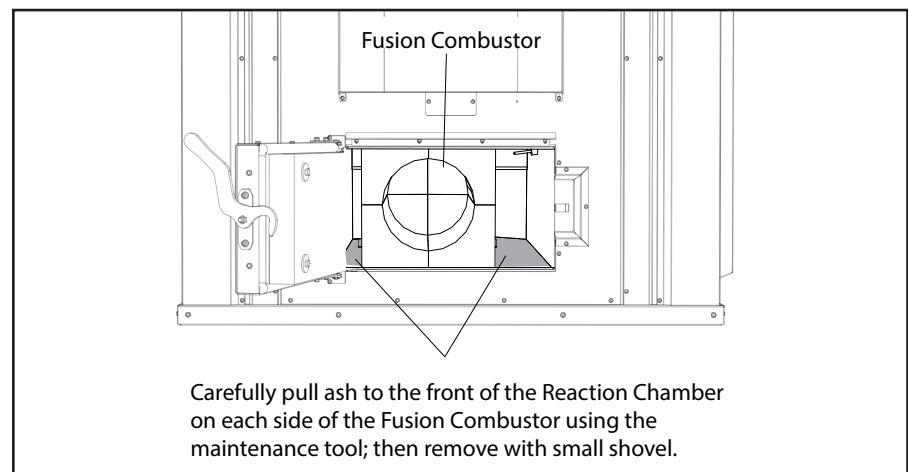
### Section 7 - Reaction Chamber

1. Press the **Power**  button on the FireStar combustion controller to turn it off.

#### CAUTION

**Be sure to turn off the FireStar combustion controller before doing this procedure.**

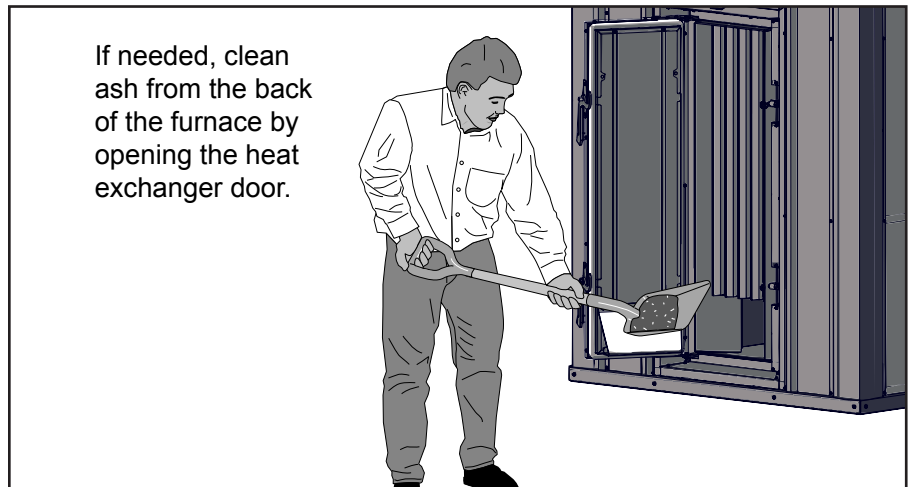
2. Unlatch and open the Reaction Chamber door.
3. Use the maintenance tool to pull the ash to the front of the furnace. Take care when pulling ash from each side of the Combustor not to move the refractory sections.
4. Use a small shovel to remove all of the ash and deposits from the Reaction Chamber. Take care not to damage the temperature sensor. You can also clean ash from the back of the furnace by opening the heat exchanger door.




**NOTE: It is extremely important to clean ash from the entire Reaction Chamber area. If necessary, refer to section Heat Exchangers section for the procedure for removing ash from heat exchanger area.**

#### CAUTION

**Take care not to damage the temperature sensor when removing ash.**



5. Close the Reaction Chamber door and secure the latch.
6. Press the **Power**  button on the FireStar combustion controller to turn it on.

### Section 8 - Firebox

#### **WARNING**

**Remove all wood, coals and ash from the firebox.**

1. Scrape the top and sides of the firebox and around the door frame area to remove any deposits; then inspect the surfaces of the firebox for any signs of corrosion, paying particular attention to the ash level and below.

**NOTE: When scraping to clean inside the firebox, be sure to pay particular attention to the corners and to the seams.**

2. If signs of corrosion are present, contact your dealer. Refer to the section Corrosion is Present in the Troubleshooting section.
3. A thin, tar-like creosote layer may form on the firebox walls and migrate toward the bottom of the firebox where it could collect into a thicker layer. Normally this layer will burn up as it collects on the bottom. If it migrates to the bottom of the firebox and does not burn up, it must be removed. Do not allow it to cover or restrict air flow through the combustion air inlets or bottom of the firebox. If larger, thick, dry deposits form on the walls in the firebox, they should be removed with the maintenance tool.

**NOTE: Be aware that the hotter the fire, the less creosote is deposited, so weekly cleaning may be necessary in mild weather, even though monthly cleaning may be enough in coldest months.**

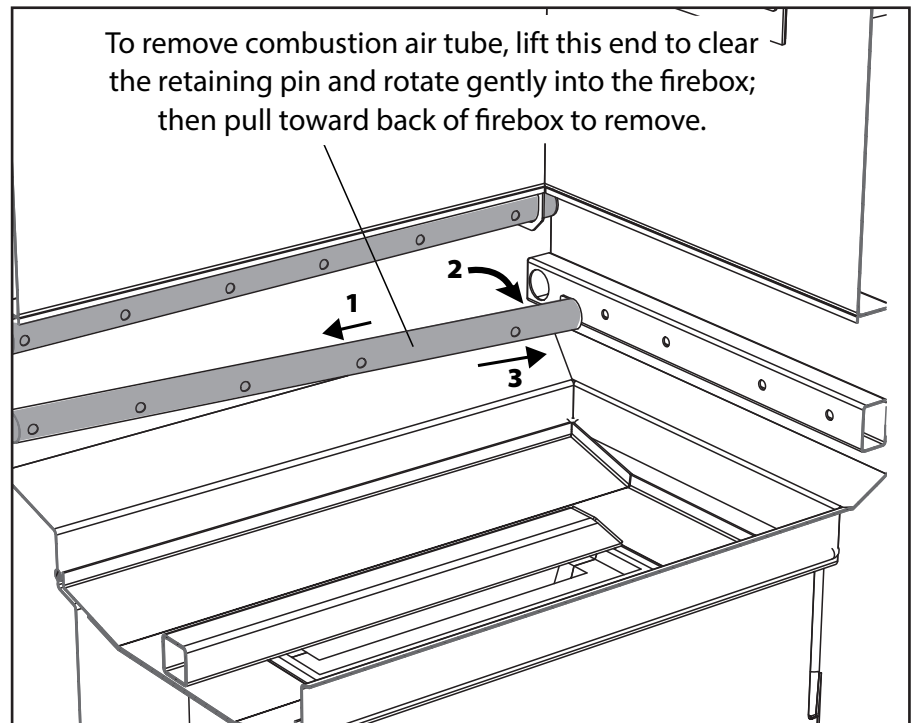
### Section 9 - Combustion Air Tubes

**NOTE: If the combustion air tubes are becoming restricted by ash or creosote, it is caused by operating the furnace incorrectly. It is important to follow the recommended operation and maintenance procedures (see Adding Wood section).**

Primary combustion air is supplied to the firebox through the combustion air inlets located in the front air channel and in the side combustion air tubes. Be sure to clean off any buildup around the combustion air tube holes and buildup that may collect around the combustion air tubes themselves.

The side combustion air tubes can be removed if necessary. To remove, lift the end of the tube closest to the back of the firebox up off of the retaining pin, then in and toward the back of the firebox. Install by reversing this procedure.

**NOTE: If there is a large amount of buildup on the exterior of the combustion air tube, it may be necessary to first remove the buildup to make removal easier.**



### Section 10 - Combustion Air Fan

1. Disconnect power to the outdoor furnace.

#### **⚠ WARNING**

**Do not proceed without testing that power is disconnected.**

2. Remove the airbox access cover; then open the hinged airbox door. Inspect the combustion air fan inlet screen and fan wheel and clean if necessary. Make sure the air intake is clean and not obstructed.



3. Close and secure the airbox door. Install the airbox access cover.

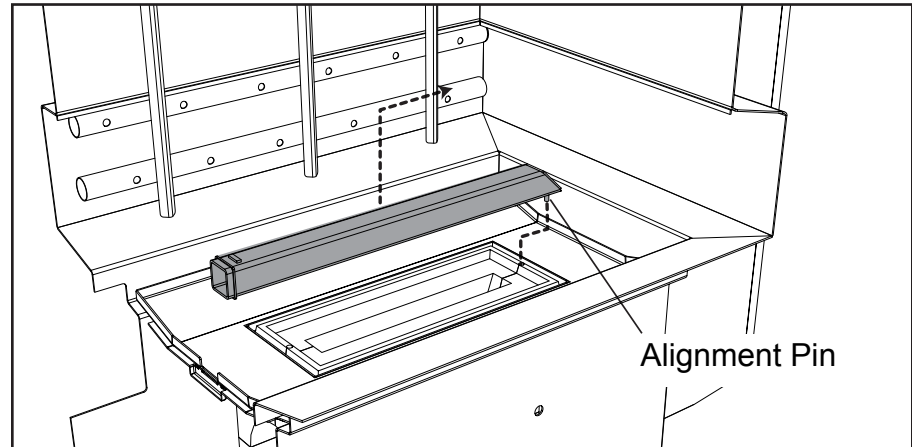
#### **⚠ DANGER**

**Do not connect power or operate the outdoor furnace with the airbox access cover removed. The outer airbox cover must be installed and secured with screws.**

### Section 11 - Air Tube and Refractory

Removing and inspecting the air tube and inspecting the refractory is best done after the outdoor furnace has been shut down and the firebox has been cleaned according to the Complete Firebox Cleaning Procedures.

**NOTE: The air tube and refractory are wear items.**



1. Remove the air tube by lifting and then sliding it toward the rear of the outdoor furnace. Inspect the area beneath the air tube to see the area is not plugged.
2. Inspect each refractory module for damage. Small cracks and chips in the refractory are normal. If large pieces of the refractory modules are missing, contact your WoodMaster dealer.
3. Install the air tube making sure the alignment pin is seated in the alignment hole in the refractory modules.

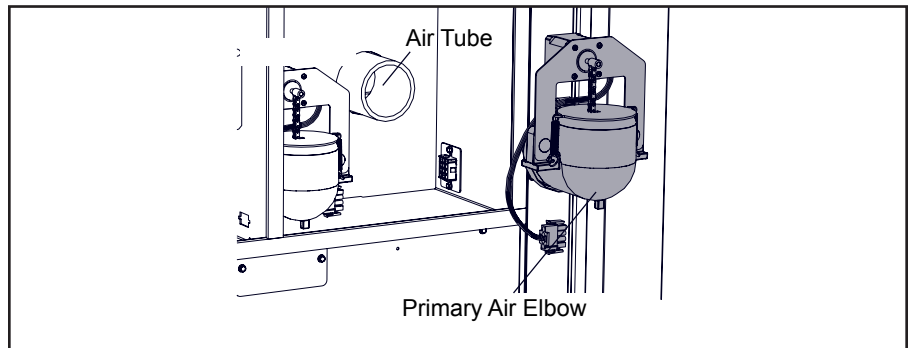
### Section 12 - Primary Air Elbow

1. Disconnect the electrical power to the outdoor furnace at the main power source.

#### **⚠ WARNING**

**Do not proceed without testing that power is disconnected. Make sure the power cannot be reconnected while servicing the actuator motors (i.e., use lock out, tag out).**

2. Remove the outer airbox cover; then open the airbox door.
3. Disconnect the actuator motor wiring harness.
4. Loosen the hose clamp securing the primary air elbow to the air tube; then remove the assembly from the airbox.



5. Inspect the elbow and clean out any build-up or blockage.

**NOTE: A small amount of material in the elbow is normal and is not an indication of improper operation.**

**NOTE: If there is creosote buildup in the primary air elbow, it is caused by operating the furnace incorrectly. It is important to follow the recommended operation and maintenance procedures (see Adding Wood section).**

6. Inspect the air tube for blockage or obstructions. To remove blockage or obstructions in the air tube, a screwdriver and a shop vac may be useful.
7. Install the primary air elbow over the air tube; then tighten the hose clamp.
8. Connect the actuator motor wiring harness.
9. Close and secure the airbox door. Install the outer airbox cover and secure with screws.

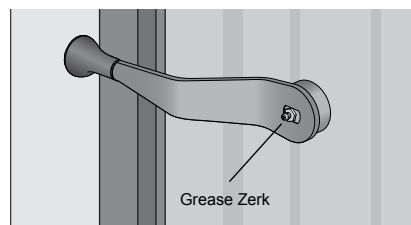
### **⚠ DANGER**

**Do not connect power or operate the outdoor furnace with the outer airbox cover removed. The outer airbox cover must be installed and secured with screws.**

10. Connect the electrical power to the outdoor furnace at the main power source.

### **Section 13 - Bypass Handle (if applicable)**

1. Using the grease zerk on the bypass handle, add grease.



2. Lift and lower the bypass handle several times to distribute the grease.

## Section 14 - Complete Cleaning Procedures

The frequency for performing a complete cleaning will vary depending on a number of factors, including your heat load requirements, type of wood used, and the moisture of the wood.

**NOTE: Proper maintenance of the firebox, Reaction Chamber, heat exchanger, chimney transition box and chimney tee are essential for the outdoor furnace to function properly and for longevity.**

**NOTE: It may be best to allow the wood and coals to burn out completely before this type of cleaning.**

### **⚠ CAUTION**

Always wear the appropriate personal protective gear (e.g., protective gloves, clothes, dust mask, etc.) when cleaning ash from the firebox and the Reaction Chamber, etc.


### **⚠ CAUTION**

Clear the entire area surrounding the outdoor furnace of any combustible materials before performing these cleaning procedures.

### **⚠ WARNING**

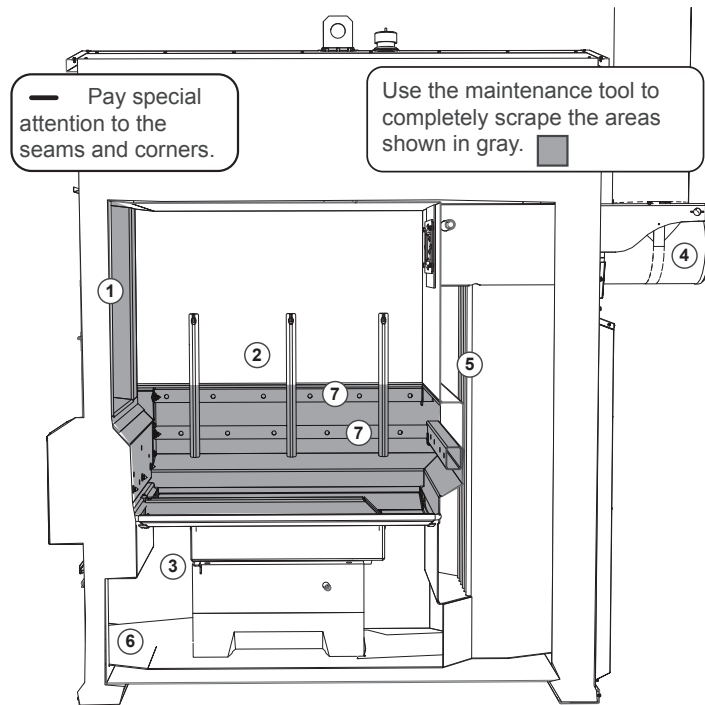
Be careful not to spill any coals or ash. Place coals and ash in a metal container with a tight-fitting metal lid.

**NOTE: Refer to the illustration and clean the areas identified in the order shown. For each area in the illustration, refer to the corresponding maintenance section.**

1. Press the **Power**  button to turn the FireStar combustion controller off.

### **⚠ CAUTION**

Be sure to turn off the FireStar combustion controller before doing this procedure.



Clean ash and deposits from the areas identified in the order shown. Refer to the corresponding maintenance sections for detailed procedures.

- ① Door Frame    ② Firebox    ③ Reaction Chamber    ④ Chimney Tee
- ⑤ Heat Exchangers    ⑥ Reaction Chamber
- ⑦ Combustion Air Outlets

### Door Frame

Open the firebox door; then scrape the face and surface area of the door frame to remove any deposits.

### Firebox

See Maintenance Section 8 - Firebox.

### Chimney Tee

See Maintenance Section 3 - Chimney Tee.

### Heat Exchangers

See Maintenance Section 6 - Heat Exchangers.

### Reaction Chamber

See Maintenance Section 7 - Reaction Chamber.

### Combustion Air Tubes / Air Tube

See Maintenance Section 9 - Combustion Air Tubes and Maintenance Section 11 - Air Tube and Refractory.

## SERVICEABLE ITEMS

**NOTE:** These procedures should be performed by a qualified individual and in accordance with any and all federal, state/provincial and local codes and regulations. When performing work on an appliance observe all precautions in the literature, tags and labels attached to the appliance and other safety precautions that may apply. When working with electricity and electrical components, failure to follow precautions could result in property damage, personal injury or death.

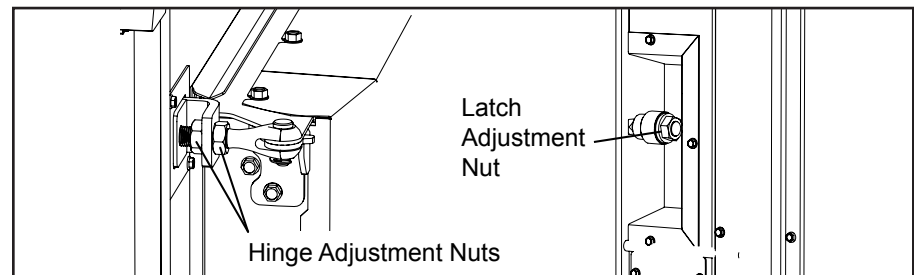
**NOTE:** If any of these items are under warranty, remember that the warranty covers only the cost of the replacement part. Labor is not covered.

**NOTE:** Use only genuine WoodMaster parts and accessories if it ever becomes necessary to replace any component on the outdoor furnace.

## FIREBOX DOOR HINGE / LATCH BEARING ADJUSTMENT

If the firebox door seal has been replaced and it is not sealing properly, the firebox door may need to be adjusted to close more tightly. When adjusting the firebox door, make sure it is not adjusted too tightly as damage to the firebox door, frame or door seal may result.

1. To tighten the hinges, loosen the outer adjustment nut and turn the inner nut counter-clockwise; then tighten the outer adjustment nut securely. Adjust the top and bottom hinge for equal pressure when the door is latched.
2. To tighten the latch bearing, loosen the latch adjustment nut; then tap the latch bearing assembly in toward the firebox. Tighten the latch adjustment nut securely.



## FIREBOX DOOR SEAL

The firebox door seal must be in good condition to ensure an airtight seal. If the outdoor furnace is operated with the door open or ajar, the firebox door seal may become damaged or brittle due to excessive temperatures. If replacement is necessary, use the following procedure:

### **⚠ WARNING**

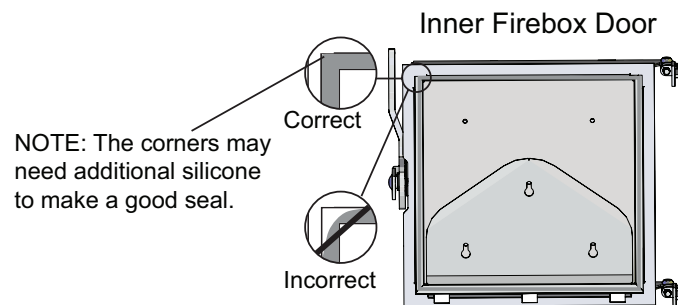
**Remove all wood, coals and ash from the firebox.**

1. Disconnect power to the outdoor furnace.

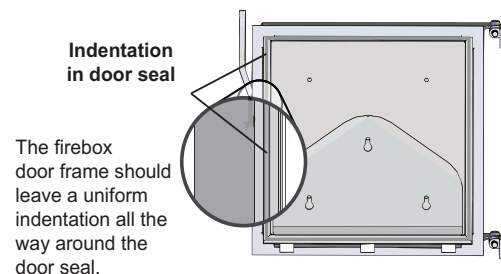
### **⚠ WARNING**

**Do not proceed without testing that power is disconnected. Make sure the power cannot be reconnected while testing components (i.e., use lock out, tag out).**

2. Using a scraper, remove the firebox door seal on the inner side of the firebox door and clean any remaining silicone adhesive from the groove. Any residue left in the groove will interfere with the new door seal.
3. Apply a liberal amount of silicone sealant into the entire firebox door seal groove.
4. Starting at the center of the hinge side of the firebox door, insert the new door seal into the groove, pressing it firmly into the bead of silicone sealant. Make sure the seal is not stretched as it is pressed into the corners. Force the seal out to fill in the corners as shown.



5. Scrape the face and surface area of the door frame to remove any deposits.
6. Close the firebox door. Make sure that pressure is felt as the latch is closed to ensure the seal is tight with the door frame.
7. Open the firebox door and check that there is an impression in the seal from the door frame. This mark must extend, with no gaps, around the entire perimeter of the firebox door seal. If needed, adjust the hinges and latch assembly.



### **⚠ CAUTION**

**The firebox door seal will be damaged or destroyed if it is not installed properly.**

## REACTION CHAMBER DOOR SEAL

The Reaction Chamber door seal must be in good condition to ensure an airtight seal. If replacement is necessary due to the Reaction Chamber door seal becoming damaged or brittle, use the following procedure:

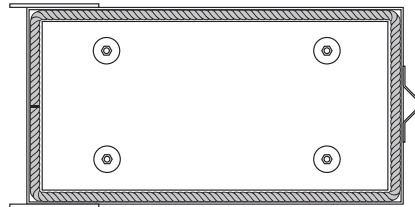
1. Disconnect power to the furnace.
2. Unlatch and open the Reaction Chamber door.
3. Use the maintenance tool to pull the ash to the front of the furnace; then use a small shovel to remove all of the ash and deposits from the Reaction Chamber. Take care not to damage the temperature sensor.

### **⚠ WARNING**

**Remove all ash from the Reaction Chamber.**

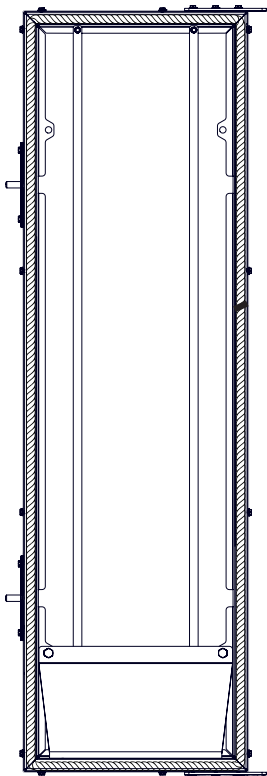
4. Using a scraper, remove the Reaction Chamber door seal rope and clean any remaining silicone adhesive from the groove. Any residue left in the groove will interfere with the new seal.
5. Apply a liberal amount of silicone sealant into the entire Reaction Chamber door seal groove.
6. Starting at the center of the hinge side of the Reaction Chamber door, insert the new door seal rope into the groove, pressing it firmly into the bead of silicone sealant. Make sure the Reaction Chamber door seal rope is not stretched as it is pressed into the corners. Force the Reaction Chamber door seal rope out to fill in the corners as shown.

**Reaction Chamber  
Door**




7. When the seal has been pressed into the groove all the way around the Reaction Chamber door, cut the end of the rope about one inch longer than required and press it tightly against the beginning end of the rope.
8. Close the Reaction Chamber door and secure the latch.

### Heat Exchanger Door Seal Rope



## HEAT EXCHANGER DOOR SEAL

The heat exchanger door seal must be in good condition to ensure an airtight seal. If replacement is necessary due to the door seal becoming damaged or brittle, use the following procedure:

1. Press the **Power**  button on the FireStar combustion controller to turn it off.

### CAUTION

**Be sure to turn off the FireStar combustion controller before doing this procedure.**

2. Remove the heat exchanger access cover from the back of the furnace.
3. Carefully undo both latches on the heat exchanger door; then slowly open the door making sure to stand clear of the opening.

### CAUTION

**Open the heat exchanger door slowly and stand off to the side when opening it.**

4. Using a scraper, remove the heat exchanger door seal rope and clean any remaining silicone adhesive from the groove. Any residue left in the groove will interfere with the new seal.
5. Apply a liberal amount of silicone sealant into the entire heat exchanger door seal groove.
6. Starting at the center of the hinge side of the heat exchanger door, insert the new door seal rope into the groove, pressing it firmly into the bead of silicone sealant. Make sure the door seal rope is not stretched as it is pressed into the corners. Force the door seal rope out to fill in the corners as shown.
7. When the seal has been pressed into the groove all the way around the heat exchanger door, cut the end of the rope about one inch longer than required and press it tightly against the beginning end of the rope.
8. Close the heat exchanger door and secure with latches. Install and secure the heat exchanger access cover.

## CIRCUIT BREAKER

The circuit breaker is located in the pump access area and also serves as the furnace disconnect. If the circuit breaker trips (turns off), reset it by turning it on. If the circuit breaker continues to trip, a component may be faulty. It is possible to isolate a faulty component using the following procedure.

1. Disconnect power to the outdoor furnace.

### **⚠ WARNING**

**Do not proceed without testing that power is disconnected. Make sure the power cannot be reconnected while testing components (i.e., use lock out, tag out).**

2. Remove the airbox access cover; then open the airbox door.
3. Disconnect the actuator motor harness and disconnect the fan harness.
4. To test for a faulty component, connect one component at a time (e.g., start with one of the actuator motors); then connect power to the outdoor furnace. If the circuit breaker trips, the component is likely faulty. If not, disconnect power to the outdoor furnace and repeat the procedure until all components have been tested.

### **⚠ CAUTION**

**Disconnect power to the outdoor furnace before disconnecting a component and before connecting a component.**

5. Close and secure the airbox door. Install the airbox access cover.

### **⚠ DANGER**

**Do not connect power or operate the outdoor furnace with the outer airbox cover removed. The outer airbox cover must be installed and secured with screws.**

## AIRBOX SEAL

Replace the airbox seal if it becomes damaged or worn to maintain proper operation of the furnace. See your WoodMaster dealer for replacement seals.

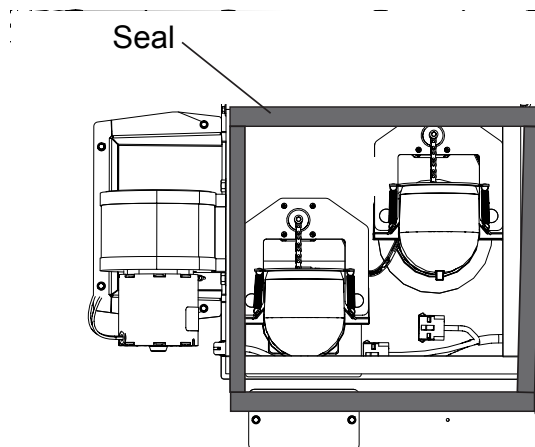
**NOTE: It is best to replace the entire seal. Over time, the seal will compress, and replacing it in sections may result in the old sections not sealing completely against the airbox door.**

1. Disconnect power to the outdoor furnace.

### **⚠ WARNING**

**Do not proceed without testing that power is disconnected. Make sure the power cannot be reconnected while replacing the airbox seal.**

2. Remove the airbox access cover; then open the airbox door. Using a scraper or similar tool, scrape off the existing seal from the airbox.
3. Clean off any remaining adhesive residue with alcohol or a suitable solvent.
4. Measure and cut replacement seal.



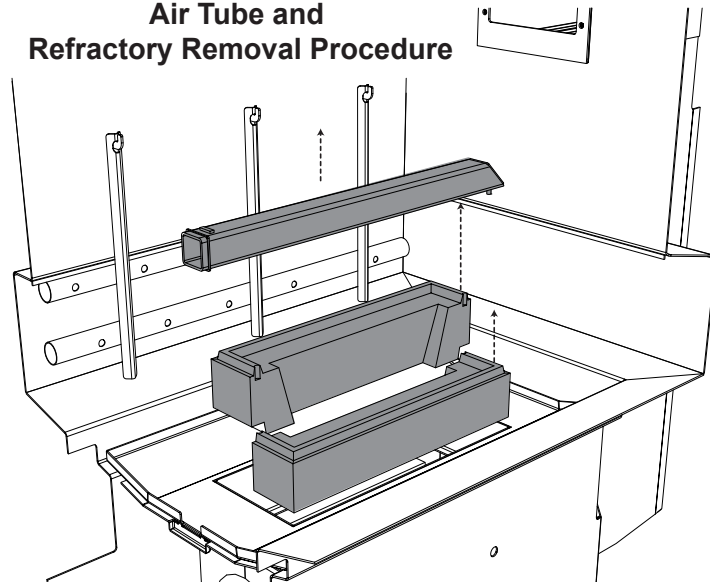
5. Remove the adhesive backing from the replacement seal and carefully apply the seal to the airbox as shown, making sure there are no gaps.
6. Close the airbox door and turn the furnace back on.
7. After the fan has started, use your hand to feel around the edges of the airbox door to check for leaks. A little air leakage, especially around the latches, is normal. If an excessive amount of air is felt, turn off the furnace; then check and repair/replace the seal if necessary.
8. Install the airbox access cover.

## AIR TUBE AND REFRACTORY MODULES

### ⚠ WARNING

Remove all wood, coals and ash from the firebox and allow the firebox to cool thoroughly before replacing the air tube and/or refractory.

#### Air Tube and Refractory Removal Procedure



1. Remove the air tube by lifting it up and sliding it toward the back of the outdoor furnace.
2. Remove the rope gasket; then remove the existing refractory modules.
3. Ensure the area where the new refractory modules will be installed is clean and free of all debris. Install the new refractory modules; then install a new rope gasket on top of the refractory modules.
4. Install the new air tube by placing it in the opening at the front of the outdoor furnace as shown; then pull it toward the front of the outdoor furnace to secure it in place making sure the alignment pin fits into the alignment hole in the refractory modules.

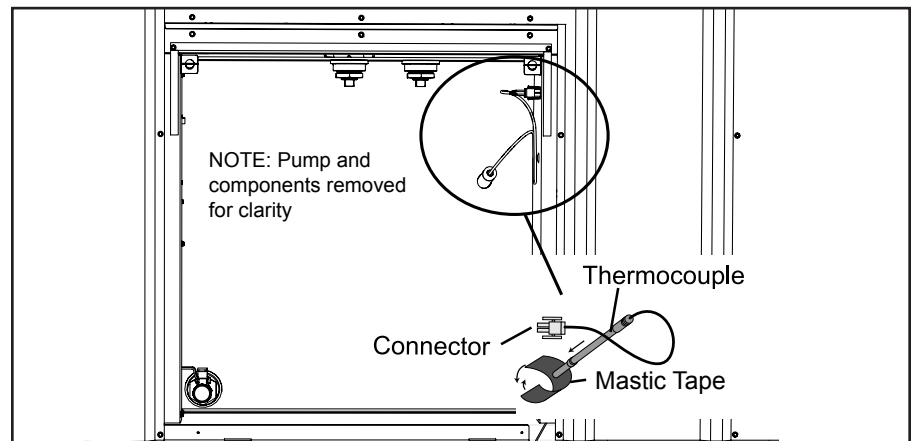
## THERMOCOUPLE

1. Disconnect power to the outdoor furnace.

### ⚠ WARNING

**Do not proceed without testing that power is disconnected. Make sure the power cannot be reconnected while replacing the thermocouple.**


2. Remove the pump access cover.
3. Disconnect the thermocouple connector; then remove the mastic tape from the thermocouple.
4. Remove the thermocouple.
5. Install the new thermocouple until the stop collar contacts the thermocouple tube.



6. Secure the thermocouple with the mastic tape; then connect the thermocouple connector.
7. Install the pump access cover; then connect power to the furnace.

## HEAT EXCHANGER DOOR INSULATION

**NOTE:** Insulation for the heat exchanger door is not standard fiberglass insulation. Use only the correct insulation when replacing or damage could occur. Contact your WoodMaster dealer for replacement insulation.

1. Press the **Power**  button on the FireStar combustion controller to turn it off.
2. Remove all wood, coals and ash from the firebox and allow the firebox to cool thoroughly.

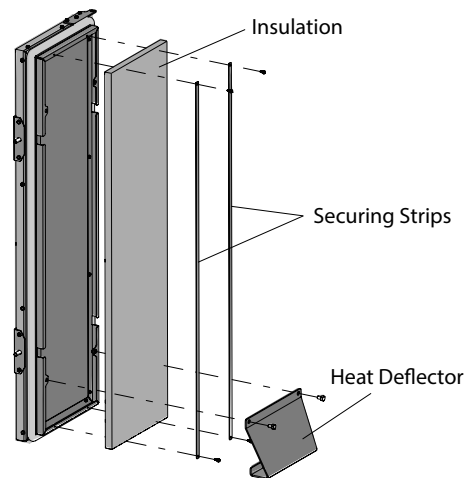
### **WARNING**

**Remove all wood, coals and ash from the firebox and allow the firebox to cool thoroughly before replacing the heat exchanger door insulation.**

3. Remove the heat exchanger access cover from the back of the furnace.
4. Carefully undo both latches on the heat exchanger door; then slowly open the door making sure to stand clear of the opening.

### **CAUTION**

**Open the heat exchanger door slowly and stand off to the side when opening it.**



5. Swing the door open far enough to gain access to the inside of the door.
6. Wearing proper protective gear, use a brush or small broom to clean off any accumulated ash from the inside of the door.

7. Remove the heat deflector from the bottom of the door.
8. Remove the hardware and securing strips.
9. Carefully remove the insulation paying close attention to how the insulation is installed in the door and tucked into the edges of the door. This will aid in installation of the new insulation.
10. Before installing the new insulation, place it over the opening to make sure it is the correct size.
11. Place the new insulation inside the heat exchanger door with the reflective side facing out (toward you). Be careful not to tear the reflective material. Ensure that the edges of the new insulation are tucked into the edges of the door.
12. Install the securing strips. It may be necessary to adjust the insulation being careful not to tear it, after the securing strips are installed.
13. Install the heat deflector.
14. Check the insulation again to ensure that it is properly secured and attached to the inside of the heat exchanger door.
15. Carefully close and latch the heat exchanger door.

**NOTE: The first few times the heat exchanger door is opened and closed after installing new insulation, it could seem more difficult to secure the latches. This is normal and once the insulation settles, securing the latches will be easier.**

16. Install the heat exchanger access cover.

## HEAT EXCHANGER ACCESS COVER INSULATION

**NOTE: Be sure to check the temperature range for the spray adhesive. It may be necessary to replace the heat exchanger access cover insulation indoors to allow it to cure properly.**

1. Remove the heat exchanger access cover from the back of the furnace.
2. Lay the cover on a piece of cardboard on a flat surface; then, wearing proper protective equipment, use a scraper to remove the insulation and any adhesive from the cover.
3. Test fit the new piece of insulation.
4. Using a good quality spray adhesive, follow the instructions on the can and apply the necessary amount to the inside of the cover.
5. Install the insulation in the cover, pressing down in multiple spots to ensure complete contact with the adhesive. Make sure the insulation is tucked all the way into the top of the cover.
6. Leave the cover on the flat surface until the adhesive cures according to the adhesive manufacturer's instructions.

7. After the adhesive has cured, check to ensure the insulation has properly bonded to the cover; then install the heat exchanger access cover on the furnace.

## COMBUSTION AIR TUBE / FRONT AIR CHANNEL

Press the **Power**  button on the FireStar combustion controller to turn it off.

### CAUTION

Be sure to turn off the FireStar combustion controller before doing this procedure.

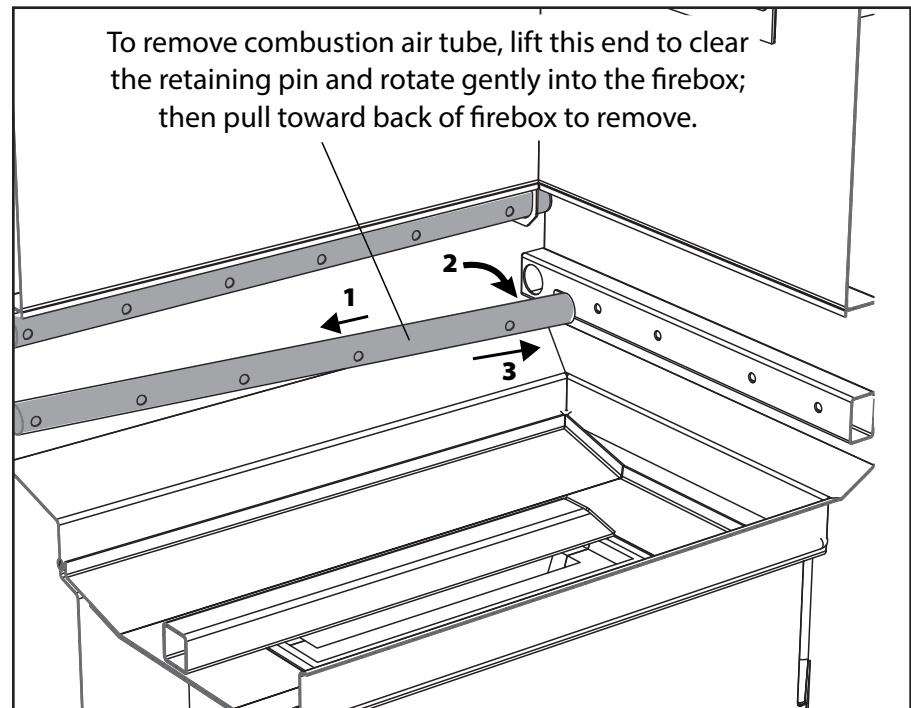
### WARNING

Remove all wood, coals and ash from the firebox and allow the firebox to cool thoroughly before working inside the firebox.

### Combustion Air Tube

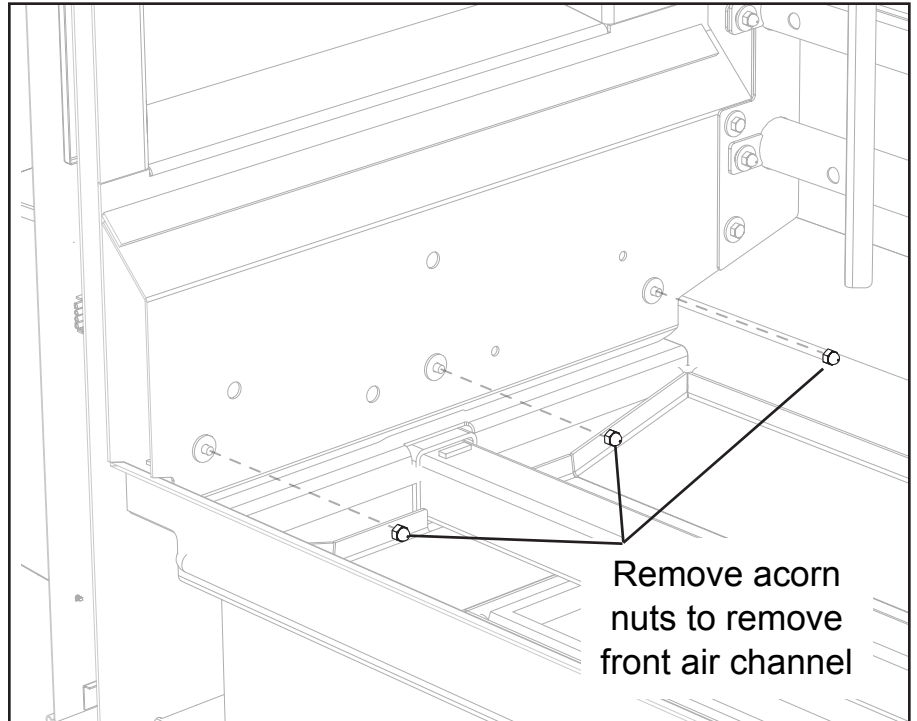
1. Lift the end of the tube closest to the back of the firebox up off of the retaining pin, then in and toward the back of the firebox. Install by reversing this procedure.

**NOTE:** If there is a large amount of buildup on the exterior of the combustion air tube, it may be necessary to first remove the buildup to make removal easier.



### Front Air Channel

1. Remove the acorn nuts securing the front air channel and remove. Remove any ash or deposits from behind the air channel in the wall of the firebox.



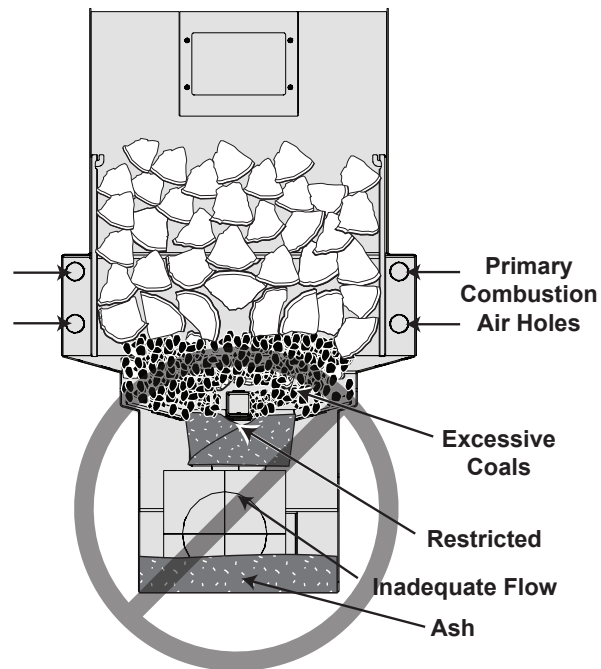
2. Install the new air channel. Apply a high-temperature, anti-seize compound to the stud threads; then secure with the acorn nuts and tighten securely.

# TROUBLESHOOTING

## GENERAL TROUBLESHOOTING INFORMATION

If the outdoor furnace is not operating the way it should, first review the information found in the Operation Instructions section, particularly the Adding Wood section.

### INCORRECT (Inadequate Flow)

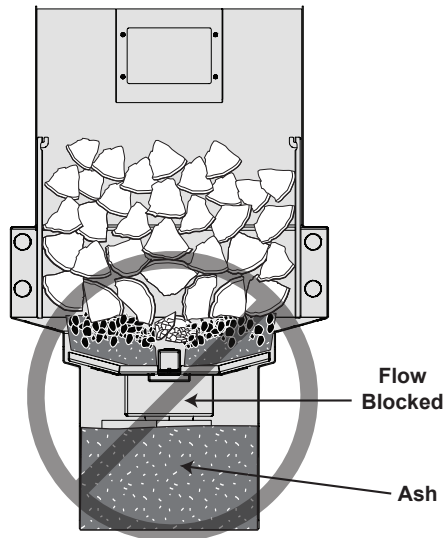


#### Is the Reaction Chamber full of ash?

The Reaction Chamber is where final combustion occurs. It is important that the Reaction Chamber remain unobstructed to allow final combustion to occur. It is not designed to be an ash collection area, although over time ash will gradually accumulate in the Reaction Chamber.

If ash builds up in the Reaction Chamber to a level that obstructs flow, the performance of the outdoor furnace will be affected, so the ash must be removed. A good rule is to clean the Reaction Chamber before it becomes 1/2 full (approximately 5" or 13 cm deep in any area of the Reaction Chamber).

### INCORRECT (Blocked Flow)



#### Are the air inlets plugged?

Primary combustion air is provided through the combustion air inlets in the firebox. If the air inlets are restricted or plugged, the furnace will not operate correctly. If it appears the combustion air inlets are plugged or restricted, refer to the Maintenance Sections for the Combustion Air Tubes and Air Tube and Refractory. If after cleaning each combustion air inlet, air flow is still blocked, inspect the primary combustion air elbow. Refer to the Maintenance Section for Primary Air Elbow.

**NOTE: If there is creosote buildup in the primary air elbow, it is caused by operating the furnace incorrectly. It is important to follow the recommended operation and maintenance procedures (see Adding Wood section).**

#### Is there creosote and/or ash inside the airbox?

Creosote, ash, or even coals in the airbox is an indication that the outdoor furnace has not been maintained and/or operated properly. Especially important to the operation and efficiency of the outdoor furnace is unrestricted air flow throughout the entire system. Refer to Adding Wood for a detailed explanation of how to operate and maintain your CleanFire.

**One or more combustion air inlets are covered** - If the level of coals and ash in the firebox is allowed to accumulate over the combustion air inlets, normal air flow can be blocked and could force coals and ash back into the airbox. Remove enough ash so the combustion air inlets are not covered. Review the Adding Wood section for more information.

## TROUBLESHOOTING OTHER SITUATIONS

### A. OUTDOOR FURNACE IS NOT OPERATING CORRECTLY

Review the information in the Adding Wood section, starting at step 5.

1. **Out of wood** - Add wood as necessary. Use correctly sized, seasoned wood.
2. **Area directly below the charge tube or Combustor obstructed** - Inspect and clean as required.
3. **Combustion air inlets obstructed** - Clean as required to prevent the combustion air inlets from being obstructed.
4. **Combustion air fan obstructed or not running** - Check the screen over the fan inlet and the inside of the fan for any obstructions.
5. **Airbox leaking** - The airbox cover must be properly secured. Determine the cause and correct.
6. **Primary air actuator motor closed** - If the primary air actuator motor is not operating properly, determine the cause and correct.
7. **Reaction Chamber, heat exchanger or the chimney plugged** - If the Reaction Chamber, heat exchanger or chimney are plugged, determine the cause and correct.
8. **Door open** - If the display on the controller indicates Door Open, close the firebox door. Make sure the firebox door is properly latched and check the condition of the firebox door seal. If it is not sealing properly (indicated by a uniform indentation), replace the seal.
9. **Low water** - If the display on the controller indicates Low Water, the system senses a low water condition. Check the water level at the sight gauge and, if necessary, add water according to the Water Quality and Maintenance section. If adding water does not correct the problem, contact your WoodMaster dealer.

**NOTE: If water needs to be added, it is very important to identify the cause of water loss and correct immediately. A leaky system or overheating commonly leads to dilution of the corrosion inhibitor and water jacket corrosion.**

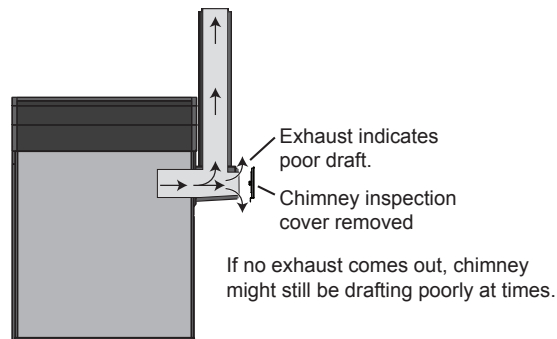
10. **Low water temperature for too long a period of time** - The display on the controller will indicate Fire Out and the controller will shut down the furnace if the water temperature has been too low for too long. Determine the cause of the water temperature being too low.
11. **Alarm condition** - Refer to the FireStar Combustion Controller Operation Manual.
12. **Chimney not drafting properly** - Draft is the force which moves air from the appliance up through the chimney. The amount of draft in your chimney depends on the length of the chimney, local geography, nearby obstructions and other factors. Draft occurs when the temperature in the chimney is high enough to cause a negative pressure that "pulls" the exhaust up and out the chimney.  
Proper draft is necessary for the CleanFire to operate optimally. Too much draft may cause excessive temperatures in the appliance. Inadequate draft may cause backpuffing and plugging of the chimney.

If poor draft is suspected, perform the following test: with the outdoor furnace and chimney at normal operating temperature, loosen the chimney inspection cover and pull it back about an inch. If exhaust comes out from around the cover, pressure in the chimney may be incorrect and adding more chimney sections may be required. However, due to many variables, even if exhaust does not come out from around the cover, the chimney might still not be drafting properly at all times. Due to a number of variables, poor draft can be an intermittent problem.

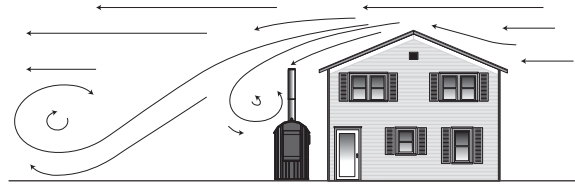
**NOTE: A qualified installer may perform the following test to check for proper draft. Before performing the test, the outdoor furnace should be completely cleaned to ensure nothing obstructs exhaust flow through the system. Fire the furnace and allow it to reach normal operating temperature before performing the test.**

- Drill a hole in the chimney inspection cover; then with the outdoor furnace and chimney at normal operating temperature, use a manometer to check draft. If flue draft is less than  $-0.05$  in. WC ( $-12.45$  Pa) add more chimney sections.
- After the test, fill the hole in the chimney inspection cover with high-temp silicone.

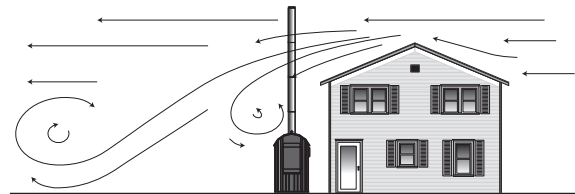
**Perform test with bypass closed at normal operating temperature.**



- If a spark arrestor is being used, make sure it is clean and unobstructed.
- Objects like buildings and trees in close proximity or nearby terrain (e.g., hills, valleys, etc.) can adversely affect air flow in the chimney. Adding chimney sections may overcome these factors.



May cause poor draft.



Allows for better draft.

### B. FIRE GOES OUT OR KEEPS GOING OUT

Review the information in the Adding Wood section, starting at step 5.

### C. BUILDING IS LOSING TEMPERATURE

Review the information in the Adding Wood section, starting at step 5.

1. **Circulation valve(s) closed** - Be sure the proper valves in the system are open to allow circulation.
2. **Circuit breaker off** - If there is a circuit breaker that supplies power to the outdoor furnace, check that it is on.
3. **Circuit breaker off** - Check that the circuit breaker switch (located in the pump compartment) is on. If the circuit breaker has tripped, determine the cause before resetting it.
4. **Circulation pump(s) not operating** - Check that circulation pumps are operating. If not, disconnect power to the pump. Close valves at the pump. Disassemble the pump and try to turn the pump shaft. If the shaft is stuck, replace the pump cartridge. Replace only the cartridge whenever possible. If necessary, replace the pump. Follow instructions supplied with the pump.
5. **Air in system** - Check for air in the water lines or heat exchangers. If you hear a gurgling sound in a heat exchanger, air is present in the system. Shut off the pump, wait 15 seconds and start the pump. If it is necessary to force air from lines, refer to Initial Start-up Procedures.
6. **Building(s) poorly insulated or uninsulated** - Poorly insulated or uninsulated buildings, buildings with uninsulated or poorly insulated ceilings, or a lack of proper insulation under radiant flooring can cause excessive fuel consumption and or heating problems.
7. **Supply and return lines installed incorrectly** - Make sure the hot supply line is connected to the correct fitting on the outdoor furnace and heat exchanger.

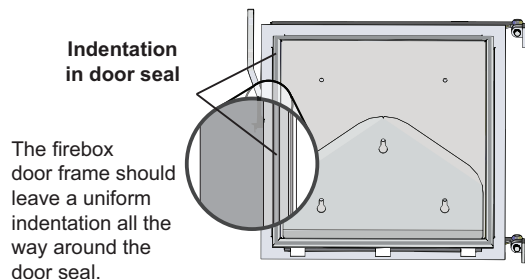
8. **Circulation pump(s) installed backwards** - Check that pump flow direction is correct. If not, shut off power to pump. If the flow is not in the correct direction, disconnect pump from water line and reverse pump mounting to correct flow direction. If the pump is not mounted on the outdoor furnace, check for proper pump mounting location.
9. **Underground supply and return lines insulated poorly** - Heat loss from poorly insulated underground supply and return lines is often indicated by an unusually high amount of snow melting above the lines when the ground temperature is 10° F (-12°C) or colder.
10. **Supply and return lines uninsulated** - Uninsulated supply and return lines in areas that are not intended to be heated (unheated crawl spaces, under mobile homes, etc.) may cause excessive heat loss. Insulate the supply and return lines.
12. **Poor water quality** - Water with high amounts of solids, sand or dirt can create deposits inside the wall of heat exchanger components, reducing the amount of heat output. If this condition is suspected, contact your WoodMaster dealer.
13. **New construction with radiant in-floor heat** - Bringing a cold concrete slab up to temperature the first time will take a considerable amount of time and wood; once warm, wood consumption will be reduced if the concrete slab and building are insulated properly.
14. **Heat load too large** - Re-evaluate the system and match heat load to the outdoor furnace.

#### D. SMOKE COMING FROM BETWEEN FIREBOX DOOR AND FRONT OF THE DOOR FRAME

1. **Door seal faulty or door frame obstructed** - If there is smoke coming from between the firebox door and the front of the door frame for more than a short time after reloading, scrape the face and surface area of the door frame to remove any deposits. Check the condition of the firebox door seal and replace if necessary.
2. **Door hinges and/or latch need adjusting** - Adjust the hinges and/or latch bearing.

#### E. OUTDOOR FURNACE IS OVERHEATING

1. **Air entering through the firebox door or smoke coming out of the firebox door when the door is closed** - Make sure the firebox door is properly latched and check the condition of the firebox door seal. If it is not sealing properly (indicated by a uniform indentation), replace the seal. If firebox door does not close tightly, adjust using the appropriate procedure (see Owner Serviceable Items).



**NOTE: If the outdoor furnace is operated with the door open, the firebox door seal may be damaged.**

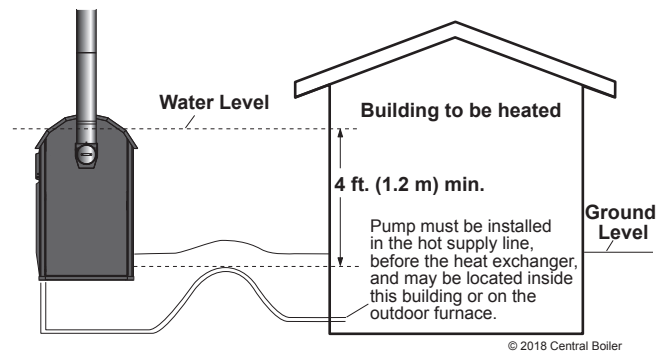
2. **Actuator motor and/or air regulating disc stuck open or obstructed** - Remove any obstructions. Lubricate the chain with a high temperature dry film lubricant rated for chains. Be careful not to get lubricant on the actuator motor or motor shaft. If replacement is necessary, refer to Air Regulating Disc Gaps for the factory settings for the air regulating discs.

**NOTE: If the outdoor furnace loses water from boiling, the problem should be identified and repaired immediately. Under normal operation, little or no water needs to be added. Adding water to the furnace may cause corrosion if not immediately treated with MolyArmor 350. In addition, the amount of dissolved solids in the system (due to adding additional water) can cause problems.**

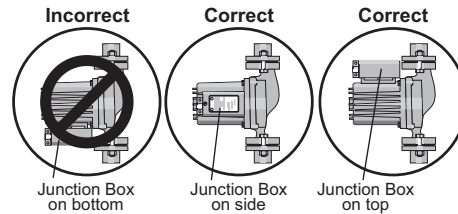
3. **Water is not circulating** - Check to make sure the pump is operating and water is circulating continuously through the supply and return lines to keep water temperature uniform in the outdoor furnace.
4. **Circulation valve(s) closed** - Be sure the proper valves in the system are open to allow circulation.
5. **Pulse set to run too long and/or too often in a low heat draw situation** - Increase the time between idle pulses of air and/or decrease the amount of time the pulse is provided (see FireStar operating instructions).
6. **FireStar combustion controller set incorrectly** - Refer to FireStar Combustion Controller Operation Manual.

#### F. FREQUENT PUMP TROUBLE OR POOR WATER CIRCULATION

1. **Pump mounted incorrectly** - If the pump is not mounted on the outdoor furnace, it must be mounted at a minimum of four feet lower than the top water level in the outdoor furnace.



Make sure the pump motor is installed in a horizontal position. The junction box must not be located below the pump motor. If necessary, remove the four screws and rotate the pump body.



2. **Water will not circulate** - If the system has been drained and refilled, or if the system has been opened for any reason (e.g., replacement of pump, adding heat exchangers, repairing a leak), the system must be purged (see Initial Start-up Procedures).
3. **Poor water quality** - Water with high amounts of solids, sand or dirt can cause frequent pump failure. Use softened and/or filtered water.
4. **Deposits in water lines/heat exchanger walls** - If water high in silica or other mineral content has been used, material deposits may build up on the insides of the supply and return lines and on the heat exchanger walls. If this occurs, the system will need to be drained and then cleaned using Sludge Conditioner (p/n 166). The system must then be refilled with the proper amount of MolyArmor 350 (p/n 2900631) and fresh water.

#### G. BURNING AN EXCESSIVE AMOUNT OF WOOD

1. **High volume water heating** - High volume water heating (e.g., car wash, swimming pool, etc.) will require high wood consumption.
2. **Excessive heat loss** - See items 6-10 of Building is Losing Temperature.
3. **Supply and return line heat loss** - If not using ThermoPEX, supply and return lines buried in a wet, low-lying area may cause a large heat loss that will greatly increase wood consumption.
4. **High heat demand** - Concrete slabs (with radiant heat) that are poorly insulated or are exposed to water or cold outside temperatures will require increased wood consumption (see Hydronic Installations section). Bringing a cold concrete slab up to temperature the first time will take a considerable amount of time and wood; once warm, wood consumption will be reduced if the concrete slab and building are insulated properly. The following will also have a high heat demand: poorly insulated buildings, buildings with large amounts of glass windows/doors, buildings with overhead doors, greenhouses, uninsulated crawl spaces, outdoor air infiltration and air leaking through foundation.

#### H. VISIBLE EXHAUST COMING FROM CHIMNEY

Review the information in the Adding Wood section, starting at step 5.

There are conditions related to outside temperatures, humidity, fuel moisture, burn rate and other factors that can cause steam to be visible in the exhaust plume of combustion equipment, whether it is wood, gas or oil.

Seeing a white exhaust plume with moisture present is normal under many conditions and is not suggestive of poor combustion or high emissions.

Opacity is the amount of light which is blocked in an exhaust plume. It is a measurement that is usually stated as a percentage. For example, an opacity of 0% means that all light passes through while an opacity of 100% means that no light can pass through. Opacity measurements give an indication of the concentration of particles in an exhaust plume.

To read opacity correctly, observations should be made only when:

- The sun is shining and behind you,
- You are at least three times the distance of the chimney height away from the furnace, and
- The plume is traveling perpendicular to your position.

The observation should be conducted looking at the point of the plume where condensed water vapor (steam) is not present. Do not observe the plume itself but rather look through it at a contrasting background (such as green leaves or trees). There are many other important factors as well.

The amount of visible emissions can be reduced by burning seasoned wood, by making sure that your chimney meets the recommendations in this owner's manual and by loading the firebox to match your heat load. Once the water content of the wood has evaporated, the emissions become very transparent.

1. **Too much ash in firebox** - Refer to Routine Maintenance for ash removal.

#### I. CORROSION IS PRESENT - CALL DEALER

**NOTE: To reduce condensation in the firebox, it is not recommended to set the temperature below 185°F (85°C).**

1. **Burning garbage or plastic** -Do not burn garbage or plastic. It is likely unlawful and may damage the firebox in a very short period of time.

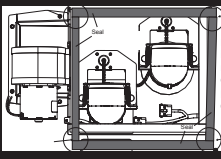
**NOTE: Chloride or sulfurous gases can be generated if plastic or rubber is burned and will mix with the moisture from the wood to form hydrochloric or sulfuric acids in the firebox, creating corrosion.**

2. **Firebox wasn't cleaned out at the end of the heating season** - Be sure to follow the post-heating season maintenance schedule which includes scraping out firebox and removing all ash.
3. **Cleaning rod not run through ash bed prior to loading wood** - It is important that you push the cleaning rod back and forth through the ash bed each time prior to loading wood to allow air flow and prevent the ashes from accumulating moisture. See Operating Instructions for more details.

# GENERAL INFORMATION

## Make note of these precautionary statements, also found on the outdoor furnace.

**NOTICE**



Refer to Owner's Manual in regards to stepper motor operation. This is essential to maintaining proper and efficient operation of the furnace.

Inspect seals for any damage or gaps. Pay close attention to corners and any location where one seal meets another, as a good seal is crucial for proper furnace operation. Refer to the Owner's Manual for instructions on how to replace a defective seal.

\*Airbox illustration for reference only. Actual setup and component location may differ from your specific model. Refer to your Owner's Manual for more details.

pin 7000242

**CAUTION**



Temperature Sensor

Take care not to damage the temperature sensor when removing ash.

**ATTENTION**



Captur de température

Prenez soin de ne pas endommager le capteur de température lorsque vous enlevez les cendres.

**NOTICE**

During a cold start, a considerable amount of moisture from condensation will collect inside the firebox and Reaction Chamber. This is normal and the moisture will evaporate when the outdoor furnace reaches operating temperature.

**REMARQUE**

Lors d'un démarrage à froid, une importante quantité d'humidité de condensation s'accumule à l'intérieur du foyer et de la chambre de réaction. Ce phénomène est normal et l'humidité s'évaporera lorsque la chaudière extérieure aura atteint sa température de service.

pin 7000248

**NOTICE**

Chimney pipe and all extensions must be insulated.

**REMARQUE**

Coupez l'alimentation électrique avant d'enlever ce panneau.

**WARNING**

Disconnect power before removing this panel.

**CAUTION**

**HOT Surfaces**

Do NOT Touch During Operation

**ATTENTION**

Surfaces BRÛLANTES

NE touchez PAS pendant le fonctionnement

pin 7000245

**AVERTISSEMENT**

Coupez l'alimentation électrique avant d'enlever ce panneau.

pin 7000245

**NOTICE**

For use with aluminum or copper conductors.

**REMARQUE**

Pour utilisation avec des conducteurs en aluminium ou en cuivre.

pin 7000245

**WARNING**

**AVOID DAMAGE!**

BEFORE operating this appliance read manual and watch videos for proper operation and maintenance procedures. Damage or decreased life expectancy of appliance could result if appliance is not properly operated or maintained.

pin 7000248

**WARNING**

Risk of fire. Do not store fuel or other combustible materials within marked clearances to combustibles. Do not cover supply and return lines with combustible materials.

**AVERTISSEMENT**

Risque d'incendie. Ne stockez pas de carburant ou autres matériaux combustibles à l'intérieur du périmètre de sécurité indiqué. Ne recouvrez pas les conduites d'alimentation et de retour avec des matériaux combustibles.

pin 7000243

**NOTICE**



Firebox Door Frame

Use the tools provided to completely scrape the face of the firebox door frame where the door seal contacts.

**AVIS**

Pour réarmer le disjoncteur, appuyez l'interrupteur sur ARRÊT puis sur MARCHÉ.

pin 7000233

**NOTICE**

Initially inspect the heat exchangers weekly, and clean as needed, until you can determine the frequency of cleaning based on your application.

Refer to the Owner's Manual for cleaning procedures.

pin 7000154

**CAUTION**

**ANY TIME WATER IS ADDED, the furnace MUST BE immediately heated to 185° F, circulated, and the inhibitor level tested. FAILURE TO DO SO WILL RESULT IN DAMAGE to your furnace's water jacket!**

Carefully follow the steps in your Owner's Manual for adding water and testing inhibitor levels.

pin 7000077

**WARNING**

Turn off Furnace Power Disconnect before opening this panel. Furnace Power Disconnect located on side of furnace under the pump panel. Do not operate furnace with this panel removed.

**AVERTISSEMENT**

Avant d'ouvrir ce panneau, arrêtez le commutateur de coupe électrique de la chaudière. Ce commutateur est situé sur le côté de la chaudière sous le panneau de la pompe. Ne pas faire fonctionner la chaudière à bois extérieur avec ce panneau retiré.

pin 7000241

**CAUTION**

Failure to perform proper care and maintenance will reduce the life and performance of your furnace. For best results, always follow these guidelines:

1. Add water treatment before filling with water.
2. Burn properly seasoned wood.
3. Do not burn anything other than the recommended fuels.
4. Clean and inspect the furnace regularly.
5. Do not operate with the water temperature below 150° F (66° C).
6. Maintain the recommended water treatment levels at all times.

Clean the firebox thoroughly and keep it dry when not in use. See Owner's Manual for more information about regularly scheduled maintenance.

**DO NOT BURN GARBAGE**

Burning garbage causes damage to components of wood burning appliances.

HPBA

Refer to your Owner's Manual

**DANGER**

Risk of fire or explosion.

**DANGER**

Risque d'incendie ou d'explosion

**WARNING**

Risk of fire. Do not open the Reaction Chamber door when appliance is in operation. Do not leave Reaction Chamber door open unattended.

**AVERTISSEMENT**

Risque d'incendie. N'ouvrez pas la porte de la chambre de réaction lorsque l'appareil est en marche. Ne laissez pas la porte de la chambre de réaction ouverte sans surveillance.

pin 7000331

**CAUTION**

1. Add water treatment before filling with water.
2. Burn properly seasoned wood.
3. Do not burn anything other than the recommended fuels.
4. Clean and inspect the furnace regularly.
5. Do not operate with the water temperature below 150° F (66° C).
6. Maintain the recommended water treatment levels at all times.

Clean the firebox thoroughly and keep it dry when not in use. See Owner's Manual for more information about regularly scheduled maintenance.

**BURN RESPONSIBLY**

**Preserve Your Right to Burn Wood**

- Before installing, ALWAYS consider the direction that the chimney exhaust will travel with prevailing winds.
- BEFORE operating, the furnace must be installed with adequate chimney height. If there is a residence not served by the furnace within 300 feet (91.5 meters), the chimney must be 2 feet (0.6 meters) higher than the peak of the residence it serves. If there is a residence not served by the furnace within 100 feet (30.5 meters), the chimney must be 2 feet (0.6 meters) higher than the peak of the residence served or not served, whichever is higher.
- Proper chimney height will aid in dispersing the chimney exhaust. Chimney height may need to be greater than the above minimum requirements. The outdoor wood furnace must be installed in accordance with the manufacturer's recommendations and/or in accordance to all applicable codes and regulations, whichever is more stringent. Refer to your Owner's Manual.
- ONLY burn the proper fuels specified.
- DO NOT create a nuisance. Be certain your chimney exhaust is not adversely affecting neighbors. Creating a nuisance may affect your right to burn wood. If any issue with chimney exhaust arises, take immediate action to solve the issue.
- Properly dispose of ashes into a metal container with a cover.
- It's been said that lighting a fire can be more of an art than a science. You may need to vary techniques to achieve best results. Many factors can have a significant effect such as size of wood, moisture content, wood storage, etc. Over time, you will become familiar with your particular conditions. This will allow you to identify cause and effect in a variety of circumstances and what works best for your conditions.

Protect your right to heat with wood. Careless operation may result in a loss of your rights.

pin 7000239 Rev. 6

**WARNING**

- Risk of fire.
- DO NOT operate with flue draft exceeding 0.050 in. water column (12.450 Pa).
- DO NOT use chemicals to start unit firing.
- DO NOT burn garbage, gasoline, fuel oils, or other flammable liquids or materials.
- DO NOT operate with fuel loading or ash removal doors open.
- DO NOT store fuel or other combustible materials within marked installation clearances. Inspect and clean flues and chimneys regularly.
- For safety, open bypass door 15 seconds before opening the firebox door and do not operate the furnace with the firebox door unattended.
- Operating the furnace with the firebox door unattended may lead to a runaway fire. In the event of a runaway fire or immediately after tenting to the fire, latch the firebox door and wait 15 seconds before using the bypass door to purge the firebox.
- DO NOT leave furnace unattended with the firebox door unattended.
- DO NOT install or operate furnace before test reading and understanding the Owner's Manual.
- DO NOT allow others to install or operate furnace without first reading and understanding the Owner's Manual.

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- DO NOT leave furnace unattended with the firebox door unattended.
- DO NOT install or operate furnace before test reading and understanding the Owner's Manual.
- DO NOT allow others to install or operate furnace without first reading and understanding the Owner's Manual.

**CAUTION**

- DO NOT start fire until water level is full.
- Keep face away from door area.
- Hot surfaces.
- Keep children away.
- DO NOT touch during operation.
- DO NOT burn treated wood, plastics or rubber in the furnace.
- Maximum draft marked on the nameplate.
- ALWAYS comply with all applicable codes and regulations.
- ALWAYS take care when adding wood to the furnace to prevent hot coals from spilling out.
- ALWAYS store ashes in a covered non-combustible container.

**CAUTION**

Do not plug, block or seal vent opening. Sealing can result in a dangerous buildup of pressure.

**ATTENTION**

Ne pas bloquer, colmater ou sceller l'ouverture ou conduit d'évacuation. Sceller l'ouverture pourrait entraîner une augmentation dangereuse de la pression.

pin 7000252

**CAUTION**

Watch your head.

pin 8956

**CAUTION**

15 seconds before opening firebox door, lift and push handle toward back of furnace to open bypass door.

15 seconds after closing firebox door, pull handle toward front of furnace and push down to close bypass door.

**ATTENTION**

Quinze secondes avant d'ouvrir la porte du foyer, couvrez la porte de dérivation en soulevant puis poussez la poignée en direction de l'arrière de la chaudière.

Quinze secondes après avoir fermé la porte du foyer, fermez la porte de dérivation en tirant la poignée en direction de l'avant de la chaudière puis en la poussant vers le bas.

pin 7000253

**ATTENTION**

NE démarrez PAS le feu avant de faire le plein d'eau. Éloignez votre visage de la porte.

- Surfaces brûlantes.
- Éloignez les enfants.
- NE touchez PAS pendant l'utilisation.
- NE brûlez PAS de bois traité, de plastique ou de caoutchouc dans la chaudière.
- Le tirage maximal est indiqué sur la plaque signalétique.
- Respectez TOUJOURS l'ensemble des réglementations et recommandations applicables.
- Procédez TOUJOURS avec précaution lorsque vous ajoutez du bois dans la chaudière pour éviter de faire tomber des braises à l'extérieur.
- Stockez les TOUJOURS les cendres dans un récipient non combustible et couvert.

pin 7000253

**CAUTION**

DO NOT disable the door switch, as it serves as a safety and reset function.

**ATTENTION**

NE désactivez PAS l'interrupteur de la porte car il sert de fonction de sécurité et de réinitialisation.

pin 7000249

**ATTENTION!**

Remove the Owner's Manual and read it before operating furnace. If you have any questions, contact your dealer.

**NOTICE**

Inspect and clean the heat exchangers monthly or as needed. READ OWNER'S MANUAL FOR COMPLETE INSTRUCTIONS.

**MAINTENANCE SCHEDULE**

**DAILY**  
Check water level. Remove ashes as needed.

**MONTHLY**  
Check door seal, chimney and vent cap. Remove ashes and clean the firebox, inspect and clean the heat exchanger and Reaction Chamber.

**SEMIANNUALLY**  
Periodically remove the ashes from the firebox. Inspect and scrape the firebox. Inspect and clean the heat exchanger and Reaction Chamber. This inspection should also be performed after the first and third months of operation. Use a wire brush and small scraper to clean firebox, side walls, back wall and ash pan.

READ OWNER'S MANUAL FOR COMPLETE INSTRUCTIONS

pin 7000239 Rev. 6

**WARNING**

- Risk of fire.
- DO NOT operate with flue draft exceeding 0.050 in. water column (12.450 Pa).
- DO NOT use chemicals to start unit firing.
- DO NOT burn garbage, gasoline, fuel oils, or other flammable liquids or materials.
- DO NOT operate with fuel loading or ash removal doors open.
- DO NOT store fuel or other combustible materials within marked installation clearances. Inspect and clean flues and chimneys regularly.
- For safety, open bypass door 15 seconds before opening the firebox door and do not operate the furnace with the firebox door unattended.
- Operating the furnace with the firebox door unattended may lead to a runaway fire. In the event of a runaway fire or immediately after tenting to the fire, latch the firebox door and wait 15 seconds before using the bypass door to purge the firebox.
- DO NOT leave furnace unattended with the firebox door unattended.
- DO NOT install or operate furnace before test reading and understanding the Owner's Manual.
- DO NOT allow others to install or operate furnace without first reading and understanding the Owner's Manual.

**AVERTISSEMENT**

- Risque d'incendie.
- N'UTILISEZ PAS l'appareil si le tirage dépasse de 0,050 pouce la colonne d'eau (12,450 Pa).
- N'utilisez PAS de produits chimiques pour allumer la machine.
- Ne brûlez PAS de déchets d'essence, d'huile de vidange ni d'autres liquides ou matériaux inflammables.
- NE faites PAS fonctionner la chaudière avec la porte de chargement du combustible ou celle d'enlèvement des cendres ouverte.
- NE stockez PAS de carburant ou autres matériaux combustibles à l'intérieur du périmètre de sécurité indiqué.
- Inspectez et nettoyez périodiquement les carreaux et la cheminée.
- Pour des raisons de sécurité, ouvrez la porte de dérivation quinze secondes avant d'ouvrir la porte du foyer. Ne faites pas fonctionner la chaudière avec la porte du foyer déverrouillée.
- Si la chaudière fonctionne avec la porte du foyer déverrouillée, un feu de cheminée risque de se déclarer. Si le feu de cheminée survient ou immédiatement après avoir fermé la porte, verrouillez la porte du foyer et attendez quinze secondes avant de fermer la porte de dérivation pour purger la porte du foyer.
- Ne laissez PAS la chaudière sans surveillance lorsque la porte du foyer est déverrouillée.
- N'installez PAS et N'utilisez PAS la chaudière avant de lire et de comprendre le manuel du propriétaire.
- N'autorisez PAS d'autres personnes à installer et utiliser la chaudière avant de lire et de comprendre le manuel du propriétaire.

pin 7000232

# WIRING DIAGRAM

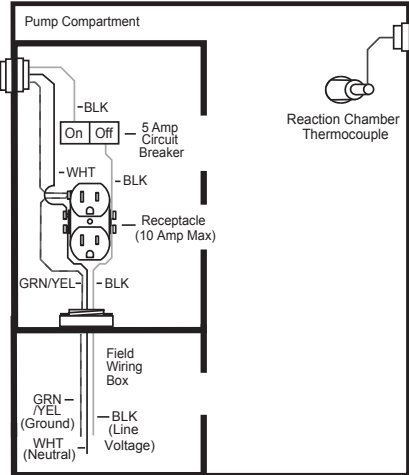
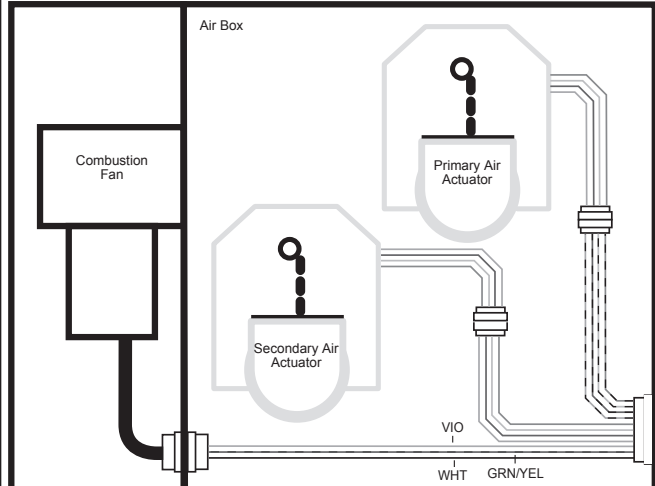
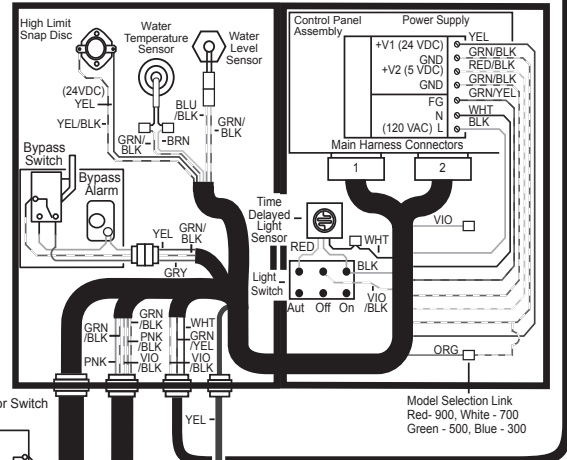
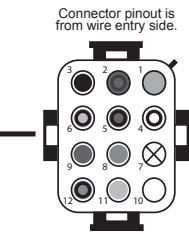
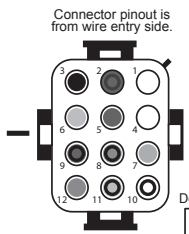
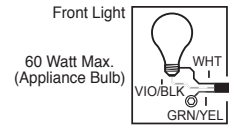
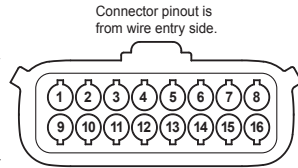
## CleanFire Wiring Diagram

| MAIN HARNESS CONNECTOR 1 |                   |             |                       |
|--------------------------|-------------------|-------------|-----------------------|
| TERMINAL                 | WIRE COLOR & SIZE | DESTINATION |                       |
| 3                        | VIO               | 18GA        | Auxiliary Input       |
| 4                        | ORG               | 18GA        | Model Selection Input |
| 5                        | BRN               | 18GA        | Water Temperature     |
| 8                        | PNK               | 18GA        | Door Switch           |
| 9                        | RED               | T/C         | Reaction Temp -       |
| 10                       | YEL               | T/C         | Reaction Temp +       |
| 11                       | PNK/BLK           | 18GA        | Reaction Door Open    |
| 12                       | VIO/BLK           | 18GA        | Reaction Door Closed  |
| 13                       | GRY               | 18GA        | Bypass Alarm Switch   |
| 14                       | BLU/BLK           | 18GA        | Water Level Switch    |

| MAIN HARNESS CONNECTOR 2 |                   |             |                        |
|--------------------------|-------------------|-------------|------------------------|
| TERMINAL                 | WIRE COLOR & SIZE | DESTINATION |                        |
| 1                        | BLK/WHT           | 18GA        | Primary Air Actuator   |
| 2                        | RED/WHT           | 18GA        | Primary Air Actuator   |
| 3                        | BLU/WHT           | 18GA        | Primary Air Actuator   |
| 4                        | GRN               | 18GA        | Secondary Air Actuator |
| 5                        | RED               | 18GA        | Secondary Air Actuator |
| 6                        | BLU               | 18GA        | Secondary Air Actuator |
| 8                        | BLK               | 16GA        | 120 VAC                |
| 9                        | GRN/WHT           | 18GA        | Primary Air Actuator   |
| 11                       | YEL/BLK           | 18GA        | +24VDC                 |
| 12                       | GRN/BLK           | 18GA        | DC Ground              |
| 13                       | BLK               | 18GA        | Secondary Air Actuator |
| 14                       | RED/BLK           | 18GA        | +5VDC                  |
| 15                       | GRN/YEL           | 16GA        | Earth Ground           |
| 16                       | VIO               | 16GA        | Combustion Fan         |

| CONTROL PANEL 12 PIN CONNECTOR |                   |             |                        |
|--------------------------------|-------------------|-------------|------------------------|
| TERMINAL                       | WIRE COLOR & SIZE | DESTINATION |                        |
| 1                              | BLK               | 16GA        | 120 VAC                |
| 2                              | GRN/YEL           | 16GA        | Earth Ground           |
| 3                              | WHT               | 16GA        | 120 VAC Neutral        |
| 4                              | BLK               | 18GA        | Secondary Air Actuator |
| 5                              | GRN               | 18GA        | Secondary Air Actuator |
| 6                              | RED               | 18GA        | Secondary Air Actuator |
| 7                              | VIO               | 16GA        | Combustion Fan         |
| 8                              | BLU/WHT           | 18GA        | Primary Air Actuator   |
| 9                              | GRN/WHT           | 18GA        | Primary Air Actuator   |
| 10                             | BLK/WHT           | 18GA        | Primary Air Actuator   |
| 11                             | RED/WHT           | 18GA        | Primary Air Actuator   |
| 12                             | BLU               | 18GA        | Secondary Air Actuator |

| AIR BOX 12 PIN CONNECTOR |                   |             |                        |
|--------------------------|-------------------|-------------|------------------------|
| TERMINAL                 | WIRE COLOR & SIZE | DESTINATION |                        |
| 1                        | VIO               | 16GA        | Combustion Fan         |
| 2                        | GRN/YEL           | 16GA        | Earth Ground           |
| 3                        | WHT               | 16GA        | 120 VAC Neutral        |
| 4                        | BLK/WHT           | 18GA        | Primary Air Actuator   |
| 5                        | GRN/WHT           | 18GA        | Primary Air Actuator   |
| 6                        | RED/WHT           | 18GA        | Primary Air Actuator   |
| 8                        | BLU               | 18GA        | Secondary Air Actuator |
| 9                        | GRN               | 18GA        | Secondary Air Actuator |
| 10                       | BLK               | 18GA        | Secondary Air Actuator |
| 11                       | RED               | 18GA        | Secondary Air Actuator |
| 12                       | BLU/WHT           | 18GA        | Primary Air Actuator   |





## NOTES

## NOTES

## NOTES

# WARRANTY COVERAGE

The warranty obligations of WoodMaster, Inc. ("WoodMaster") are strictly limited to the terms, conditions, limitations and exclusions set for in these warranties:

**Limited One-Year Warranty** - WoodMaster, Inc. ("WoodMaster") warrants to the original Owner, WoodMaster CleanFire, FireMax and Traditional Titanium Series outdoor furnaces against defects in workmanship for a period of ONE (1) YEAR from the date of original retail purchase provided that the Owner strictly complies with instructions in the Owner's Manual. The controller is covered for workmanship defect failures for two (2) years from the furnace purchase date.

If failure of a warranty-covered part occurs that is caused by a defect in workmanship, WoodMaster will, at its option:

1. repair or replace (using new or refurbished replacement parts) the defective or failed part; or
2. exchange the furnace with a comparable model furnace that is new or manufactured from new or serviceable used parts and is at least functionally equivalent to the original furnace.

**Optional Limited 25-Year Extended Warranty** - WoodMaster provides the original Owner with an Optional Limited Twenty-five (25) Year Extended Warranty from the original retail purchase date of the furnace provided that all qualifying requirements are met.

Optional Limited 25-year Extended Warranty coverage:

If a failure of the welded firebox/water jacket occurs that is caused by a defect in workmanship or corrosion, WoodMaster shall, at its sole discretion, elect one of the following remedies:

1. Repair or replace (using new or refurbished replacement parts) the defective or failed portion of the welded firebox/water jacket based on the date of original retail purchase, according to the following prorated scale:
  - Years 1-5: Parts and labor covered at 100%
  - Year 6: Parts covered at 70%
  - Year 7: Parts covered at 60%
  - Year 8: Parts covered at 50%
  - Year 9: Parts covered at 40%
  - Years 10-20: Parts covered at 15%
  - Years 21-25: Parts covered at 10%
2. Exchange the furnace with a comparable model furnace that is new or manufactured from new or serviceable used parts and is at least functionally equivalent to the original furnace; or
3. Provide a discount off of the retail purchase price of a new WoodMaster furnace of comparable model based on the pro-rated scale: Years 1-5: 100%; Years 6-7: 50%; Years 8-10: 40%; Years 11-15: 30%; Years 16-25: 10%.

Any replacement furnace or part provided under this warranty assumes the remaining warranty of the original furnace or part for ninety (90) days from the date of replacement or repair, whichever period provides longer coverage. As a condition of any replacement or remedy under this limited warranty, WoodMaster may, at its sole discretion, require the return of the replaced furnace or part to WoodMaster for inspection, recycling, or disposal. Wear parts, electrical parts, and other parts that are not welded to the firebox/water jacket are excluded from this extended warranty.

Optional Limited 25-year Extended Warranty qualifying requirements:

1. The Limited Warranty Registration Form must be fully completed and sent to WoodMaster within seven (7) days of the original Owner taking possession of the furnace otherwise this Optional Limited 25-year Extended Warranty will not be in effect.
2. The Owner must strictly comply with the instructions set forth in the Owner's Manual; otherwise, this Optional Limited 25-year Extended Warranty will not be in effect. Without limitation, the Owner must maintain Manufacturer-Approved Corrosion Inhibitor at the proper concentration, as it is imperative to preventing corrosion and is an essential condition of coverage. In addition, the Owner must submit a Furnace water sample to WoodMaster when the Furnace is initially placed into service and annually thereafter to verify compliance with maintenance and corrosion inhibitor requirements. This extended warranty will not be in effect, and no warranty claim can be approved unless all required water test verifications are on file at WoodMaster. In the absence of valid water test results on file with WoodMaster demonstrating continuous compliance with required corrosion inhibitor levels, it shall be conclusively presumed that the corrosion inhibitor levels were not properly maintained, and all warranty coverage for corrosion, defects, failures, or damage of any kind shall be denied.

**EXCLUSIONS AND LIMITATIONS** - These Limited Warranties apply only to WoodMaster CleanFire, FireMax and Traditional Titanium Series outdoor furnaces. These limited warranties cover only those defects or corrosion failures that arise as a result of normal use of the outdoor furnace and does not cover any other defects or problems, including those resulting from: (a) improper maintenance; (b) operation outside the furnace's specifications (see owner's manual), accident, abuse, misuse, misapplication, or parts that are not factory-installed; (c) service performed by anyone other than WoodMaster, unless authorized by WoodMaster in writing; (d) modifications undertaken without the written permission of WoodMaster; or (e) if any WoodMaster serial number has been removed or defaced.

The optional limited extended warranty shall be void if the Owner fails to maintain the proper amount of Manufacturer-Approved Corrosion Inhibitor in the system, fails to submit water samples to WoodMaster as required, or burns materials in the firebox other than the recommended fuels listed in the Owner's Manual.

This standard One-year Limited Warranty and the Optional Limited 25-year Extended Warranty exclude the cost of shipping, labor required to remove or reinstall the furnace, plumbing labor and/or parts and the cost of alternative heat if the furnace is out of service for repairs. Both warranties exclude replacement of water, corrosion inhibitors or other additives, and parts used in the system whether or not mounted on the furnace including without limitation, pumps, valves, and piping.

WoodMaster is not liable for damage or repairs required as a consequence of faulty installations or applications by others or any event of *force majeure*. WoodMaster further shall not be liable for incidents or accidents which can be prevented by the Owner or that occur from the operation of the outdoor furnace. A backup heating system should be in place to prevent damage in case of failure to refuel the outdoor furnace or in the event that mechanical failure of the outdoor furnace or system occurs. Heat replacement representations found in WoodMaster promotional information should be used only as a guideline. Heat loss for all applications with all weather extremes and other heat variables must be considered when sizing an outdoor furnace for different applications.

THESE LIMITED WARRANTIES AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. WOODMASTER SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT IMPLIED WARRANTIES CANNOT BE LAWFULLY DISCLAIMED, SUCH WARRANTIES SHALL BE LIMITED IN DURATION TO THE DURATION OF THESE LIMITED WARRANTIES.

No WoodMaster dealer or employee is authorized to modify, extend, or add to these limited warranties. WOODMASTER IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some states or provinces do not allow limitations on the duration of implied warranties or conditions, or the exclusion or limitations of incidental or consequential damages; therefore, the above limitations or exclusions may not apply to you. These warranties provide specific legal rights, and you may have other rights that vary by state or province.

**OBTAINING WARRANTY SERVICE** - To obtain warranty service, contact the WoodMaster dealer from whom you purchased your furnace or contact WoodMaster by telephone (218-782-3419) or by mail at 600 Polk Ave. SW, Red Lake Falls, MN 56750. Please provide the dealer's name, original date of sale, model number and serial number in all communications. WoodMaster reserves the right to require the warranty service to be performed at a WoodMaster facility when deemed necessary by WoodMaster. All corrosion repairs will be performed at WoodMaster unless authorized in writing by WoodMaster.

Design Changes. WoodMaster reserves the right to change and improve the product design for improved performance without assuming responsibility to upgrade previously sold products.