

HEATMOR

STAINLESS STEEL OUTDOOR FURNACES



X-SERIES

Operations and
Maintenance Manual



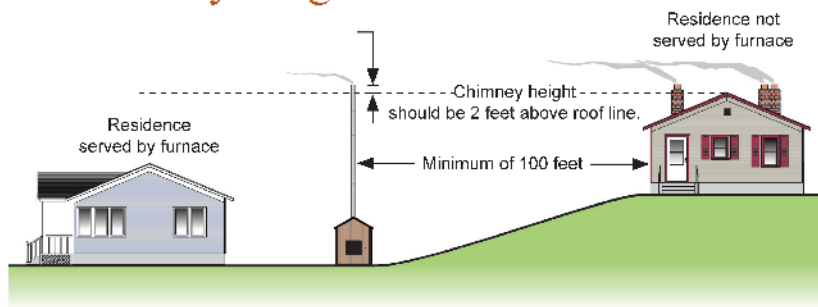
www.heatmor.com

The Longest Lasting. Most Energy Efficient
Stainless Steel Outdoor Furnace in the Industry.

OUTDOOR FURNACE BEST BURN PRACTICES

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

Chimney Height Installation Scenario



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



OUTDOOR FURNACE MANUFACTURERS CAUTION

HEATMOR™

STAINLESS STEEL, OUTDOOR FURNACES

X-SERIES

SAVE THESE INSTRUCTIONS

French Manuals available at www.HEATMOR.com

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When these safety symbols appear on the following pages, they will alert you to the possibility of serious injury if you do not comply with the corresponding instructions. The hazard may originate from something mechanical or electrical shock. Please read the instructions carefully.



When you see this safety symbol on the following pages, it will alert you to the possibility of damage to your HEATMOR™ Stainless Steel Outdoor Furnace if you do not comply with the corresponding instructions. Please read the instructions carefully.



The HEATMOR™ Stainless Steel Outdoor Furnace is certified to offer safe service provided it is installed, operated and maintained in accordance with the instructions contained in this manual.

Proper personal protective equipment (PPE) **MUST BE WORN AT ALL TIMES** when servicing and maintaining any of the HEATMOR™ Stainless Steel Outdoor Furnace product line.

This manual describes the installation and operation of the HEATMOR™ 200X and the HEATMOR™ 350X catalytic equipped wood heater. These heaters meet the 2015 U.S. Environmental Protection Agency's crib wood emission limits for wood heaters sold after May 15, 2015. Under specific test conditions the 200X can output 54,019 Bru/hr. Under specific test conditions the 350X catalytic equipped wood heater can output 89,753 Bru/hr.

This wood heater has a manufacturer-set burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.

The 350X contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.

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Notice to the Reader

HEATMOR™ Inc. warrants and guarantees ALL HEATMOR™ Stainless Steel Outdoor Furnace Models. HEATMOR™ Inc. does not warrant or guarantee any of the supporting products described within this Operations and Maintenance Manual.

The contents, descriptions, directions, diagrams, and recommendations within this material are for the sole purpose of suggested operation and maintenance methods.

Furthermore, HEATMOR™ Inc. shall not be liable for any special, consequential, or exemplary damages, resulting, in whole or part, from the readers' neglectful use, based upon the material within this Operations and Maintenance Manual. Adhere to and follow all maintenance procedures set forth in this manual.

Person(s) operating an OWHH is/are responsible for operation in a manner that does not create a public or private nuisance condition. Meeting the 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.

The methods of operation described within this Operations and Maintenance Manual have proven to be effective for HEATMOR™ Inc. for the sole purpose of the operation of a HEATMOR™ Stainless Steel Outdoor Furnace.

All formulas and figures listed within this Operations and Maintenance Manual are approximated and should be read as such.

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PHASE 2 QUALIFIED

U.S. Environmental Protection Agency Hydronic Heater Program

This model is qualified by EPA to meet Phase 2 smoke emission levels.
Models with lower smoke emissions may reduce your risk of
respiratory illness.

SMOKE EMISSIONS

This Model	EPA Phase 2 Emission Level
0.30 lbs./million BTU	0.32 lbs./million BTU
	

MANUFACTURER:	Heatmor
MODEL NUMBER:	200X
MAXIMUM OUTPUT RATING:	184,459 BTU/HR
8-HOUR OUTPUT RATING:	54,019 BTU/HR
8-HOUR AVERAGE EFFICIENCY*:	63% (high heating value) 68% (low heating value)
ANNUAL EFFICIENCY*:	62% (high heating value) 67% (low heating value)
PARTICLE POLLUTION:	8.1 GRAMS/HR (average) 0.30 LBS/MILLION BTU OUTPUT

*Performance may vary due to heating requirements, proper sizing of boiler to home, and owner operation. Follow the operator's manual and burn only dry seasoned wood.
Tested with EPA's Method 28 WHH (revision 8/18/2011)

Burn Wise

Program of U.S. EPA

For more information go to www.epa.gov/burnwise



PHASE 2 QUALIFIED

U.S. Environmental Protection Agency
Hydronic Heater Program

This model is qualified by EPA to meet Phase 2 smoke emission levels.
Models with lower smoke emissions may reduce your risk of
respiratory illness.

SMOKE EMISSIONS

This Model	EPA Phase 2 Emission Level
0.31 lbs/million BTU	0.32 lbs/million BTU
	

MANUFACTURER:	Heatmor
MODEL NUMBER:	350X
MAXIMUM OUTPUT RATING:	255,582 BTU/HR
8-HOUR OUTPUT RATING:	89,753 BTU/HR
8-HOUR AVERAGE EFFICIENCY*:	61% (high heating value) 66% (low heating value)
ANNUAL EFFICIENCY*:	58% (high heating value) 63% (low heating value)
PARTICLE POLLUTION:	9.2 GRAMS/HR (average) 0.31 LBS/MILLION BTU OUTPUT

*Performance may vary due to heating requirements, proper sizing of boiler to home, and owner operation. Follow the operator's manual and burn only dry seasoned wood.
Tested with EPA's Method 28 WHH (revision 8/18/2011)

BurnWise

Program of U.S. EPA

For more information go to www.epa.gov/burnwise

UL Compliance

Units are Safety Listed by Omni Test Laboratories

Report # 0275WB011S

Testing and Listed to UL2523-2009 and CSA B366.1-11

Tested &
Listed By



Portland
Oregon USA

OMNI-Test Laboratories, Inc.

Emissions Testing Results as per Method 28

Model	200X	350X	
8hr output rating	54,019	89,753	Btu/hr
Annual Delivered Efficiency	62.0%	58.0%	Using Higher Heating Value
	66.7%	62.4%	Using Lower Heating Value
Annual SLM (Stack Loss Method) Efficiency	72.9%	70.6%	Using Higher Heating Value
	78.5%	76.0%	Using Lower Heating Value
Annual Particle Emissions	8.1	9.3	Grams/hr
	.30	.31	Lbs/MM Btu Output
Annual CO Emissions	7.92	14.98	Grams/hr

HEATMOR™ X-SERIES OUTDOOR FURNACE MODEL



Model 200X, 350X



RESIDENTIAL FURNACE SPECIFICATIONS

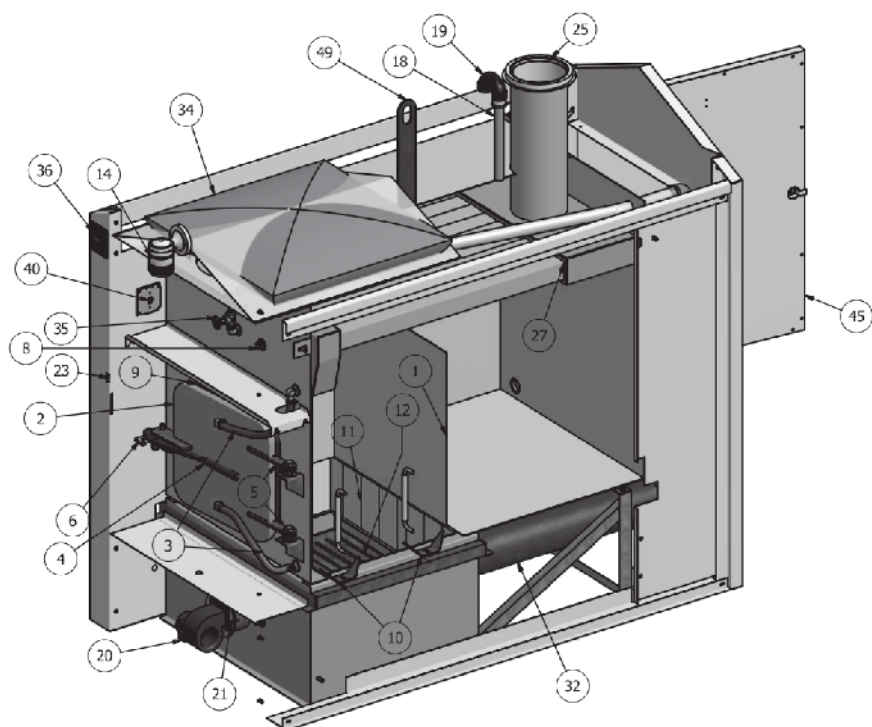
Specifications	Model 200X	Model 350X
Overall Width	50"	50"
Base Width (Footprint)	46.5"	46.5"
Overall Height	82.5"	82.5"
Overall Length	95"	95"
Base Length (Footprint)	83.75"	83.75"
Total Weight (lbs, without water)	1,835	1980
Water Capacity (U.S. gallons)	310	270
Forced Draft (C.F.M.)	150	2 x 150
Chimney Size	8"	8"
Maximum Wood Length	19"	30"
Insulated Heating Area* 1 Loading/day 2 Loading/day	2,500 sqft 5,000 sqft	4,000 sqft 8,000 sqft
Firebox Width	23.75"	23.75"
Firebox Length	24"	36"
Firebox Height	27.5"	27.5"
Volume of Firebox (Cu. Ft.)	14	21
Firebox Door Size (W x H)	20"x18"	20"x18"
Flue Transfer Area	39.75 sqft	39.75 sqft
BTU's (maximum)**	200,000	280,000
Water Jacket Steel Gauge	409 Stainless	409 Stainless
	10	10
Firebox Steel Gauge	409 Stainless	409 Stainless
	10	10
Base Steel Gauge	409 Stainless	409 Stainless
	14	14
Base of Unit to Bottom of Loading Door	24"	24"
Warranty - Workmanship	Limited Lifetime	Limited Lifetime
Warranty - Corrosion	Limited Lifetime	Limited Lifetime
Approvals Test Standards	UL 2523-2009 CSA-B366.1-11	UL2523-2009 CSA-B366.1-11
Hook-ups	Back	Back
Type of Fuel	Wood	Wood
Electrical Supply	115 V, 60HZ, 1 Phase	115 V, 60HZ, 1 Phase

*This is an estimate only. Actual loadings per day may vary depending on structures heated, type of wood used, and climate.

**This value should only be used as an indication of the furnace's heat recovery ability. Sustained outputs at this rate will increase the loadings per day. Some types of wood may prevent the furnace from reaching this maximum output.

FRONT CUT-AWAY VIEW OF HEATMOR™ X-SERIES OUTDOOR FURNACE

NOTE: For parts not shown on the cut-away view, please refer to the appropriate chapter for further details





FURNACE PARTS LIST - FRONT CUT-AWAY OF X-SERIES

Firebox

1. Firebox
2. Firebox door
3. Firebox door hoses and elbows
4. Firebox door handle
5. Firebox door hinge
6. Firebox door latch
7. Firebox door handle holder
(not shown)
8. Firebox door gasket (not shown)
9. Firebox door frame
10. Firebox / base connector clamps
11. Firebrick
12. Standard grates
13. Sand (around ash pan)
50. Firebox heat shield (not shown)

Water Jacket

15. Water jacket (surrounds firebox)
16. Supply line threaded connector
(not shown)
17. Return line threaded connector
(not shown)
18. Relief vent pipe
19. Relief elbow

Ashes

30. Ash pan (under grates #12)
31. Ash auger (not shown)
32. Ash auger tube
33. Ash auger tube cover plate
(not shown)

Bladder assembly

34. Bladder
35. Bladder gate valve and hose

Electrical

14. Front Light
36. Electronic Controller
37. Electrical supply junction box
(not shown)
38. Electrical plug outlets (not shown)
39. Water temperature high-limit
controller (aquastat) (not shown)
40. Front light and combustion air
blower control switch
41. Temperature Probe (not shown)
42. Low Water Switch
(under Bladder)

Air Supply

20. Combustion air blower
21. Flipper assembly
22. Air box (not shown)
23. Automatic Fab Switch (A.F.S.)

Chimney and Top Flue

25. Chimney
26. Chimney extension(s)
(not shown)
27. Tube flue
28. Flue cover plate (not shown)
29. Flue scraper (not shown)

Housing - (not shown)

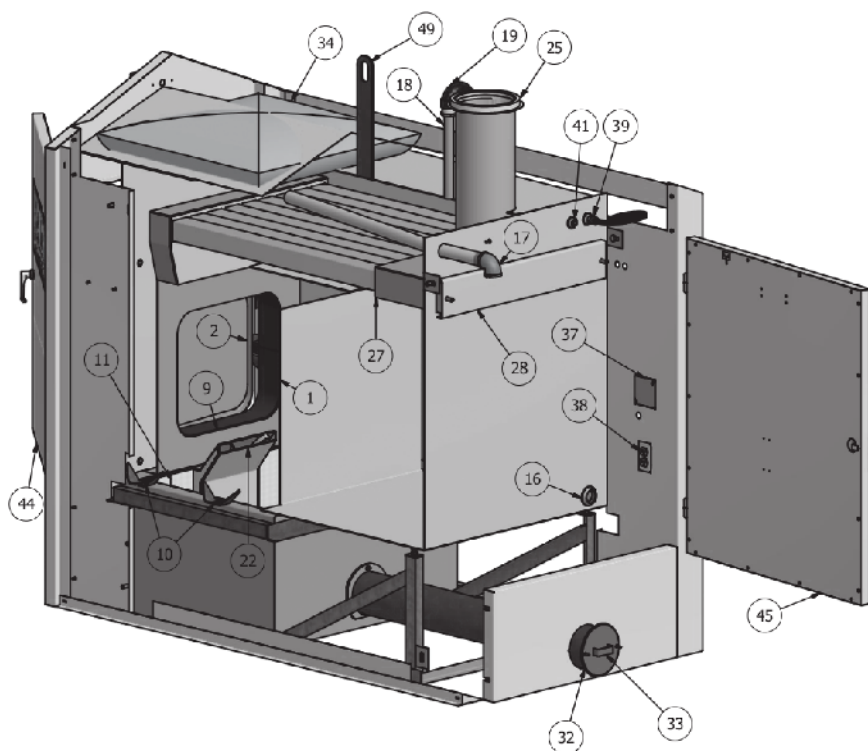
44. Outer front door
45. Outer rear door
46. Roof
47. Sides
48. Insulation

Lift Hook

49. Lift ring

REAR CUT-AWAY VIEW OF HEATMOR™ X-SERIES OUTDOOR FURNACE

NOTE: For parts not shown on the cut-away view, please refer to the appropriate chapter for further details.





FURNACE PARTS LIST - REAR CUT-AWAY OF X-SERIES

Firebox

1. Firebox
2. Firebox door
3. Firebox door hoses and elbows
4. Firebox door handle (not shown)
5. Firebox door hinge (not shown)
6. Firebox door latch (not shown)
7. Firebox door handle holder (not shown)
8. Firebox door gasket (not shown)
9. Firebox door frame
10. Firebox / base connector clamps
11. Firebrick
12. Standard grates (not shown)
13. Sand (around ash pan)
50. Firebox heat shield (not shown)

Water Jacket

15. Water jacket (surrounds firebox)
16. Supply line threaded connector
17. Return line threaded connector
18. Relief vent pipe
19. Relief elbow

Ashes

30. Ash pan (under grates #12)
31. Ash auger (not shown)
32. Ash auger tube
33. Ash auger tube cover plate

Bladder assembly

34. Bladder
35. Bladder gate valve and hose (not shown)

Electrical

14. Front Light (not shown)
36. Electronic Controller (not shown)
37. Electrical supply junction box
38. Electrical plug outlets
39. Water temperature high-limit controller (aquastat)
40. Front light and combustion air blower control switch (not shown)
41. Temperature Probe
42. Low Water Switch (not shown)

Air Supply

20. Combustion air blower (not shown)
21. Flipper assembly (not shown)
22. Air box
23. Automatic Fab Switch (A.F.S.) (not shown)

Chimney and Top Flue

25. Chimney
26. Chimney extension(s) (not shown)
27. Tube flue
28. Flue cover plate
29. Flue Ash Catcher (not shown)

Housing - (not shown)

44. Outer front door
45. Outer rear door
46. Roof
47. Sides
48. Insulation

Lift Hook

49. Lift ring

MINIMUM CLEARANCE SEPARATION SPECIFICATIONS

The HEATMOR™ furnace, is certified to be installed outside, away from other buildings. Please observe the following "Clearance to Combustibles" guidelines. If you have any further questions, which are not addressed in this Operators Manual, please contact your local dealer for further information.

- To HEATMOR™ Stainless Steel Outdoor Furnace BACK. 96"
- To HEATMOR™ Stainless Steel Outdoor Furnace TOP 18"
- To HEATMOR™ Stainless Steel Outdoor Furnace FRONT 48"
- To HEATMOR™ Stainless Steel Outdoor Furnace Chimney 18"
- To HEATMOR™ Stainless Steel Outdoor Furnace Sides 6"
- DO NOT store combustible liquids or materials near the furnace
- It is not recommended to install the furnace in any form of building

Before installing your HEATMOR™ Stainless Steel Outdoor Furnace, if in the United States, always check any and all applicable state and local regulations and inform your insurance agent.

Before installing your HEATMOR™ Stainless Steel Outdoor Furnace, if in Canada, always check any and all applicable Provincial and Municipal regulations and inform your insurance agent.

HEATMOR™ Inc. strongly recommends not installing a HEATMOR™ Stainless Steel Outdoor Furnace within 50 feet of any flammable structure.

A HEATMOR™ Stainless Steel Outdoor Furnace should be located with consideration to your neighbor's property and in accordance with local ordinances. Refer to the "Best Burn Practices" for further operating considerations.

HEATMOR™ Outdoor Furnace, is not designed or certified to be located in densely populated areas.

WARNINGS AND PRECAUTIONS

Please read the following list of cautions, warnings, and dangers before installing and operating your HEATMOR™ STAINLESS STEEL OUTDOOR FURNACE. If you have any questions or concerns regarding any of the following cautions, warnings, dangers, or instructions in the Operations and Maintenance manual, please contact your local dealer.

Familiarize yourself with the “Best Burn Practices” located on the inside front cover.

For more information go to <http://www.epa.gov/burnwise/>

Installation

Installation should be performed by a qualified installer and will comply with all the requirements of the authority having jurisdiction over the installation.

1. The HEATMOR™ furnace is designed for outside installations, away from other buildings.
2. Please observe the following “Clearance to Combustibles” guidelines.

To unit back = 96"	To unit sides = 6"
To unit front = 48"	To chimney = 18"
To unit top = 18"	
3. Before installing the furnace, always check any and all applicable state, provincial, and local regulations.
4. HEATMOR™ Inc. strongly recommends not installing a HEATMOR™ Stainless Steel Outdoor Furnace within 50' of any flammable structure.
5. A HEATMOR™ Stainless Steel Outdoor Furnace should be located with consideration to your neighbor's property and in accordance with local ordinances. The HEATMOR™ Outdoor Furnace is not designed to be located in densely populated areas.
6. HEATMOR™ suggests the use of brass fittings when installing the unit.
7. Before installing the HEATMOR™ furnace, contact and inform your insurance agent.



8. The HEATMOR™ Outdoor Furnace is to be installed on a concrete base only. Any attempt to place the furnace on any other surface may void the warranty.
9. Do not connect the HEATMOR™ furnace to the chimney of an existing heating system.
10. This unit was not designed, nor is it recommended, for use as a stand-alone heating system. A back up source of heat must be in place to prevent the outdoor furnace from freezing and to provide supplementary heat for the heated buildings.
11. Do not pressurize the HEATMOR™ Outdoor Furnace. This unit is designed to operate under atmospheric pressure only.
12. Place the in-line fill/drain assembly in a location where the drained contents of the HEATMOR™ will not cause damage to the surrounding areas or its content.

HEATMOR™

Electrical



1. Do not connect the electrical components of the HEATMOR™ Outdoor Furnace to any other electrical appliance.
2. This HEATMOR™ Outdoor Furnace operates on 115-volt power only. Do not connect the furnace to a 220-volt electrical supply.
3. **HEATMOR™ Inc. recommends a licensed professional electrician make all the necessary electrical connections involved with the installation of the furnace.**
4. Always disconnect the HEATMOR™ Outdoor Furnace from the main electrical supply before servicing any of the electrical components of the HEATMOR™ Outdoor Furnace.
5. Always disconnect any existing electrical connections to any in-house heating system, before installing the outdoor furnace to any existing indoor heating system or appliances.
6. The red wire from the high-limit aquastat on the back of the HEATMOR™ should be wired to a 120v indoor temperature control to override the thermostat. This will dissipate excess heat in the event of a possible malfunction with the HEATMOR™. **The red wire is capped off in the electrical junction box when the HEATMOR™ is new.**

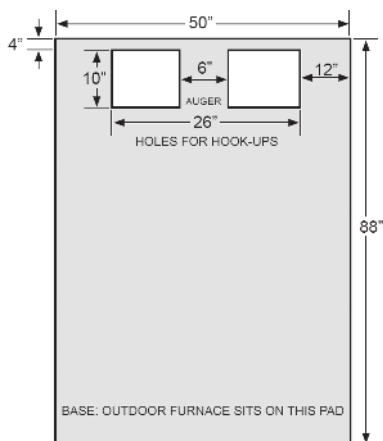
Other

1. The unit may be connected to an existing indoor boiler system by installing a water-to-water heat exchanger.



2. HEATMOR™ INC. recommends that you contact a licensed professional plumber to make all necessary plumbing installations between the HEATMOR™ furnace and the existing heating system of your building(s).
3. Do not operate the HEATMOR™ furnace until all electrical and water line connections have been properly installed and tested.
4. Do not allow any fire in the firebox until the HEATMOR™ has the correct amount of water and sand installed.
5. **DO NOT OVER-FIRE THIS HEATER.** Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater and to the catalytic combustor if so equipped.

X-Series Pad Specifications



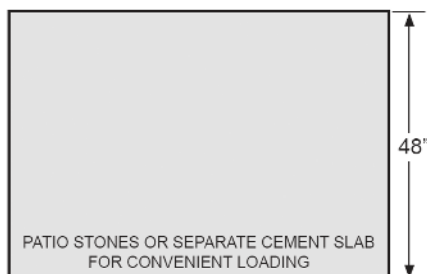
The actual pad size is 50" x 88". This gives approximately 2" extra on all sides of furnace.

CAUTION: Do not exceed this length measurement. Overall width may exceed measurements if desired.

The bottom of the loading door is 24" above ground or base of furnace. If you desire to have the loading door higher, you can do so by making the pad depth thicker.

Example: 12" instead of 4" or any figure in between.

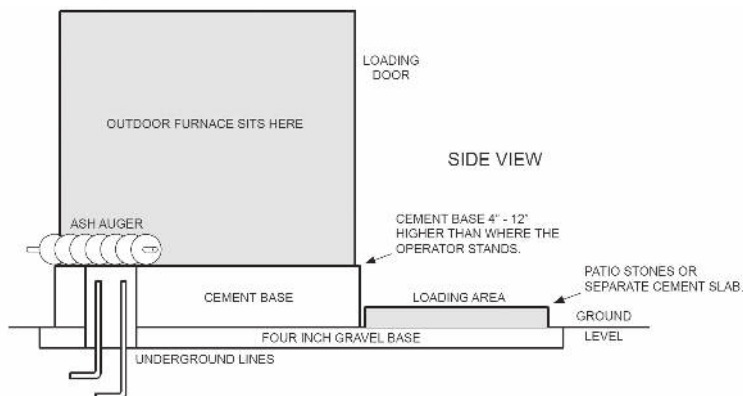
Patio stones or separate cement pad in front of the loading door should NOT be attached to main base of furnace.



It is recommended to use steel mesh or rebar in pad for strength.

Benefits to raising the pad:

1. Gives space below the ash auger to place a pail for convenient ash removal.
2. Allows better visibility of the firebox.
3. Less bending when adding wood.
4. Keeps exhaust above the operator.
5. Protects the base of the HEATMOR™



INSTALLATION OF THE HEATMOR™ FURNACE

Installation should be performed by a qualified installer and will comply with all the requirements of the authority having jurisdiction over the installation.

Principles

1. Need to have an airtight seal between the concrete base and the perimeter of the firebox base.
2. Need to seal the perimeter of the entire HEATMOR™ so rodents are not able to find a home inside the HEATMOR™.
3. Need to lift the HEATMOR™ without damaging it.

Equipment Required

1. It is NOT possible to lift a HEATMOR™ with the forks of a forklift under the HEATMOR™. It MUST BE LIFTED FROM THE TOP, by the lift hook. A crane or heavy backhoe works best, although a heavy duty farm tractor is acceptable.
 - a. With a farm tractor, extreme care must be taken to prevent the HEATMOR™ from swinging and causing damage to the HEATMOR™.



Placing the HEATMOR™ on the Concrete Base

2. Before setting the HEATMOR™ onto the concrete base, it is a good idea to place a solid sheet of the proper "reflective air foil" (also called bubble foil) between the concrete and the HEATMOR™. This will absorb ridges in the concrete and make it easier to apply caulking around the inside perimeter of the base of the HEATMOR™. This reflective foil will also reflect escaping heat up into the sand, and help prevent air leaks into the firebox if cement cracks.
3. Make sure the total area of the base (where the sand is going) is on solid concrete. Do not let the base extend past the hole in the concrete where the lines come in.
4. After the HEATMOR™ is in place perform the following:

Caulking around the Firebox Base

- a. One person should get into the HEATMOR™.
- b. Apply a substantial bead of caulking around the entire inside perimeter of the base. This will give an airtight seal so no air will seep through the sand. This should require about three tubes of High Temperature Silicone.

Caulking around the Outside Perimeter of HEATMOR™

- c. With a sharp knife, trim any excess bubble foil that extends past the base of the HEATMOR™.
- d. Apply a bead of caulking around the entire outside perimeter of the HEATMOR™ to seal out rodents.

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FILLING THE HEATMOR™ OUTDOOR FURNACE INITIALLY WITH WATER

Before your HEATMOR™ furnace with water, all plumbing connections at the back of the HEATMOR™ furnace, all electrical hookups, and all heating appliances should be installed and tested for possible leaks.

HEATMOR™ suggests the use of brass fittings when installing the unit.

NOTE: If you have any questions regarding installation of the furnace or any aspect of installation, contact your local dealer.



NOTE: Never start a fire inside the firebox until the water jacket is full of water and sand has been added to the base to the correct level.

1. Close the bladder gate valve located at the front of the HEATMOR™ furnace.
2. This valve will ensure no water can enter the bladder.
3. Close the bottom supply line valve at this back of the HEATMOR™.
4. Open the top return line valve at the back of the HEATMOR™.
5. Ensure the vent pipe is unobstructed. *If equipped with a pop-off ball on the roof of the furnace, remove it from the relief vent pipe.*
6. Connect the water source to the return line leading to the HEATMOR™. Use a garden hose to add the water to the return line.
7. Turn on the source of water.
8. The pressured water will now flow through and remove the air out of the return line as the water flows into the HEATMOR™.
9. Continue adding water until water flows out the relief vent pipe onto the roof of the HEATMOR™.
10. Turn off the source of water.



Bladder Gate Valve

The HEATMOR™ is now full of water and the return line is also full of water and air free, BUT the supply line leading from the HEATMOR™ to the building to be heated is still full of air.

11. Close the top return line valve at the back of the HEATMOR™.
12. Remove the garden hose that was used to deliver the source of water from the top return line, BUT leave the garden hose valve open.
13. Open the bottom supply line at the back of the HEATMOR™ (bottom). The pressure of the water in the HEATMOR™ will now force water from the HEATMOR™ through the supply line back into the building to be heated. This water will soon discharge from where the garden hose was connected. When there is a steady stream of water flowing, the air will be removed from that supply line. Usually it requires the removal of approximately five gallons of water to ensure the line is air-free.

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FILLING THE HEATMOR™ OUTDOOR FURNACE INITIALLY WITH WATER

NOTE: The circulator pumps cannot “push” much air through a system. They are designed to move water not air.

14. Start the circulating pump. Remember to properly bleed air from the pump.

ABSOLUTELY NO FIRE IN THE FIREBOX WHEN PERFORMING THIS PROCEDURE. DO NOT PERFORM THIS PROCEDURE WHEN UNIT WATER TEMPERATURE IS UNSAFE. ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT WHEN WORKING WITH WATER AND CHEMICALS.

Maintaining the Correct Amount of Water in the Bladder and in the HEATMOR™

1. Close the bladder gate valve located at the front of the HEATMOR™ furnace. Closing this valve will ensure no water can enter the bladder.
2. Remove the pop-off ball (if equipped) from the relief vent pipe.
3. Connect the water source to the return line leading to the HEATMOR™. Use a garden hose to add the water to the return line.
4. Turn on the source of water, but only about half a full flow.
5. The pressured water will now flow through the return line as the water flows into the HEATMOR™.
6. Continue adding water until water flows out the relief vent pipe, onto the roof of the HEATMOR™, leave the water running. Some may continue to spill out onto the roof.
7. Place the pop-off ball (if equipped) back onto the relief vent pipe.
8. Turn on the green bladder gate valve and let the bladder fill half full. You can check this by felling the bladder with your hand inserted through the bladder inspection cover plate.
9. Turn off the water when the bladder is half full.

Low Water Condition

If the water level is below the bladder port when the water heats up, air will enter the bladder instead of water. To remove the air from the bladder, follow steps 1 through 7 above and make sure there is a good seal on the pop-off ball (if equipped). Next:

1. Open the bladder gate valve.
2. CAREFULLY remove the bladder hose, allowing the bladder to empty its contents.
3. After bladder is empty of air/water, re-attach the bladder hose to the bladder gate valve and tighten the hose clamp.

Next, follow steps 7-9 above.



NOTE: Never light a fire inside the firebox until the water jacket is full of water and sand has been added to the base to the correct level.

Installation should be performed by a qualified installer and will comply with all the requirements of the authority having jurisdiction over the installation.

READ THROUGH THE ENTIRE OPERATIONS AND MAINTENANCE MANUAL BEFORE OPERATING YOUR HEATMOR™ STAINLESS STEEL OUTDOOR FURNACE.

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Initial Installation of Sand

Types of Sand to Use

1. Sand that does not contain clay, rocks or organic matter is appropriate. Use a sand that when packed will not allow air to pass through. Mortar sand or sand that is used in the redi-mix concrete business is good. Never use gravel.
2. 200X requires approximately 0.18 cubic yards.
3. 350X requires approximately 0.28 cubic yards.

Installation

1. Cover the grates with a piece of cardboard.
2. One person enters the firebox.
3. Another person shovels the sand into the firebox while the person inside packs the sand completely, using a piece of wood like a 2" x 4" x 10" long.
4. Fill the base with sand, level to the top of the grates.



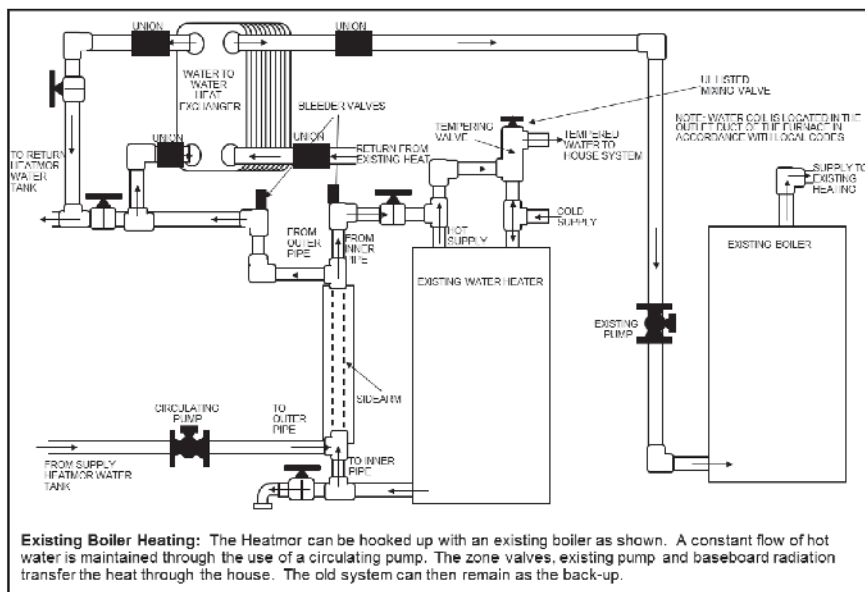
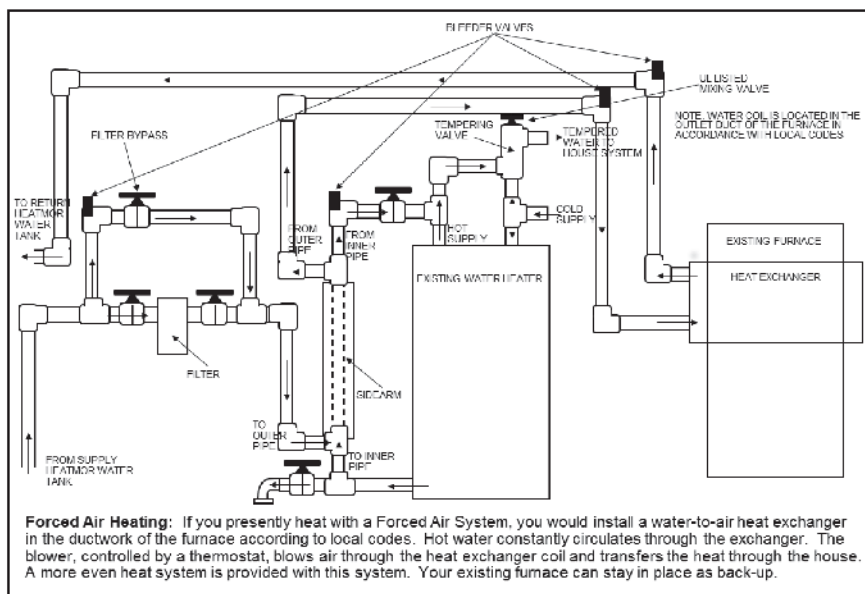
Open Bottom without Sand



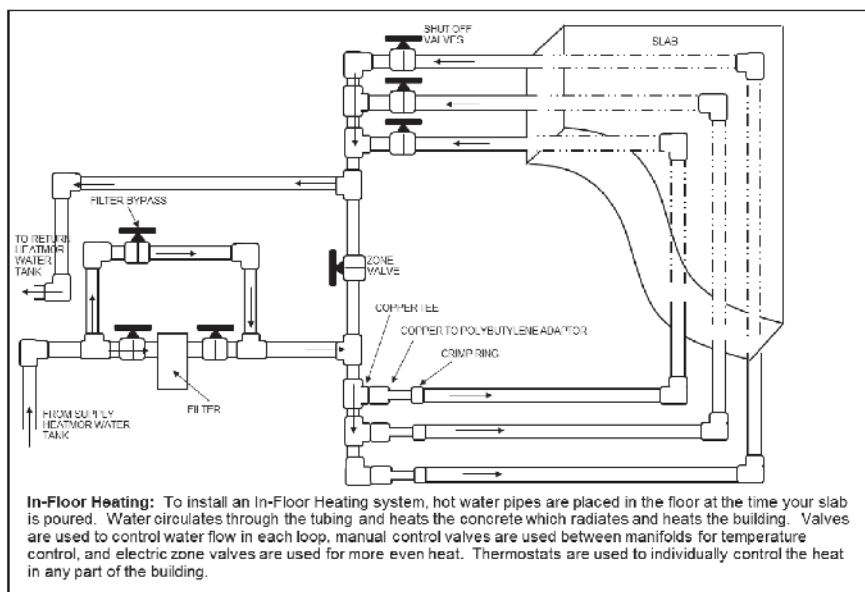
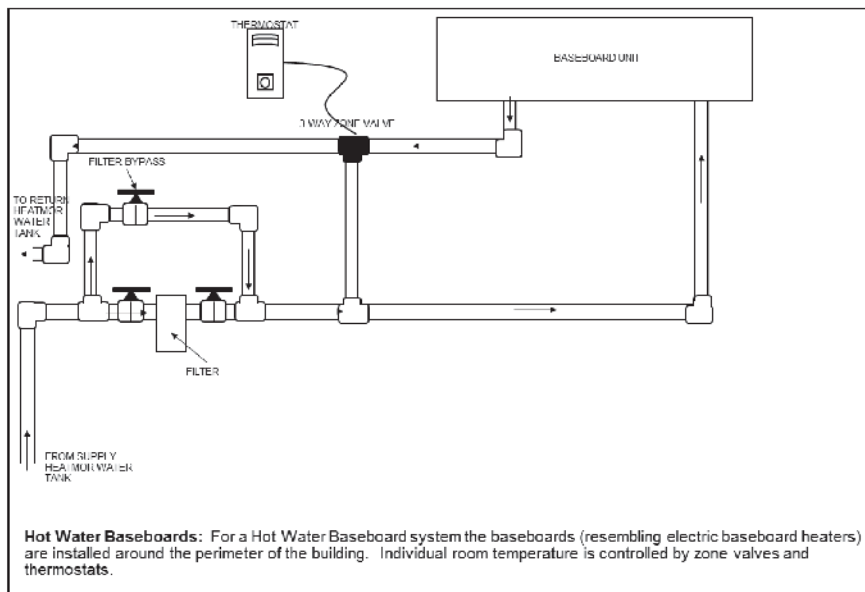
NOTE: Never light a fire inside the firebox until the water jacket is full of water and sand has been added to the correct level in the base.

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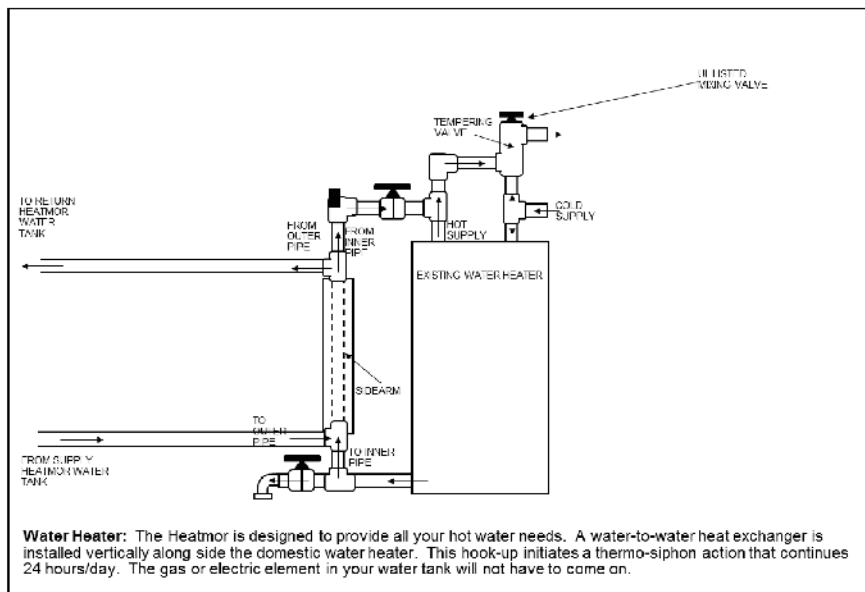
HEATMOR'S RECOMMENDED INSTALLATION INSTRUCTIONS



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OTHER APPLICATIONS

Pools/Hot Tubs: The HEATMOR™ can also be used to heat your swimming pools and hot tubs. A water to water heat exchanger is used for this application.

Sidewalks/Driveways: The HEATMOR™ can also be used to melt snow and ice from your sidewalk and/or driveway. Tubing is laid beneath the concrete. The heated water circulates through the slab melting the snow and ice before it has a chance to stick. This application greatly reduces the labor involved in shoveling.

Disclaimer: Be sure to consider but required for this when sizing unit.

Unit Heater (Fan/Coil Unit): A unit heater (forced air water heater) can be placed at the ceiling, in a cabinet, or built into the floor or wall. Hot water from the HEATMOR™ circulates through out the exchanger and the heat is extracted with an enclosed thermostatically controlled blower. Each heater is thermostatically controlled.

SAFE FURNACE OPERATION GUIDELINES

OPERATION



DO NOT USE CHEMICALS OR FLUIDS TO START THE FIRE DO NOT BURN GARBAGE, GASOLINE, NAPHTHA, ENGINE OIL, OR OTHER INAPPROPRIATE MATERIALS.

HEATMOR™ OUTDOOR FURNACES X-SERIES ARE CERTIFIED TO BURN WOOD ONLY.

Burning of other materials may result in serious burns, health consequences, or damage to this furnace and other components of the heating system and may void warranty.

*****IMPORTANT NOTICE*****

PLEASE REFER TO “FILLING YOUR HEATMOR™ FURNACE WITH WOOD”, FOR ADDITIONAL SAFE LOADING PROCEDURES.



1. Never open the firebox door if the combustion air blower is operating or if you suspect a roaring hot fire inside the firebox.
2. Never open firebox door immediately after the combustion air blowers have shut off. If the water temperature is very close to the high setting, you should assume the air combustion fans have just shut off.
3. If there is more than a 'whiff' of exhaust coming from the chimney and the draft fan is off, do not open the firebox door for at least two minutes. The burn cycle would have just ended and the firebox will be full of unburned gases (exhaust) that may ignite when fresh air is introduced.
4. Load the unit with wood carefully, but quickly. After loading wood make sure all debris is cleaned from the firebox door frame and gasket. Then close firebox door securely.
5. Keep the firebox door, ash auger tube cover cap, top flue cover plate, and the outer door of the HEATMOR™ furnace closed at all times except for servicing and refueling.
6. Keep the locking handle on the outer door locked at all times when not servicing or refueling to reduce the risk of tampering and possible injury.
7. Never add water to the HEATMOR™ furnace if the internal water temperature is over 212° Fahrenheit. Failure to adhere to this warning may cause a steam flash and result in an explosion.
8. Do not store combustible liquids or materials near the outdoor furnace. Adhere to the “Clearance to Combustibles” guidelines.
9. Never use gasoline, kerosene, charcoal, lighter fluid or similar liquids to start, restart or freshen up a fire. Using such liquids may result in severe burns and injuries.
10. When adding water, water treatment or maintaining the HEATMOR™ furnace, protective clothing must be worn at all times.
11. Never leave the HEATMOR™ furnace unattended while the firebox door is open or unlatched.
12. Stay clear of any exhaust emitting from the firebox.
13. Do not burn garbage, plastics, rubber naphtha, trash, tires, solvents, engine oil, gasoline, leaves, paper products, cardboard, material treated with petroleum products (particleboard, railroad ties and pressure treated wood) or other inappropriate materials.



14. Store ashes outside, in a metal container with a metal tight fitting lid, away from the outdoor furnace and other buildings. No other waste should be placed in this container.
15. Wear a particle mask when removing ashes.
16. Ash auger may be hot after removing ashes.
17. In case of power failure, do not open any doors on the HEATMOR™. Monitor the water temperature very closely. Refer to "freeze protection" in this manual.
18. In below freezing weather, if the water temperature in the HEATMOR™ drops below 40° Fahrenheit, drain all water from the HEATMOR™ immediately (if there is not anti-freeze in your system).
19. Water additives supplied with a HEATMOR™ do not give any freeze protection.
20. Always remove the pop-off ball (if equipped) before removing more than 5 gallons of water from the HEATMOR™.
21. Check daily for creosote buildup until experience shows how often cleaning is necessary.
22. Be aware that the hotter the fire, the less creosote is deposited, and that weekly cleanings can be necessary in mild weather, even though monthly cleanings can be enough in the coldest months.

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Lighting the HEATMOR™ for the First Time

When lighting the HEATMOR™ furnace for the first time, all installations must be complete and the furnace must be full of water. It is recommended to open bladder valve, reinstall the pop-off ball (if equipped), and the build fire to bring the water up to temperature. This will help prevent the bladder from over expanding.

The lighting process is fairly simple. Please use the following steps simply as a guideline or contact your local dealer for further instruction. **Read the entire manual before lighting, so you have a complete working knowledge of the furnace. Ask for a demonstration from your local dealer. It is very important to fully educate all persons who will be lighting and fueling the HEATMOR™ furnace.**

PLEASE READ THROUGH ALL "LIGHTING YOUR HEATMOR™" STEPS BEFORE LIGHTING YOUR FURNACE.

1. Remove the pop-off ball (if equipped) from the relief vent pipe, on top of the HEATMOR™ furnace.
2. Close the green valve, supplying the bladder, located at the rear of the furnace.
3. Ensure that the furnace is full of water by running five gallons of water onto the roof of the HEATMOR™.
4. Replace pop-off ball (if equipped) and open green bladder valve.
5. Ensure that there is a 115-volt electrical power supplying the HEATMOR™ furnace.
6. Place some small pieces of wood (five pounds) with paper into the firebox.
7. Place a few larger pieces of wood (20 pounds) on top of the smaller pieces.
8. Light the fire.
9. Leave the fire box door partially open to allow the fire to start burning. The firebox door should only need to be open about two inches. At this point the exhaust should go up the chimney and not out the firebox door.
10. Once the fire is burning rather briskly, close the fire box door and turn off the light switch which in turn will make the combustion air blower(s) operate.
11. Operate the blowers for approximately 10 minutes.
12. Turn off the blowers.
 - a. Wait a few seconds to allow the combustion to decrease.
13. Open the firebox door and add a substantial amount of wood to the firebox.
14. Turn on the blowers

NOTE: Before the furnace is fired up, the furnace is filled with water. While the furnace is filling with water, the bladder is shut off to prevent excess water into the bladder, preventing over fill. When the furnace is freshly filled the water temperature is approximately 50 degrees Fahrenheit. When the furnace is full of water you will notice water coming out onto the roof from the relief vent pipe. At this point the water should be turned off and the bladder valve opened. After the furnace is fired up, the water temperature will start to increase. While the water temperature rises, the water will expand as it heats up, causing the excess water to go into the bladder. It will go into the bladder because it is the place of least restriction. This is another reason why we do not fill the bladder initially, too much water in the bladder at cooler temperatures could cause the bladder to overflow at higher temperatures caused by the expansion of the water during temperature rise

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DEW POINT

NOTE: As the temperature inside of the firebox is increasing, there will be some sweating inside the firebox. There may be streams of water running down the inside firebox walls and down the inside of the firebox door. Water may run out onto the fan cover, below the firebox door, out of the flue covers, and even out the auger tube. **THE HEATMOR™ IS NOT LEAKING!**

Just as moisture collects on the inside of a warm house window on a cold outside day, the same thing is occurring inside the HEATMOR™ firebox. The warm moisture in the exhaust is condensing on the cold firebox walls of the HEATMOR™. In most typical situations, once the water temperature is above approximately 130 degrees Fahrenheit, the sweating will stop because you are above the dew point.

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Loading Wood into the HEATMOR™

Please read through the entire HEATMOR™ Operation and Maintenance Manual and talk to your local dealer for instruction. Ask for a demonstration from your local dealer. It is very important to fully educate all those who will be loading the furnace with wood.

Loading a large amount of wood into the HEATMOR™ furnace once a day is not always best. We have found that you have a more efficient fire and produce less smoke when you add fuel twice a day. Example: Half of the days' demand in the morning and half in the evening. The number of loadings and the amount of wood needed will vary depending on the amount of heat being removed.

Here are some suggested points to assist you in loading your furnace.

1. Make sure you have your fuel readily available to fill your furnace. (i.e. a wheelbarrow full of wood near the furnace)
2. Maintain a clear, clean area in front of the furnace.
3. Open the outer front door. This allows you access to the inner firebox door as well as engages the AFS. This turns on the fan and blows air into the firebox to decrease the possibility of the exhaust igniting and creating a "flash back" before you open the main firebox door.
4. Turn on the light switch. The light should turn on and the combustion air blowers should turn off if they were operating correctly.
5. Wait a few seconds for the fire to die down or for the exhaust to clear.
6. Standing to the right, next to the exterior door, with your left hand and your left arm outstretched, pull fire box door handle out of the safety latch.
7. Crack the firebox door open about two inches and allow any pressure left over in the firebox to escape.
8. Open the firebox door as you step backwards towards the exterior door. This allows you to be out of the way if there is a "flash back" or exhaust exiting the door opening.
9. Set the firebox door handle into the holder provided on the outer door.
10. After all exhaust has been eliminated, give the ashes over the grates a light stirring with a long rake.
11. Add the necessary fuel to the firebox, loading the wood parallel to front and back, being careful not to push ashes into the air boxes. Do not let wood sit on top of the air-box.
12. Close the firebox door and latch securely.
13. Turn off the light switch. This will return power to the blowers and turn off the light.
14. Close and lock the exterior door.

NOTE: The X Series firebox is not square, some longer wood maybe loaded in the outer sides of the firebox, but the max wood length can be easily loaded in the middle of the firebox; remember to load the wood parallel to front to back



What should I burn?

Wood

This heater is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air dried seasoned hardwoods, as compared to softwoods or to green or freshly cut hardwoods. **DO NOT BURN:**

- Garbage;
- Lawn clippings or yard waste;
- Materials containing rubber, including tires;
- Materials containing plastic;
- Waste petroleum products, paints or paint thinners, or asphalt products;
- Materials containing asbestos;
- Construction or demolition debris;
- Railroad ties or pressure-treated wood;
- Manure or animal remains;
- Salt water driftwood or other previously salt water saturated materials;
- Unseasoned wood; or
- Paper products, cardboard, plywood, or particleboard. 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.

Burning these materials may result in release of toxic fumes or render the heater ineffective and cause smoke.

Well-seasoned wood is wood that has been properly prepared for combustion. Proper seasoning is generally accepted to be wood that has been harvested, split if necessary, and stored for a reasonable amount of time, normally over the summer months. Using a moisture meter can aid in the determination if the wood had been left to dry sufficiently. Use the directions from the moisture meter to ensure the moisture content of the wood is less than 25 percent.

The most efficient preparation will result in a wood moisture content of 17 percent to 25 percent. If the moisture content is more than 30 percent a significant amount of recoverable heat will be utilized in "boiling" off the water in the wood which escapes as steam. This loss will accelerate as the moisture content increases. Wood that is too dry will com-bust too rapidly, thereby increasing heat and fuel loss out of the stack.

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Our experience indicates that piece diameters of 6 to 8 inches or less are preferable. Larger pieces (up to 10 inch diameter) will perform well as long as they are properly seasoned. Fortunately, the combustion process will “see” a mix so that larger/smaller and damper/drier wood combinations can still provide a good result.

Learn to load the furnace to most appropriately match the heat demand. Warmer outdoor temperatures indicate a need for smaller loads and smaller pieces of wood, thereby matching demand to supply and resulting in higher efficiencies. Being aware of your individual “Types of Wood” will aid in your decisions.

How does a fire burn out?

When the temperature of the water has reached its high limit (185 degrees Fahrenheit), the combustion air blower(s) shut off. At this point, the fire “banks”. When the air combustion blower(s) turn back on, there may not be enough coals to restart the fire. You will then need to restart the fire. If this situation occurs, you may want to transfer to your standard system for better efficiency.

A new unit will require the establishment of “bed of coals” which will aid in re-establishing proper combustion. This may take a few burn cycles.

Please refer to the “Outdoor Wood Furnace Best Burn Practices” located on the inside front cover of this manual.

NOTE: To obtain the high efficiencies that the X Series is designed for, please follow these guide lines:

The moisture content of wood is very important. Trying to burn “wet” wood is wasteful and not recommended. When you burn “wet” wood, the moisture must be driven out of the wood before it burns, so there is heat wasted on driving out this moisture.

One cord of Oak has roughly 26.5 Million BTUs of Energy in it. If you burn this cord of oak when it has 23% Moisture Content you will get roughly 20.4MBTUs of energy. If you burn this cord of Oak when it has 40% Moisture Content you will get roughly 15.37MBTUs of energy.

This means that roughly for every 5 cords of wood you burn at 40% Moisture Content you will waste 1 cord just because the wood was not dry. HEATMOR™ is dedicated to helping you burn your wood cleaner, and more efficiently! We recommend burning wood with a moisture content range of 17-25% in this furnace.

Types of Wood

There are different types of wood, classified by species, hard or soft, old or new, dry or damp, even larger or smaller. All will burn satisfactorily as long as the proper moisture content and heat load combinations are observed. Therefore, knowing your heat load demands and our fuel supply characteristics is very important.

Wood as a Fuel

Wood as a fuel contains more moisture than most heating fuels. Therefore, proper management of the process is more important. Heat is required to evaporate the moisture from the fuel. Once moisture is evaporated, proper control of the remainder of the combustion process is also required. At about 600 degrees Fahrenheit the wood will gasify. At this point the fuel/air mixture is fuel rich. With proper “secondary air” introduction the fuel/air mixture will

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approach ideal and result in proper combustion. Your HEATMOR™ furnace is designed to create this situation. Wood too high in moisture content results in lower temperatures and unreliable performance.

Stages of Combustion

During the four stages of combustion, wood breaks down into water, smoke and charcoal. The first stage occurs when wood is placed in the furnace. It must be heated to drive off the moisture. The higher the moisture content, the greater the amount of heat needed and subsequently lost for heating purposes. The drier the wood, the more rapidly it can be heated and passed through this first stage of heating the water. When moisture is being driven from the wood, white smoke may be emitted from the chimney. This is what we call "steam smoke". It is mostly water vapor.

In the second stage, at 500 degrees Fahrenheit, wood begins to break down chemically. If this smoke is released but not burned, two-thirds of the energy in the wood will be lost. A hot fire is needed to burn the smoke.

The third stage takes place at temperatures above 1,100 degrees Fahrenheit. At this point, the smoke is burning at 100 percent efficiency, as long as the proper amounts of oxygen, temperature and draft are present. If one of these elements is missing, the combustion will be incomplete. The third stage is the most important stage of wood combustion since smoke represents two-thirds of the wood heat.

The fourth stage takes place after 1,100 degrees Fahrenheit to 2,000 degrees Fahrenheit temperatures have been reached. The smoke and gases are completely burned and the charcoal remains, which represents approximately one-third of the wood heat, and allows the fire to re-start when required.

When a new charge of wood is loaded, the first stage of combustion begins again. The charcoal heats the fresh wood until it gets hot enough to react and ignite, and the process continues. All four stages can take place concurrently but complete combustion requires proper placement of secondary air and adequate temperatures. This is incorporated in the design of the HEATMOR™ furnace.

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Efficiency Measurements

There are several different ways that efficiency is calculated. Each calculation has its advantages and disadvantages and no one way is necessarily better than the other, however, when comparing one stove to another it is imperative that the same method be used. No efficiency number is able to give an exact expectation of an individual installation. Many factors combine to change the actual efficiency number. The ambient air that the stove is in will cause the efficiency to reduce as the temperature that the stove is in gets lower. Also having the stove sized too large for the needed heat load will cause the efficiency to decrease. The efficiency of the stove will decrease as number of idle cycles increase. As stated before, Moisture content of the fuel will also have a direct impact of the efficiency. HEATMOR™ has two different ways that our stoves are rated, Delivered Efficiency and Overall Efficiency (SLM).

Delivered Efficiency

The percentage of heat available in a test fuel charge that is delivered to a simulated heating. This is done by recording the flow of water and change of temperature through a heat exchanger. The BTU's recovered by the heat exchanger can be found and compared to the BTU's put into the stove.

Overall Efficiency (SLM)

The efficiency for each test run as determined using the CSA B415.1-10 stack loss method. This method monitors the stack of the stove. The flue gas temperature and makeup (CO%, CO2%, O2%, etc...) is recorded along with the weight of the fuel. These numbers are put into an equation and an efficiency is calculated based on how well the fuel was burned, and how close to the ambient temperature the flue gas was.

Heating Value (HHV or LHV)

There is a lot that goes into calculating the efficiencies of a stove. One major component to finding out efficiency is the amount of BTU's put into the stove. Two values are used to determine the amount of BTU's/lb., Higher Heating Value (HHV), and Lower Heating Value (LHV). This number is used to calculate the amount of BTU's that were input into the stove.

Higher Heating Value

The higher heating value is the amount of BTU's available in the fuel without respect to the moisture content.

Lower Heating Value

The lower heating subtracts the energy needed to convert a standard moisture in the fuel to gas.

Loading of the Furnace

Loading the furnace relative to the heat load will result in more efficient performance. More nearly matching your fuel load to the current temperature conditions for an 8 to 12 hour burn will result in longer burn cycles, higher overall burn temperatures and more efficient performance. Your furnace has been rated for an 8 hour burn cycle.



Handling and Storage of Wood

Common questions concerning wood storage.

1. Q. Do I have to keep my wood covered?

A. It can be more convenient. It is an extra task if snow has to be knocked off the wood before it is loaded into the firebox. Rain and snow landing on the exposed wood will tend to add a certain amount of moisture to the wood. Refer to "first stage of the burning process." Uncovered wood will still burn.

2. Q. Why is it important to have my loading of wood directly at the furnace when I go to load my furnace? Why must I load my furnace quickly?

A. Because of the large firebox and large firebox door, it often only takes a few minutes after opening the door, until the unburned wood in the firebox will ignite and cause smoke to come out the loading door.

3. Q. Is it a good idea to put the front of my HEATMOR™ into my wood storage building so I can load the HEATMOR™ from inside?

A. This is never a good idea. The HEATMOR™, is designed to be placed outside away from all buildings to maintain optimum safety. Refer to the "Clearance to Combustibles" section.

4. Q. What is the best method of handling wood?

A. Handle wood as little as possible. Keep the wood covered. Keep the wood storage area neat and tidy. If you have a tractor that can lift pallets or crates, you are well on your way to solving all three concerns. Have available approximately 20 crates (5 feet square x 5 feet high). Take the crates to where you are cutting the wood with the tractor. As you cut, pile the wood in the crates. Use the tractor to move and store the full crates not too far from the HEATMOR™. Cover them if you wish. Use the tractor to bring the crates to the front of the HEATMOR™, as you need them. Throw the wood into the firebox.

5. Q. What is seasoned wood and how long should I season my wood?

A. Seasoned wood is wood that is cut and then stored for a certain amount of time prior to use. We recommend seasoning hardwoods for one to two years and softwoods six months to one and a half years. Ideal moisture content of seasoned wood is 17 - 25 percent.

WATER

Qualities of Water to Use

Water quality will vary from one location to another. Different qualities of water can have a damaging effect on your HEATMOR™ furnace, pumps, and plumbing components. Please observe the following guidelines for best results.

- Do not add water from ponds or off roofs.
- Do not add water exceeding 50 parts per million (ppm) in chlorides.
- Do not add water over 27 grains hardness - mix this water 50/50 with softened water.
- Do not add water exceeding 50 ppm silica content.
- Do not add water from shallow wells.
- Do not add water from a well that has recently been “shocked” with chlorine.

Water Level Maintenance

You can verify the water level of your HEATMOR™ by checking the fullness of the bladder. The water level gauge (“add water” weight) inside the front door should be up near the bladder, not down near the shelf. An even better method of gauging the fullness of the bladder is to reach up through the bladder cover plate and feel the bladder. The bladder should still have wrinkles in it when the water temperature is 180°Fahrenheit. If the filling procedures were done correctly, the bladder would have been the last thing topped off after the water jacket of your HEATMOR™. Refer to “Filling your Furnace Initially” for further details or contact your local dealer.

NOTE: The X-Series Stoves have an automatic water level switch installed. If the water is low on these furnaces the controller will alarm and you will not be able to run the furnace until the water level is correct.

Removal/Replacement of System Water

Before removing more than five gallons of water from your HEATMOR™, make certain to remove the pop-off ball (if equipped) so that air can enter the water jacket as water leaves. Failure to do so may put a negative pressure on the water jacket and collapse it. Warranty does not cover this.

If a sediment faucet was installed at the back of furnace, it may be used for draining purposes. If you have a sediment faucet installed on the main manifold in the house, which also can be used to drain the HEATMOR™.

The drained contents of the HEATMOR™ must be discharged to an area or place where they will not damage property or create an environmental hazard. If you are draining the system because of total system shutdown in cold weather, remember to also drain the supply and return lines to prevent freeze-up.

To refill your HEATMOR™, refer to “Filling your Furnace Initially.” It is important to add water treatment to the HEATMOR™ once you have refilled your HEATMOR™. For further information on replacing the water in your furnace, contact your local dealer.



Water Additives

**ABSOLUTELY NO FIRE IN THE FIREBOX WHEN PERFORMING THIS PROCEDURE.
DO NOT PERFORM THIS PROCEDURE WHEN UNIT WATER TEMPERATURE IS
UNSAFE. ALWAYS WEAR PROPER PERSONAL PROTECTIVE EQUIPMENT WHEN
WORKING WITH WATER AND CHEMICALS.**

Principles of Water Treatment

1. Minimize the corrosion potential of system metallurgy.
2. Keep water in the 8 to 10 pH range.
3. Acts as an oxygen scavenger.
4. **Water treatment supplied with the HEATMOR™ does not give any freeze protection.**
5. With proper chemical control, longer equipment life can be achieved.

Addition of Water Treatment

When installing a completely new system, we recommend that the system first be filled with water only. After two or three days of operation, check that all air is out of the system, and all connections are leak free. Once the entire system is confirmed to be leak free, add the water treatment.

To add water treatment to the HEATMOR™ furnace, follow these steps.

- 1) Before adding the treatment, drain out a corresponding amount of water.
- 2) Remove the pop-off ball (if equipped) from the relief vent pipe.
- 3) Take a funnel and place it into the relief vent pipe.
- 4) Pour the entire contents of the water treatment chemical, as supplied, into the HEATMOR™ furnace.
- 5) Top off your HEATMOR™ furnace with water, fill the bladder, and replace the pop-off ball (if equipped). Refer to "Filling the Bladder Initially" for details or contact your local dealer.

Water Treatment Maintenance / Result

The water in the HEATMOR™ should be chemically analyzed once per year to ensure the proper levels of treatment are being maintained. Contact your local dealer as to where to have your water tested. Provide the testing person with an amount of water from your HEATMOR™, equal to approximately 20 ounces, in a clean container. The amount of water treatment that has to be added yearly is dependent on how much fresh water you have added to your system since the last test. Be certain to add a water treatment that is approved by your dealer and HEATMOR™ Inc.



Water Treatment Additives and Safety Specifications

Water Treatment Safety Specifications

DANGER: CORROSIVE MATERIAL - CAUSES BURNS

CAUTION: KEEP OUT OF THE REACH OF CHILDREN

Product Identification: Control Water Stove Treatment and Rust Inhibitor

Product Manufacturer: Image Supply Inc.

Contents: Sodium Nitrate
Potassium Hydroxide
Hidacid Azure Blue Dye
Water

Danger: Harmful or fatal if swallowed. Avoid skin, clothing and eye contact
Avoid breathing mist or vapors
Keep container closed and away from children

First Aid: Skin Contact: Immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician if irritation develops and persists.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes.

Inhalation: Move to fresh air.

Ingestion: Harmful or fatal if swallowed. Give several glasses of water followed by citrus juice then olive oil. Get medical attention.

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON

Handling instructions: Wear eye/face protection. Wear goggles and Alkali resistant gloves. Wear suitable protective clothing.

Clean up: Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in a suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment. Neutralize area with vinegar. Wash contaminated clothing before reuse.

Other precautions: Do not leave unattended when open.
Do not reuse container.
This product does not provide any freeze protection.

FOR MEDICAL EMERGENCIES CALL

United States: INFOTRAC 1-800-535-5053
Canada: 1-800-268-901

HEATMOR™

Freeze Protection

Principles of Freeze Protection

When the total system is operating as designed, there is no need to add anti-freeze. However if the water in the outdoor furnace is not going to be kept above 50 degrees Fahrenheit in cold weather, freeze protection must be considered. In a properly designed system, the indoor appliances will automatically come on, generate heat, and keep the supply line, return line, and outdoor furnace from freezing by transferring some of the heat generated, back to the outdoor furnace. This will only happen if the circulating pumps are running. It is recommended to always have a backup system in place.

- Freeze protection products have lower heat transfer capabilities than water.
- Freeze protection products will not necessarily inhibit corrosion.
- Some insurance companies will not insure an outdoor furnace with glycol in the system.
- Ensure the correct freeze protection product is used. Non-toxic, propylene glycol based, boiler antifreeze is recommended. One such product is DOWFROST HD™ from Dow Chemicals.

Before draining the water, please refer to “Removal/Replacement of System Water”.

When installing a completely new system, we recommend that the system first be filled with water only. After two or three days of operation, check that all air is out of the system, and all connections are leak free. Once the entire system is confirmed to be leak free, add the water treatment. Before adding the treatment, drain out a corresponding amount of water.



Adding Freeze Protection Products

ABSOLUTELY NO FIRE IN THE FIREBOX WHEN PERFORMING THIS REPAIR. DO NOT PERFORM THIS REPAIR WHEN UNIT WATER TEMPERATURE IS UNSAFE. ALWAYS WEAR PROPER PERSONAL PROTECTIVE EQUIPMENT WHEN WORKING WITH WATER AND CHEMICALS.

1. Remove the pop-off ball (if equipped).
2. Drain the correct amount of water from the system for the products being added.
3. Take a funnel and place it into the relief vent pipe.
4. Pour the contents of the freeze protection products, into the HEATMOR™ furnace.
Do not pressurize the HEATMOR™; do not attempt to thread fittings onto the relief vent pipe and “pump” additives into the HEATMOR™ under pressure.
5. Top off your furnace with water, fill your bladder, and replace pop-off ball (if equipped). Refer to “Filling the Bladder Initially” for details or contact your local dealer.

BLADDER ASSEMBLY

Principles

It is best not to have the system water that is in the water jacket, exposed to the atmosphere. This is because of system water loss through evaporation. When system water is lost, it must be replenished or soon the water jacket would be empty. Not only is replenishing lost system water a nuisance, it is also accelerating the corrosion process throughout the total system, because adding fresh system water is also adding more corrosion causing minerals. The challenge is to maintain an airtight system, while at the same time, allowing for the expansion and contraction of system water as it warms and cools. This is accomplished in a HEATMOR™ design through the use of a pop-off ball (if equipped), gate valve, and a rubber bladder.

Bladder

Principle of the Bladder

The bladder is a reservoir that accepts the increased volume of water that results when the water within the water jacket expands as it is heated. Similarly, when the water within the water jacket cools down, water is drawn out of the bladder.

Operation of the Bladder

Normally, the bladder should be approximately $\frac{3}{4}$ full when the water temperature is at the high water temperature set point. As the furnace cycles, the water temperature drops 20 degrees Fahrenheit, approximately six gallon of water will flow from the bladder. If at any time the furnace is requiring additional water it will use the reserve water in the bladder before having to be topped off.



Bladder Tube

Filling the Bladder with Water

1. When the entire system is bled of air and the water jacket of the HEATMOR™ is full of water (water flows out onto the roof through the vent pipe), leave the water from the water source flowing to the HEATMOR™ at approximately half rate.
2. Place the pop-off ball (if equipped) back on the relief vent pipe.
3. Open the bladder gate valve and let the bladder fill half full. Check by feeling the bladder through the bladder inspection port.
4. Turn off the water when the bladder is half full.

Maintenance / Result

To maintain your furnace bladder simply keep the bladder half full of water so the bladder continues to supply the water jacket with water. If the water level does run low, the possibilities of water boiling and firebox warping are increased.

HEATMOR™

Removal and Replacement of the Bladder

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1. Turn off the (green) bladder gate valve located at the rear of the HEATMOR™ furnace to the left of the thermometer.
2. Remove the bladder cover plate held in place by wing nuts.
3. Remove the hose clamp from the bladder gate valve.
4. Pull the bladder hose away from the bladder gate valve and let the water drain from the bladder. Be careful, it could be warm.
5. Remove the old bladder and install the new bladder.
6. Install the new bladder with the bladder outlet in the front of the bladder compartment. Connect the tube to the bladder valve's 1/2 inch barbed fitting and tighten hose clamp.
7. Open the bladder gate valve and follow the "Filling the Bladder with Water" instructions.



Bladder Gate Valve

Bladder Gate Valve and Bladder Hose

Principle of the Bladder Gate Valve and Bladder Hose

The bladder gate valve provides water flow control in maintaining the bladder and filling the furnace with water. The bladder hose provides a means for the water to freely flow from the water jacket to the bladder allowing expansion and contraction.

**WHEN THE HEATMOR™ FURNACE IS OPERATING,
THE BLADDER GATE VALVE MUST BE OPEN.**

Maintenance / Result

To maintain the bladder gate valve, open and close the valve periodically to prevent it from seizing. Ensure that the hose clamp is tightly fastened, securing the bladder hose to the bladder and to the bladder gate valve.

Removal and Replacement

1. Turn off the power to the furnace.
2. Drain some of the water from the furnace to prevent water from draining while you are replacing the valve.
3. Loosen the hose clamp holding the bladder hose to the bladder gate valve.
4. Remove the bladder hose from the bladder gate valve and let the water drain from the bladder.
5. Remove the old bladder gate valve and install the new bladder gate valve.
6. Attach the bladder hose to the bladder gate valve and tighten the hose clamp.
7. Keeping the bladder gate valve closed, add water until furnace is full.

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8. Open the bladder gate valve and follow the "Filling the Bladder with Water" instructions.
9. Turn on the power to the furnace.

HEATMOR™

Water Level Switch - X-Series

Principle of the Water Level Switch

The water level switch communicates with the controller to activate the alarm and cut power if the water level is low.

Removal and Replacement of the Water Level Switch

1. Remove the pop-off ball (if equipped) and drain some of the water from the furnace so that when the water switch is removed no water drains from the hole.
2. Remove the wire connection from the switch.
3. Unscrew the water level switch from the furnace and install a new switch.
4. Replace the wire connection to the switch.



Water Level Probe

Refill the furnace referring to the instructions "Filling the Bladder with Water"

WATER JACKET

Water Jacket

Principles of the Water Jacket

Water within the water jacket absorbs heat produced in the firebox. The heated water is used to transfer heat from the HEATMOR™ into the building needing heat. The water jacket and the firebox are one welded component and can be replaced.

Maintenance

Keep the proper concentration of water treatment in the water and keep the water jacket full of water.

Supply Line and Return Line Threaded Connectors

Principles

The HEATMOR™ furnace is designed to draw the supply (hot) water from the bottom of the water jacket. This may seem irregular (people know hot water rises), but this method mixes the water in the water jacket better and often extends pump life. The return (cooler) water connects to the, upper, rear spud of the HEATMOR™. A circulator (pump) moves the water at approximately 10 to 15 gallons per minute, through both lines under very little pressure (3 psi). **Always attach a BRASS fitting into the STAINLESS STEEL spud to prevent galvanic corrosion.**

Relief Vent Pipe and Pop-off Ball (if equipped)

Principles

The relief vent pipe is connected to the top of the water jacket. The pop-off ball sits into the relief vent pipe, putting a pressure restriction on the total water jacket. When the water within the water jacket is heated it expands. Because of the restriction of the pop-off ball on the relief vent pipe, the water will expand into the bladder, instead of out onto the roof. Any time there is a buildup of more than two to three psi, the pop-off ball will lift up and release the pressure, maintaining a completely safe situation.



Relief Vent and Pop-off Ball



DO NOT permanently obstruct the relief vent pipe. This could cause water jacket or firebox damage if pressure builds.

FIREBOX AND OTHER COMPONENTS

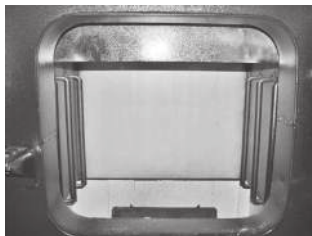
Firebox

Principles of the Firebox

Wood is burned inside the firebox to generate heat. This heat is absorbed into the water in the water jacket. The firebox and water jacket are one welded component and can be replaced. When the water is up to temperature and the combustion air blowers are off, the firebox must be airtight.

Operation of the Firebox

Temperatures within the firebox can reach 2,000 degrees Fahrenheit. Exhaust exits from the firebox into the flue. During normal operation, there will be a slight buildup of black creosote on the firebox walls. This buildup will sometimes appear flaky.



Firebox

Maintenance / Result

Wood should not be thrown into the firebox in a rough manner. Creosote should never have to be scraped off the firebox walls.

Removal and Replacement

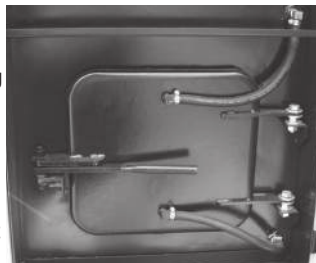
1. Remove all wood and let the unit cool down.
2. Drain all water.
3. Remove the total roof of the HEATMOR™.
4. Remove sides of the HEATMOR™.
5. Remove the ends and doors of the HEATMOR™.
6. Remove the insulation.
7. Disconnect plumbing.
8. Loosen the firebox / base connector clamps.
9. Lift the old firebox / water jacket component off the base.
10. Lift the new firebox / water jacket component onto the base.
11. Apply new silicone.
12. Reverse the above.

HEATMOR™

Firebox Door

Principles of the Firebox Door

The firebox door is water cooled to prevent warping of the door. It also acts like a water jacket, absorbing heat from the fire, and placing that energy into the water. Being water cooled, the front of the firebox door will never be hotter than the water. The cold outside atmospheric air is drawn over the warm surface of the firebox door, by the combustion blowers, which is then warmed and forced into the firebox as warmed combustion air. This lessens the time needed for the interior of the firebox to reach that high smoke burning temperature. It is important that the firebox door seal maintains an airtight seal.



Firebox Door

Operation of the Firebox Door

Water from the main water-jacket flows in a loop between the firebox door and the water-jacket by natural thermal siphoning. Since there is no pump involved, there is very little pressure. During this process, the water cools the door and the water in the door is heated.

Refer to Safe Operating Guidelines for further instructions on how to safely open and close the firebox door or contact your local dealer.

Maintenance / Result

A properly adjusted firebox door will not allow smoke to enter or escape the firebox.

Maintain a tight seal all around the perimeter of the firebox door at all times. There may be times when the perimeter of the firebox door will build up with “creosote strings,” especially along the bottom.

To keep the perimeter clean, occasionally scrape down to the steel. Do not cut, scrape or disturb the actual soft, pliable seal. Keep the door correctly adjusted on the hinges so that the pliable seal is being forced against the firebox ledge. Keep all nuts and bolts on the handle, latch and hinges properly adjusted.

The seal itself consists of a rope in the groove of the firebox door, covered with high temperature silicone.

Failure to manage and maintain the firebox door could result in premature replacement of parts and a buildup of creosote.

(When replacing the Firebox Door, it is recommended to replace the Door Hoses at this time.)



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DO NOT PERFORM THIS REPAIR WHEN UNIT WATER TEMPERATURE IS UNSAFE.
ALWAYS WEAR PROPER PERSONAL PROTECTIVE EQUIPMENT
WHEN WORKING WITH WATER AND CHEMICALS.**

Removal and Replacement

To remove the firebox door, follow these steps:

1. Turn off power to the combustion air blowers.
2. Ensure that the fire in the firebox is extinguished.
3. Stop the flow of water from the water jacket through the door hoses by pinching the two door hoses shut. Make a collar of cardboard between the jaws of two pairs of vice-grips and clamp the door hoses tight at the center point of their length.
4. Loosen the hose clamps and remove the door hoses from the firebox door.
5. Loosen and remove the nuts and bolts holding the firebox door on to the hinge.
6. Remove the firebox door from the hinges and remove the handle from the firebox door.

To replace the firebox door, follow these steps:

1. Replace the bolts and nuts onto the new door just as they were removed.
2. Hang the firebox door on the hinges loosely, with the nuts just slightly more than finger tight, and attach the handle on to the firebox door allowing the handle to just barely float freely.

Note: Ensure there is a tight seal around the firebox door frame while it is closed and latched shut. The firebox door must remain parallel with the door frame.

3. Close the firebox door and allow the handle to rest freely in the latch.
4. Get the firebox door parallel with the door frame ledge and tighten the nuts and bolts a little more firmly onto the hinges. You may want to block up the firebox door until the hinge is re-tightened.
5. Re-attach the door hoses, tighten the hose clamps, and unclamp the vice-grips.
6. Light a fire in the firebox; then ensure that there are no air leaks. You will be able to detect them by noticing smoke escaping through any air leaks, while the blowers are running.

Note: If there is smoke leakage around the firebox door or one corner of the door, it is adjustable.

7. Pull the door handle off the latch and allow it to rest loosely.
8. With two 1 1/8 inch wrenches, loosen the appropriate hinge (top or bottom) so it is slightly more than finger tight. (Use only the bottom nut to adjust.)
9. While the bolt is slightly tight, rap the nut between the hinge halves, with a punch and hammer.
10. With hinge bolt reset, tighten the lower nut.
11. The top and bottom firebox door should remain parallel with the door frame. If it tends to sag, block it up with appropriate blocking until the hinge is re-tightened.

HEATMOR™

Firebox Door Hoses and Elbows

Principle of the Door Hoses

The door hoses allow water to circulate between the firebox door and the water jacket.

Operation of the Door Hoses

The door hoses allow water from the water jacket to pass through the firebox door, through thermal siphoning. Refer to "Firebox Door" for further details.



Door Hose

Maintenance / Result

Maintaining the door hoses and elbows ensures that water is able to flow through the door. Build-up (calcium) in the elbows is possible over time, which slowly reduces the water flow through the door. We recommend to change both top and bottom elbows every other year. If water does not flow freely through the hoses to the firebox door, you may hear popping sounds in the door. Upon hearing these sounds, you should properly clean the door hose fittings (elbows). Once the hoses are around five years old or if they show signs of wear, they should be replaced.

Replacement of hoses or cleaning of the elbows is always easier if the water is cool rather than hot. To clean the elbows, remove the hoses and use a pipe cleaning brush to clear out the build-up.



Elbow

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Removal and Replacement

To remove and replace the door hoses, use the following steps:

1. Turn off power to the air combustion blowers.
2. Ensure that the fire in the firebox is extinguished, which will allow the water to cool.
3. With hose clamps or vice-grips, pinch the door hoses in the middle of the hose.
4. Before removing the old door hose, cut the new pieces of door hose, one at 19 inches and the other at 21 inches. These measurements are critical.
5. Pinch the new door hose in the middle of the hose, creating a tight seal.
6. Loosen the hose clamps on each end of the door hose.
7. Remove the first end of the door hose needing replacement.
8. Push on the end of the new door hose and repeat the steps for the opposite end of the hose.
9. Tighten the hose clamps, securely fastening the door hose to the nipple on the furnace or firebox door.
10. Remove the vice-grips pinching the door hoses. This will allow water to flow through.
11. Check for leaks.
12. Repeat the steps to change additional door hoses.



Clamping Hose

HEATMOR™

Removal and Replacement

To remove and replace the elbows, use the following steps:

1. Turn off power to the air combustion blowers.
2. Ensure that the fire in the firebox is extinguished, which will allow the water to cool.
3. With hose clamps or vice-grips, pinch each door hose in the middle of the hose, creating a tight seal.
4. Loosen the hose clamps on each elbow.
5. Remove each of the door hoses from the elbows.
6. Using a wrench, unscrew each of the door elbows, note how the elbows are angled.
7. Replace the door elbows using pipe compound and a wrench. Ensure the elbows are secure and angled correctly so the hoses will slide on easily.
8. Push the door hoses onto the new elbows.
9. Tighten the hose clamps on each top and bottom hose, securely fastening the door hose to the elbow.
10. Remove the vice-grips pinching the door hoses. This will allow water to flow through hoses.
11. Check for leaks.

Firebox Door Handle

Principles of the Firebox Door Handle

Fastened to the firebox door, the handle provides a secure method of controlling the opening and closing of the firebox door. By opening the firebox door, gives a space for fresh air to enter the firebox without the risk of a “flash back.” The firebox door handle is also designed to “stick” to the firebox door handle holder on the outer door. This procedure prevents either of the doors closing while the HEATMOR™ is being loaded with wood.

Maintenance / Result

To maintain the door handle, ensure that the nut on the pivot point is not overly tight. If the arm is not able to pivot easily, the handle will be hard to lift. If the nut is too loose, the arm will also be loose and it will be harder to obtain a perfect seal around the door. If you do not have a firm seal, you could potentially be creating an air leak resulting in further complications. Refer to “Air Leaks” for further details or contact your local dealer.



X-Series Firebox Door Handle

Removal and Replacement

To remove the handle, use the following steps.

- 1) Turn off power to the blowers.
- 2) Ensure the fire in the firebox is extinguished.
- 3) Loosen and remove the nut on the pivot bolt.

Firebox Door Hinge

Principle of the Firebox Door Hinge

Supports the firebox door and allows for adjustment.

HEATMOR™

Maintenance / Result

The adjustable hinge works in conjunction with the door handle and the firebox door. The hinge has slotted holes so the firebox door can be adjusted to provide a solid fit against the fire door frame. Secure and stable, the hinge allows the firebox door to swing free and smooth.



Firebox Door Hinge

Firebox Door Latch

Principles of the Firebox Door Latch

The safety latch is designed to provide additional safety by preventing the firebox door from opening too quickly, potentially allowing a “flashback.” The latch is adjustable and replaceable.

Maintenance/result

The latch is adjustable with the two bolts. The two bolts must be tightened firmly. When properly adjusted, the firebox door handle close and open with ease and create a perfect seal around the door.

Firebox Door Holder

Principles of the Firebox Door Holder

The firebox door holder provides a means of holding both the outer front door and the firebox door completely open while the operator is loading wood into the HEATMOR™.



Firebox Door Handle Holder

Operation

1. Open the firebox door as you step backwards towards the exterior door. This allows you to be out of the way if there is a “flash back” or smoke exiting the door opening.
2. Set the firebox door handle into the firebox door handle holder provided on the outer door.

Firebox Door Gasket

Principles of the Firebox Door Gasket

The firebox door gasket creates an airtight seal between the firebox door frame and the firebox door. It is a pliable seal that can be removed and replaced if damaged or worn.

Maintenance/Result

Occasionally, scrape the perimeter of the firebox door to keep it clean. Do not cut, scrape or disturb the pliable seal. Keep the door correctly adjusted on the hinges to ensure the pliable seal is being forced against the firebox door frame. Keep all nuts and bolts on the handle, and latch and hinges properly adjusted.

The seal itself consists of a fiberglass rope in the groove of the firebox door, covered with high temperature silicone.

Failure to manage and maintain the firebox door gasket could result in air entering into the firebox when the combustion air fans are off or smoke escaping around the seal when the combustion air blowers are running.

HEATMOR™

Air entering the firebox when the **fan is off** results in the wood continuing to smolder, resulting in the furnace overheating and more than a “whiff” of exhaust emitting from the chimney. Often, this type of exhaust has an unpleasant odor. Creosote will also be formed.

When the fan is running and the door seal is not sealing tightly, smoke will be forced through the leaking door seal. This causes the front of the furnace to be smoke filled and soon the front of the firebox will be covered with soot. Premature replacement of parts and a buildup of creosote will result.

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Removal and Replacement

1. Using a sharp knife, carefully cut away the silicone seal around the firebox door seal channel.
2. Remove the old gasket from underneath the old silicone.
3. Remove all old silicone with a wire wheel or steel brush.
4. Replace with a single length of new gasket material. Do not pack or over stretch the new gasket. Once in place allow, the material to “relax” before cutting to length.
5. Cover the door rope with silicone and tool to a smooth, flat, finish.
6. Leave the firebox door open for 24 hours to allow silicone to dry completely.

NOTE: You will need 78 inches of 1 inch door rope material plus two tubes of caulking. The door rope kit is available from your HEATMOR™ dealer.

Firebox Door Frame

Principles of the Firebox Door Frame

To provide a small edge that will seal into the firedoor gasket to provide an airtight seal.

Maintenance / result

Keep the door frame cleaned down to the steel at all times. Failure to do so results in a buildup of creosote, resulting in a barrier to an airtight seal, air leaks and premature gasket replacement.



Firebox Door Frame

HEATMOR™

Firebox / Base Connector Clamps

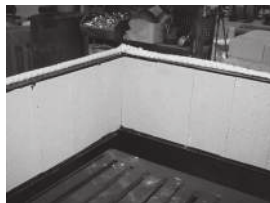
Principles of the Firebox / Base Connector Clamps

To allow easy separation of the firebox / water jacket assembly and the base, if repairs are needed to either assembly.

Firebrick

Principles of the Firebrick

Once heated, the firebricks hold heat for a long period of time. This creates a warm firebox between cycles. Because of this heat, when the combustion air blowers start, the fire inside the firebox can re-ignite and reach the smoke burning temperature of 1,100 degrees Fahrenheit much faster.



Firebrick

Maintenance/Result

Allow the ashes to bank up against the firebrick to act as a cushion against hard knocks of wood. If bricks are broken, they should be replaced as soon as possible.

Removal and Replacement

1. Let the fire go out and allow the ashes to cool completely. Remove the ashes from the firebox.
2. Crawl into the firebox.
3. Remove the black, high temperature silicone bead at the bottom of the firebrick.
4. Using a pry-bar, remove the broken brick.
5. Replace the broken brick.
6. Apply a new bead of high temperature silicone along the base of the brick.

Standard Grates

Principles of the Standard Grates

Grates allow combustion air from the combustion air blowers to pass from below the grates, up through the grates, through a shallow depth of ashes and then to the bottom of the burning fire. This way the ashes will burn completely into a fine powder that will flow through the grates into the ash pit. Because air is being forced through the ashes, the glowing embers will be more apt to ignite and set the wood ablaze.



Maintenance/Result

1. Never make the slots in the grates wider than factory dimensions.
2. If hot coals can pass through the grates, warping of the grates may result.
3. Make sure the grates are always resting in the grooves of the ash pit. If the grates move out of place, it may result in hot coals slipping under the grates causing warping of the grates.
4. Make sure the narrow side of the slot is next to the fire.
5. Replace broken grates immediately or a chain reaction of broken grates may result.
6. The grates will not break under reasonable knocks of heavy wood.

HEATMOR™

Removal and Replacement

- 1) Allow the ashes to burn completely and extinguish.
- 2) Push the ashes to the back of the firebox or remove all the ashes from the firebox.
- 3) Run a small pry bar around the perimeter of the grate and the edge of the ash pit to loosen the grate.
- 4) Lift out the broken grate.
- 5) Clean the edge of the ash pit in which the new grate will sit.
- 6) Install the new grate. Make sure to install the new grate with the narrow width of the slot towards the fire.

Sand

Principles of Sand in the Base of the Firebox

The HEATMOR™ furnace, in boiler terms, is a "dry base boiler." This is to say there is no water around the base of the firebox. The firebrick and sand hold and release heat to the firebox during the off cycle.

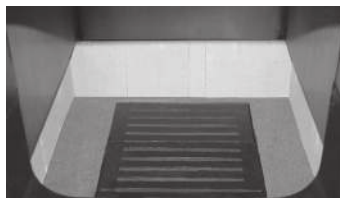
A sand base provides complete corrosion protection to the most corrosion prone area of a furnace.

Types of Sand to Use

Refer to Initial Installation for type of sand to use.

Installation

1. Cover the grates with a piece cardboard.
2. One person enters the firebox.
3. Another person shovels the sand into the firebox while the person inside packs the sand completely, using a piece of wood like a 2 x 4 x 10" inches long.
4. Fill the base with sand, level to the top of the grates.



Sand

Maintenance/Result

The sand should never need to be removed. When stirring the ashes, rake only the area over the grates. There is no need to stir the areas where the sand is located. Maintain the sand level to the top of the grates. Check the level on a yearly basis and add sand if necessary.

Removal and Replacement

1. Allow the ashes to extinguish and then remove all the ashes from the firebox.
2. Allow the water to cool down.
3. One person should get into the firebox and with a small scoop, remove the sand from around the ash pit.
4. Replace as above.

AIR SUPPLY

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. Too much draft may cause excessive temperatures in the appliance and may damage the catalytic combustor. Inadequate draft may cause back-puffing into the room and 'plugging' of the chimney or the catalyst.

Inadequate draft will cause the appliance to leak smoke into the room through appliance and chimney connector joints.

An uncontrollable burn or excessive temperature indicates excessive draft.

Maximum draft should not exceed 0.20 inches water column, if exceeded could cause solid fuel fire to burn out of control.

THE FLIPPER MUST OPERATE PERFECTLY OR PROBLEMS QUICKLY ARISE.

Combustion Air Blower and Flipper Assembly

Principles

The combustion air blower and flipper assembly supply air for combustion inside the firebox. The flipper assembly keeps air out of the firebox when combustion is not needed. These components are removable and serviceable.

Operation of the Combustion Air Blower and Flipper Assembly

- When the water temperature reaches the high water temperature setting, the aquastat turns the blower off. At this point, the hinged flipper falls shut, preventing air from getting into the firebox.
- When the water temperature reaches the low water temperature setting, the aquastat turns the blower on. At this point, the hinged flipper opens from the force of the blower and allows air into the firebox.
- The hinged flipper must completely open and close all of the time. When it is closed, it must seal completely. If more than a "whiff" of smoke is coming from the chimney when the blower has been off for approximately 10 minutes, this is a strong indication the hinged flipper is not shutting properly.



Flipper Assembly

Maintenance / Result

- Lubricate the blower motor regularly.
- Clean the fin blades of the squirrel cage fan.
- Ensure the flipper assembly is clean and seals completely when closed.

HEATMOR™

Steps to Maintain your Blower / Flipper Assembly.

1. Turn off the main power supply to the furnace.
2. Loosen and remove the two thumb nuts securing the blower / flipper assembly to the large air tube, and remove the blower / flipper assembly.
3. Lubricate the blower motor every six months with 10 to 20 drops of SAE 10W or 20W non-detergent oil (ML Type) or with electric motor oil in the appropriate oil holes. The oil holes are on the bottom of the blower.
4. With a small brush, scrape any dust or residue that has accumulated on the fins of the blower.
5. With a scraper or brush, remove any residue built up on the flipper assembly.
6. Ensure the flipper is resting completely on its seat. If it is not resting completely, perhaps there is dust or soot built up on the flipper, or some other obstruction not allowing it to close tightly.
7. Securely fasten the blower / flipper assembly back to the large airtube



Combustion Air Blower

Removal and Replacement

1. Turn off the main power supply to the furnace.
2. Loosen and remove the thumb-nuts securing the blower / flipper assembly to the air tube.
3. Disconnect the electrical wire from the blower.
4. Remove the flipper assembly from the blower by removing the four bolts. This will require a 7/16 inch wrench.
5. Attach the existing flipper assembly to the new blower.
6. Rewire the electrical wire to the blower. Contact a licensed electrician if you have any questions.
7. Securely fasten the blower back to the air tube ensuring that there are no air leaks.

THE FLIPPER MUST OPERATE PERFECTLY OR PROBLEMS QUICKLY ARISE.



If the flipper is unable to open and close freely, or remains partially open or partially closed, the furnace will starve for air resulting in a smoldering fire instead of an intense fire. More smoke and creosote is the result. If the flipper is not operating correctly, it causes a snow-ball effect of problems. **MAINTAIN THE FLIPPER!**

HEATMOR™

Air Box(s)

Principle

The air box is designed to distribute the appropriate percentage of air from the blower, into different areas of the firebox so the fire will burn efficiently and clean.

Maintenance / Result

Check for ashes in the air box. If ashes are in the air box, they may interfere with the opening and closing of the flipper. If ashes cover the air outlets, less air will get into the firebox. When raking ashes, be careful not to pull the ashes over or into the air box. Be certain the ashes are cold before attempting to remove ashes from the air box.

To maintain the air box, remove the blower / flipper assembly and clean the ashes out of the air box with a mini-vacuum, brush or your hand. You may need to loosen up hard packed ashes. Securely fasten the blower / flipper assembly back onto the large air tube ensuring there are no air leaks.



Air Box



Back Air Box 350X

HEATMOR™

Automatic Fan Switch (A.F.S.)

The Automatic Fan Switch must operate correctly for safe operation of the Heatmor

Principle

The fan switch turns the fan on while the outer door is opened to clear the possible excess fuel build up in the firebox. Along with normal recommended, safe firebox door opening practices, the risk of a flash back is greatly reduced.

Operation

The Automatic Fan Switch automatically turns on the fan when the front outer door is open. The Automatic Fan Switch can be overridden by the Front light and Combustion Air Blower Control Switch and the high limit will also override the Automatic Fan Switch.



Automatic Fan Switch

Maintenance/Result

Ensure that the outer door closes properly to activate the Automatic Fan Switch. If the outer door does not close properly the switch could stay in the "fan on" position or if the Automatic Fan Switch fails in the "fan on" position, the HEATMOR™ combustion fan will continue to run until the high limit is tripped. Ensure that the Automatic Fan Switch is working properly: if the HEATMOR™ is off when you approach the HEATMOR™, the fan should come on when you open the outer door, if it does not, then your Automatic Fan Switch has failed in the "fan off" position.

Removal/Replacement

1. Turn off the main power supply to the furnace
2. Insert a flathead screwdriver in the top and bottom of the switch and pull out the switch from the corner
3. Carefully (do not touch the bare connections), remove the two electrical wires from the switch
4. Discard the switch and replace with a new switch
5. Reconnect the two electrical connections in the back of the switch
6. Push the switch back into the hole in the corner
7. Turn on the main power supply again

Note: If you have been running off your high limit, to determine if the issue is you're A.F.S. or your aquastat, you should complete steps #2 and #3 and if your fan shuts off then it was you're A.F.S. that has failed in the "fan on" position. If the fan still runs when disconnecting the switch then your aquastat has failed.

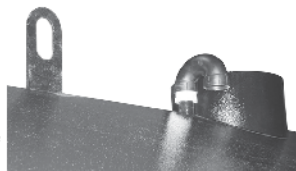
CHIMNEY AND TOP FLUE

Chimney

Principles

The principle of the chimney is to discharge exhaust from the flue into the atmosphere.

Please refer to the “Best Burn Practices” located on the inside front cover of this Operations and Maintenance Manual.



Chimney

Maintenance

Make sure chimney and chimney extensions are clean and in good condition.

The chimney may be cleaned from the top with a chimney-cleaning device. Inspect the chimney twice a month during the heating season to ensure there is not an excessive amount of creosote. If an excessive creosote buildup has occurred, it must be removed promptly to reduce the risk of a chimney fire.

When the unit is shut down for the summer, inspect and clean the chimney for the next heating season. When the furnace is not in use, cover chimney so nothing can enter. Never connect the unit to a chimney flue serving another appliance.

Chimney Extension(s)

Principle

Chimney extensions discharge smoke higher into the atmosphere. They also discharge sparks higher into the atmosphere, so they have more chance of being burned out before they reach the ground. Approved chimney extensions may be added to the chimney to discharge smoke to higher levels. Discharging smoke at a higher level helps keep smoke above property level, especially on low pressure or cloudy, hazy or wet days. When installing chimney extension you must have no less than three tech-12 screws (self-tapping). Any chimney extension exceeding 10ft must be supported with guide wires.

Please refer to the “Best Burn Practices” located on the inside front cover of this Operations and Maintenance Manual.

Maintenance / Result

- 1) See chimney maintenance above.
- 2) Purchase approved chimney extensions that fit together correctly. If the extensions don't fit properly, creosote will run down the outside of the chimney extensions and cause corrosion to the roof.
- 3) Annually remove chimney extensions for cleaning and safety purposes.

In case of chimney fire shut off combustion fan switch and consult your dealer.

8 inch x 32.5 inch steel connector and extensions are available from your local dealer.

NOTE: If more than one extension is used on the X-Series, use all insulated extensions. Insulated steel extensions are also available from your local dealer.

HEATMOR™

Flue

Principles of the Flue

The flue allows the passage of heat and gases from the firebox to the chimney. Because the flue is surrounded with water, heat is transferred to the water surrounding the flue. This captures heat that would otherwise be lost out the chimney, assisting in the process of a more efficient burn.

NOTE: The X-Series has a tubed single pass flue. All tubes should be maintained.



Flue Cover 350X

PERFORM MAINTENANCE ONLY WHEN THERE IS NO FIRE IN THE FIREBOX AND THE FURNACE IS COOLED DOWN.

Maintenance

Only dust should accumulate in the flue. If creosote develops, the cause should be determined and eliminated.

- 1) Inspect and clean the flue once a month during the heating season, if using wood such as poplar, white oak, heavily barked wood, which has high ash content, clean twice per month.
- 2) Remove the one-half inch nuts holding the flue cover and remove
- 3) Using the flue scraper provided with the HEATMOR™ furnace, push the dust to the front of the flue and let it fall down into the firebox. Remove this dust as you would ashes. If a lot of dust is dropped down, be certain that the air slot of the front air box is not covered. If there is a two pass flue, clean the top flue through the flue access ports.
- 4) Re-attach the flue cover plate(s), making sure to tighten the nuts to make an airtight seal.
- 5) If the HEATMOR™ Furnace unit is shut down for the summer, inspect and clean the flue for the next heating season.



Removing Flue Cover

Flue Cover

Principles

The flue cover(s) is airtight and provides access to the flue for cleanout.

Flue Scraper

Principles

The flue scraper is provided for cleaning the flue only and is not designed to be used for other purposes.

ASHES

Ash Management and Ash Removal

1. If ash management is deficient, the HEATMOR™ will not perform to its optimum. It is time well spent to ensure proper ash management. In the long run, the operator will be paid back many times over in higher efficiency and better performance. Improper ash management results in one unfavorable condition starting a chain reaction of additional problems.
2. Allow all wood in the firebox to fully burn out every day or two, and use this opportunity to rake the ashes in the firebox, down into the grates. By timing the loading of wood so the water temperature drops to approximately 130 degrees Fahrenheit, means all fuel in the firebox is used up, and the only thing burning are the ashes. An hour or two of this condition will ensure an easy, smoke free opportunity to rake the ashes. When all fuel has been burned out of the ashes, they will be a pale brown color. With a light raking assistance, they will fall through the grates into the ash pan below. It is best to rake the area over the grate, every day, such that the grates are at least 25 percent clear of ash. This allows upward movement of combustion air.

USE A LIGHT WEIGHT, LONG HANDLED, SOLID SPIKED, RAKE TO RAKE ASHES.

3. If the ashes don't flow into the ash pan while being raked, the ash pan is possibly full. Removing the ashes from the ash pan before it is completely full ensures the proper airflow from below the grates is maintained and also ensures the ashes can drop through the grates into the ash pan. Ashes should be removed before the ash pan is completely full.
4. Be careful not to pull the ashes too close to the front (or the rear) of the firebox, blocking off the combustion airflow from the air boxes.
5. Do not allow ashes to build up on top of the grates. Air needs to flow through the grates to fuel the fire. A blocked grate can cause inefficient or non-existent combustion conditions.
6. It is not necessary to rake or move the ashes that accumulate around the sides of the firebox. Usually they will naturally flow onto the grate area, courtesy of being disturbed as wood is added.
7. A rule of thumb is to remove ashes once per week. Choose a certain day of the week and faithfully do the ash removal chore on that same day, every week.
8. Completely burned ashes will appear like flour. They may be dusty when being removed with the auger. A particle mask should be worn when removing ashes with the auger.
9. Obtain a square, steel container, approximately one-bushel in volume that will fit under the ash auger tube. Auger out the ashes into this square container and immediately dispose of them into the larger, sealed, metal container.
10. Removed ashes should be stored in a steel container, sealed with a steel tight fitting lid, and placed in an area free of combustible materials for a few days, to allow the ashes to completely cool before being disposed.
11. If wood with nails is burned, the nails will find their way through the grates and can be removed with the ashes. Normal nails should pose no problem. If the nails are "U" shaped, they may loop over the grate with a magnet. With proper handling, it is not necessary to let the fire go out or the ashes to cool before removing ashes.

HEATMOR™

Ash Pan

Principles

The ash pan is a storage reservoir for completely burned ashes and provides support for the grates. It is also a distribution area for the combustion air that flows upwards through the grates.

A reasonable amount of ashes (two to four gallons) should be removed during each ash removal. The ash pan is replaceable.



Ash Pan (Below Grates)

Removal and Replacement - consult your local dealer



Disconnect power before removing ashes.

Ash Auger

Principles

The auger provides a convenient and cleaner method of removing ashes from ash pan.

Operation

1. **The ash auger should never be left in the ash pan between clean-outs of ashes.**
2. Doing so will interfere with the required combustion airflow beneath the grates, and required combustion airflow up through the grates.
3. Twist the auger into the ashes and either screw or pull the ashes out.
4. A proper method of storing the ash auger is to attach a six inch PVC pipe, three feet long, to the side of the HEATMOR™. Storing the auger in the tube will keep it from being frozen into or under snow.



Ash Auger

HEATMOR™

Ash Auger Tube

Principles

The ash auger tube is a six inch diameter tube that extends from the rear of the ash pan on the X-Series, to approximately four inches past the cladding of the HEATMOR™. This extension allows placing a container under the tube to catch the ashes.

Ash Auger Tube Cover Plate

Principles

The auger tube cover plate is a round plate that is secured onto the end of the ash auger tube, creating an airtight seal.

X-Series Operation

1. When removing ashes, always turn off combustion air blower and disconnect power.
2. Remove the two thumb nuts.
3. Insert the ash auger and remove the ashes.
4. Replace the ash auger tube cover plate and securely tighten the two thumb nuts.

Creosote

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.

The chimney connector and chimney should be inspected at least twice monthly during the heating season to determine if a creosote buildup has occurred.

Also check daily for creosote buildup until experience shows how often cleaning is necessary.

Be aware that the hotter the fire, the less creosote is deposited, and that weekly cleanings can be necessary in mild weather, even though monthly cleanings can be enough in the coldest months.

If creosote has accumulated it should be removed to reduce the risk of a chimney fire.

Do not connect this unit to the chimney flue serving another appliance.

ELECTRICAL

Principles

The HEATMOR™ furnace comes with all internal components pre-wired. Provision is made for easy attachment of the main electrical power supply to the HEATMOR™ controls. Electrical outlets at the rear of the HEATMOR™ accommodate plugging in circulating pumps.

Electrical Supply



Have a licensed electrician make all electrical connections.

Required electrical power supply to the HEATMOR™ is 115 volts, 60HZ, 1 phase.

1. Use only 12/3 electrical wire.
2. The 12/3 wire will actually contain 4 wires; a) black, b) white, c) red, d) ground
3. If the electrical wire is being buried in the trench, be certain to use electrical wire approved for direct burial.
4. Do not place electrical wire in close contact with the supply and return lines.
5. The electrical supply wire should be connected to its own circuit.

Electrical Supply Junction Box

Principles

The electrical components of the HEATMOR™ furnace are pre-wired at the factory. All the wiring becomes centralized in the junction box.

Connecting the main power supply to the HEATMOR™:

1. Remove the plate on the Electrical Supply Junction Box.
2. Insert the electrical supply wire through the electrical connector on the electrical supply junction box.
3. Basically, the black wires are connected, the white wires are connected, the ground wires are connected, and the red wires are connected.
4. Tighten the screw clamp in the electrical connector to hold the supply wire firm.
5. Replace the plate on the Electrical Supply Junction Box.



Electrical Supply Junction Box

Maintenance

- Keep the junction box clean and dry.
- Keep the cover plate firmly attached at all times.
- Make certain the MARR connectors (wire nuts) are properly installed and holding tight.

Double Electrical Outlets at Rear

Principles

To provide a live source of 115V power to power pumps, trouble lights, etc.

Maintenance

- Do not overload the circuit.
- Keep the outlets clean.

HEATMOR™

Electronic Aquastat Controller

Principles

The Electronic Aquastat Controller displays the temperature of the water in the water jacket.

- 1) At its low setting it will turn the combustion air blower(s) on, re-igniting the fire.
- 2) At its high setting it will turn the combustion air blower(s) off, extinguishing the fire.
- 3) The difference between the highest temperature of the water and the lowest temperature of the water is factory set at 40° Fahrenheit for the 200X and at 50° Fahrenheit for the 350X.



Electronic Aquastat Controller

Operation

The factory settings on this aquastat should not be changed; changing the factory settings will void the warranty and certifications.

Maintenance

Keep the face of the display clean by cleaning periodically with glass cleaner.

Removal and Replacement

1. Turn off the main power supply to the HEATMOR™.
2. Remove the screws from the panel that holds the Electronic Controller.
3. Pull the controller and panel away from the housing to obtain clearance to work on the Electronic Controller on the back.
4. Disconnect and label or draw a diagram of each wire connection on the Electronic Controller. Refer to the Wiring diagram at the back of this manual.
5. Replace the controller and reverse the steps above for re-installation.

NOTE: Different makes and models of furnaces may have different controllers. These controllers will NOT be interchangeable. Replace with the correct unit from your dealer.

NOTE: The temperature reading on the display may not coincide exactly with the temperature of the water leaving the back of the HEATMOR™ or the temperature of the water arriving into the building being heated. There may also be small variances between the temperature reading on the display at the front of the HEATMOR™ and the high limit aquastat on the back of the HEATMOR™.

These variances result from:

1. The Electronic Controller is reading the temperature of the water at the middle of the water jacket at the rear of the HEATMOR™. The hot supply water is taken from the bottom of the water jacket at the rear of the HEATMOR™.

IN A NORMAL OPERATING MODE, SMALL VARIANCES IN READINGS AND CALIBRATIONS WILL NOT AFFECT THE END RESULTS OF THE TOTAL SYSTEM.

2. The high limit aquastat is reading the temperature from the top of the water jacket, at the rear of the HEATMOR™.
3. Until the water is thoroughly mixed, whether or not the unit is firing, there will be variances between the different instruments.

NOTE: X-Series Controller will cut power to the Blower if your HEATMOR™ has low water.

HEATMOR™

Temperature Probe

Principles

The temperature probe is how the Electronic Controller reads the temperature of the water in the water jacket.

Removal and Replacement

1. Turn off the main power supply to the HEATMOR™.
2. Remove the cover of the low voltage junction box.
3. Pull the temperature probe out of the well.
4. Install the new temperature probe into the well.
5. Disconnect the wires in the low voltage junction box for the old temperature probe and connect the wires for the new temperature probe.
6. Replace the cover on the low voltage junction box



HEATMOR™

High Water Temperature Safety Shutoff Control

Principles

The correct name is an "aquastat." It is referred to as an aquastat because it measures the temperature of water (aqua means water). It is sometimes referred to as a thermostat, but thermo means air. It does not measure the temperature of air. The High Water Temperature Safety Shutoff Control turns off all electrical power to the combustion air blower and the front light if an excessive water temperature be reached. To provide added safety and notification, when a high water temperature is reached, this aquastat will send electrical power to the "red wire". The red wire leading from the HEATMOR™ back to the power source can be installed so the electrical power will sound an alarm or will override the comfortable heat settings within the heated building. By starting heating appliances in the building, heat will be drawn off the HEATMOR™, dumped into the building, creating an elevated temperature environment in the building, and hence a notification of an unusually high water temperature within the HEATMOR™. By removing this excess heat from the HEATMOR™, a "boil" will normally be avoided.

Operation

- From the factory, this control is set at 195 degrees Fahrenheit. When the water temperature within the water jacket lowers to 190 degrees Fahrenheit; the electrical circuit to the main combustion air blower(s) would be re-activated. The combustion air blower will not come back on until the low water temperature is reached.

- **Adjustments cannot be made to the High Limit.**

Removal and Replacement

1. Turn off the main power supply to the HEATMOR™.
2. Remove enough water from the HEATMOR™ until the water level is below the hole for the High limit.
3. Using a wire cutter snip all wires from the back of the High Limit.
4. Using a 1" wrench remove the High limit from the Bung.
5. Place thread sealer on the new high limit and tighten securely.
6. Securely attach the wires from the new High Limit to the old wires that were clipped off with tape or similar.
7. Open the 4X4 electrical box cover and locate the three wires (black, brown, and Red) coming down from the top hole. These are the old High Limit Wires.
8. Using these wires, snake the new High limit wires down to the 4x4 Electrical Box.
9. Remove the old wires from the wire nuts, and replace with new wire from the new High Limit.
10. Replace the 4X4 cover.
11. Turn on the power.

HEATMOR™

Front Light and Fan Power Switch

Principles

1. To provide light while fueling.
2. To provide a means of turning off the combustion air blower on demand.
3. To provide a visual warning that electrical power to the combustion air blower has been terminated.

Operation of the Front Light and Fan Power Switch

- By adjusting the fan power switch to the down position, the electrical power to the combustion air blower is manually terminated, and the front light turns on.
- This light will then illuminate the area in front of the HEATMOR™.
- The light must be turned off for electrical power to be running to the combustion air blower.

IF THE WATER TEMPERATURE IS HIGH ENOUGH TO TRIGGER THE HIGH WATER TEMPERATURE SAFETY SHUTOFF, THE FRONT LIGHT WILL NOT TURN ON WHEN THE FAN POWER SWITCH IS IN THE DOWN POSITION.

Removal and Replacement of the Front Light Bulb

1. Remove the glass globe by first loosening the setscrew and then unscrew the globe.
2. Replace the light bulb.
3. Replace the globe and tighten the setscrew.

Removal and Replacement of the Fan Power/Light Switch

1. Turn off the main electrical power supply to the HEATMOR™.
2. Remove the switch cover plate.
3. Make a sketch of the location of the wires on the switch.
4. Remove the wires, and replace the switch. This is a special 3-way switch.
5. Replace the wires as in the diagram.
6. Secure the cover plate.
7. Turn the main electrical power supply back on to the HEATMOR™.



Front Light

Note: It is recommended to contact a licensed electrician to perform the above operation.

In the Event of a Power Failure

If a power failure occurs during the use of a HEATMOR™, do not open the firebox door to provide draft for the fire to burn. Allow the fire to go out. In case of a prolonged power failure, a generator should be used as a back-up power source.

EXTERIOR CLADDING AND INSULATION

Outer Front Door of the HEATMOR™

Principles of the Outer Front Door

The outer door of the furnace is an exterior door, which is insulated to retain the heat that radiates from the firebox door and water jacket surface. The door provides a lockable, protective surface to prevent any hot surface from being exposed.



Operation of the Outer Front Door

The outer door is hinged and opens to the right of the furnace. As the door opens, it releases the Automatic Fan Switch push bar, which allows air to enter the air box reducing the risk of a flashback. A keyed lock is installed on the left side of the door providing an easy way to ensure the door cannot be opened allowing untrained users to be injured.

Maintenance / Result

Keep the door free from any obstruction and ensure that the inner seal of the door seals against the door-frame. This will keep cold air from entering the heated air cavity, which provides the air box and firebox with air.

Removal and Replacement

To remove the outer door, the lock handle must be unlocked and opened. With a socket, loosen and remove the bolts attaching the door to the outer frame of the furnace.

Place and secure the new door into position. Test the door to ensure a tight seal to the door-frame of the furnace.



Locable Door

Roof of the HEATMOR™

Principle of the Roof

The roof of the furnace is one solid piece of roofing steel creased in the center. This provides a dry covering to protect the insulation of the furnace.

Maintenance / Result

Inspect the roof of the furnace once a year to verify that none of the roof screws have broken. A large number of broken roof screws can allow damage to the furnace roof. Ensure the lift hook and chimney are sealed so no water can enter into the roof insulation.



Roof

ABSOLUTELY NO FIRE IN THE FIREBOX WHEN PERFORMING THIS REPAIR. DO NOT PERFORM THIS REPAIR WHEN UNIT WATER TEMPERATURE IS UNSAFE. ALWAYS WEAR PROPER PERSONAL PROTECTIVE EQUIPMENT.

HEATMOR™

Removal and Replacement

If the roof has been damaged it can be replaced by a matching roof. Follow these steps or contact your local dealer.

1. Remove the silicone from around the lift hook, chimney, anode rod, and relief vent pipe.
2. Remove all roof screws holding the damaged roof secure.
3. Lift the old roof steel off the furnace.
4. Install the new roof steel.
5. Secure the new roof to the frame of the furnace.
6. Re-seal the lift point, chimney, relief vent pipe, and anode rod coupler with caulking.

Sides of the HEATMOR™

Principle of the Sides and Ends

The sides of the furnace are clad with your choice of steel siding. The steel siding provides a dry covering to protect the insulation of the furnace.

Maintenance / Result

Inspect the sides of the furnace once a year to verify that none of the screws have broken. A large number of broken screws can allow damage to the furnace siding. Ensure there is a good seal so no water can enter into the insulation covering the sides of the water jacket.



Removal and Replacement

If the sides have been damaged they can be replaced with matching steel siding. Follow the following steps or contact your local dealer.

1. Remove all the screws holding the damaged steel siding secure.
2. Lift the old steel off the furnace.
3. Install the new steel siding.
4. Secure the new steel to the frame of the furnace.

Insulation

Principle of the Insulation

The insulation helps retain the heat in the water, which has been heated by the fire. It also provides a heat barrier to ensure that the outer steel siding does not release any heat.

Maintenance / Result

It is important to keep the insulation dry. Wet insulation loses its R-Value. Keep the base of the furnace sealed to prevent small rodents from making nests or wrecking the insulation.



Removal and Replacement

To remove and replace the insulation, refer to the preceding removal and replacement steps involving the roof and siding. If you have any further questions, please contact your local dealer.

AIR AND/OR WATER LEAKS

Air Leaks

Checking For Air Leaks

Once your HEATMOR™ system is up and running, we recommend that you conduct an initial check for air leaks from the furnace. To detect an air leak, put some green grass (or something which will create heavy smoke) into the furnace. When the furnace is smoking, cover the chimney and turn off the blower and watch for smoke leaks.

Why we do not want air leaks

Air leaks cause the fire to not burn as hot or efficiently. In result you will use more wood to achieve the desired water temperature. The HEATMOR™ Outdoor Furnace is designed with over / under forced drafts and if air leaks occur, it would change the output of the furnace.

<p>AIR LEAKS INTO THE FIREBOX WILL CAUSE THE FORMATION OF EXCESS CREOSOTE.</p>

Water Leaks

If you suspect that your HEATMOR™ Stainless Steel Outdoor Furnace has developed a water leak, please contact your local dealer for verification and further details.

DOMESTIC COIL (Optional)

Principle of the Domestic Coil

The domestic coil provides a method of heating water indirectly through water-to-water convection. This method of heating needs to be planned from the initial stages of purchasing your HEATMOR™. A HEATMOR™ Outdoor Furnace must be special ordered and manufactured with a special hole at the back of the furnace to accommodate the domestic coil.

Operation of the Domestic Coil

The coil is inserted at the rear of the furnace through a hole in the water jacket and fastened by nuts and bolts. The domestic coil plate is sealed to the outer face of the water jacket by a sealing gasket. As water passes through the domestic coil, the water in the water jacket heats it.

Maintenance / Result

- Make sure a tight seal is maintained between the coil plate and the outer face of the water jacket.
- Firmly fastened connections are essential to ensure there are no leaks.
- The pH level of the water treatment is important to assist in corrosion control. Low water treatment levels could lead to domestic coil pinhole leaks. This would allow the water to mix together causing contamination of domestic water and pressurization in the water jacket resulting in water spillage.

Removal and Replacement

If you suspect you have a leak or faulty internal coil requiring replacement, contact your local dealer.

CATALYTIC CONVERTER (350X)

This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.

The Combustor supplied with the 350X is a Healthy Hearth Combustor. The full assembly P/N 17094 can be obtained by contacting your HEATMOR™. For Warranty claim information on the combustor (HEATMOR™ P/N 92942) contact your HEATMOR™ Dealer or HEATMOR™.



Catalytic Converter

HEATMOR™

PO Box 787, Warroad, MN 56763

1-800-834-7552

Principle of the Catalytic Converter

The catalytic converter is equipped on the 350 X to reduce the emissions levels to a satisfactory level. Without the Catalyst in place, the emissions levels of the stove are not within the limit of the Phase 2 Hydronic Heater program. It consists of a ceramic Catalyst insert in the front flue opening.

Operation of the Catalytic Converter

The catalyst consists of a ceramic porous material that is coated with precious metals. The catalyst sits in the entrance of the flue where all of the flue gas has to go through. As the catalyst heats up it reacts with the smoke and the oxygen in the flue gas and aids in combustion. The temperature in the stove and the gases entering the combustor must be raised to between 500° to 700°F for catalytic activity to be initiated. The induced draft of the stove will bring the firebox temperatures up to the proper level as long as both the under gate and over grate air is not restricted. Since the stove has an induced draft, there is no need to have a bypass to help get the firebox temperatures high enough.

Maintenance / Result

"It is important to periodically monitor the operation of the catalytic combustor to ensure that it is functioning properly and to determine when it needs to be replaced. A non-functioning combustor will result in a loss of heating efficiency, and an increase in creosote and emissions. Following is a list of items that should be checked on a periodic basis:

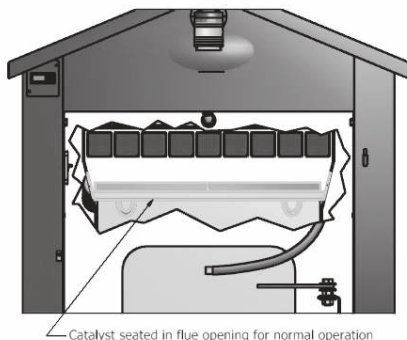
- Combustors should be visually inspected at least three times during the heating season to determine if physical degradation has occurred. Catalyst needs to be brushed at least every three days to keep ash buildup from clogging the catalyst and decreasing BTU output. Actual removal of the combustor is not recommended unless more detailed inspection is warranted because of decreased performance. If any of these conditions exists, refer to Catalyst Troubleshooting section of this owner's manual.
- This catalytic (or hybrid) heater is equipped with a temperature probe to monitor catalyst operation. Properly functioning combustors typically maintain temperatures in excess of 500°F, and often reach temperatures in excess of 1,000°F. If catalyst temperatures are not in excess of 500°F, refer to Catalyst Troubleshooting section of this owner's manual.
- An indication that the catalyst is not working properly is that there is excessive smoke coming out of the chimney. This can be compared to the initial startup of the stove.

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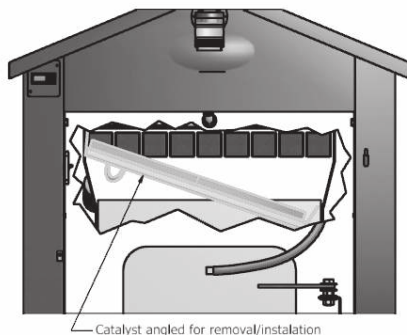
Removal

There are no nuts or bolts that need to be removed in order for the catalyst to be removed from the stove. The catalyst is wedged into the flue opening using gravity.

- Remove permanent flash screen by pushing up, then pulling down and forward.
- Remove catalyst holder by pushing one end up and out, then pull down the opposite end of the catalyst holder. It should angle down and slide out of the flue opening. Some insulation (Cerawool) may come down when the catalyst is removed. Keep this to block the gaps between the catalyst and the stove.



- To Replace, angle one end of the catalyst holder up into the flue opening.
- Rotate up the opposite end to swing up into the flue opening.
- Pull both ends down evenly to seat the catalyst in place.



- Insert insulation in gaps between catalyst and stove.

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Cleaning

Surface Cleaning – It is important to ensure the surface of the catalyst stays free of ash and debris. At least every three days, using the supplied brush, brush over the surface of the catalyst. This knocks down that the ash that starts to clog the catalyst, shortening the burn cycle and making the stove inefficient.

Deep Cleaning

After a period of time, brushing the surface of the catalyst will fail to remedy the long burn time problem. In this case it is necessary to remove the catalyst from the stove and deep clean the catalyst. Follow the steps below:

1. Gently remove any loose ash from the combustor. A home vacuum cleaner is effective, using either suction or exhaust. **USE CAUTION** – High air velocities can strip catalyst off the ceramic. (Never use a high pressure air hose!) Never scrub or abrade any part of the catalyst since this may remove the catalyst from the ceramic, or damage the ceramic.
2. Prepare the cleaning solution. Make a 50/50 mixture of vinegar and water in a large pot, and heat the mixture until boiling.
3. Locate a container that can fit the catalyst. Place catalyst in container and carefully pour cleaning solution over top of catalyst until catalyst is fully covered by the cleaning solution.
4. Let Catalyst and solution sit for 30 minutes. While catalyst soaks, boil enough distilled water for 2 rinses. After 30 min is up, remove catalyst and place on a towel. Discard cleaning solution.
5. Place Catalyst back into container and pour just enough rinse water to cover catalyst. Allow catalyst to sit 15 minutes.
6. Repeat Rinse a second time. Note: There will be little to no change in the color of the catalyst.
7. Let catalyst dry for 24 hrs. This will allow the combustor to dry and prevent steam from damaging the catalyst. If catalyst must be returned sooner, place in an oven at 300 degrees F for 60 minutes. Turn off oven and let combustor return to room temperature.
8. Reinstall according to instillation instructions

If Removal and cleaning of catalyst does not fix the problem, contact your local dealer.

SEASON STARTUP AND MAINTAINANCE

To begin season start-up of your HEATMOR™ Outdoor Furnace, assuming you followed the procedures outlined in the “End of Season Maintenance Checklist,” follow the instructions below:

- 1) Remove cap from chimney.
- 2) Build fire in firebox and bring your furnace up to temperature. (Refer to the “Lighting the HEATMOR™ or the first time” section of the HEATMOR™ Operations and Maintenance Manual.)
- 3) Once your furnace is up to temperature, you can start all pumps.



CAUTION: It is recommended to start your pumps **AFTER** you bring your furnace up to temperature. This helps ensure your system isn't air locked and ensure your water is circulating correctly.

- 4) Your start-up is complete.

END OF SEASON AND SHUTDOWN MAINTAINANCE

To begin End of Season Shutdown of your HEATMOR™ Outdoor Furnace, follow the instructions below:

1. Turn off pump(s).
2. Clean Flue (Refer to the "Flue" section of the HEATMOR™ Operations and Maintenance Manual.)
 - a) Remove Flue Cover(s)
 - b) Using the flue scraper provided with the HEATMOR™ furnace, push the dust to the front of the flue and let it fall down into the firebox. Remove this dust as you would ashes. If a lot of dust is dropped down, be certain that the air slot of the front air box is not covered. If there is a two pass flue, clean the top flue through the flue access ports.
 - c) Re-attach the flue cover plate(s), making sure to tighten the nuts to make an airtight seal.
3. Clean ashes out of Firebox. (Refer to the "Ashes" section of the HEATMOR™ Operations and Maintenance Manual.)
 - a) Thoroughly pull ashes from sides and corners of Firebox. Rake ashes in Firebox down into the grates.
4. Auger ashes out of Ash Pan. (Refer to the "Ashes" section of the HEATMOR™ Operations and Maintenance Manual.)
5. Place cap on Chimney. There is no specific product sold for this use, but a five gallon bucket or something similar will cover the chimney keeping unwanted moisture and visitors away.
6. Properly clean and oil Fan(s). (Refer to the "Air Supply" section of the HEATMOR™ Operations and Maintenance Manual.)
 - a) Turn off the main power supply to the furnace.
 - b) Loosen and remove the two thumb nuts securing the blower / flipper assembly to the large air tube, and remove the blower / flipper assembly.
 - c) Lubricate the blower motor every six months with 10 to 20 drops of SAE 10W or 20W non-detergent oil (ML Type) or with electric motor oil in the appropriate oil holes. The oil holes are on the bottom of the blower.
 - d) With a small brush, scrape any dust or residue that has accumulated on the fins of the blower.
 - e) With a scraper or brush, remove any residue built up on the flipper assembly.
 - f) Ensure the flipper is resting completely on its seat. If it is not resting completely, perhaps there is dust or soot built up on the flipper, or some other obstruction not allowing it to close tightly.
 - g) Replace firebox door elbows every other season. If you did not change your fire door elbows last year, it is strongly suggested to change them following the steps on page 40.
 - h) Securely fasten the blower / flipper assembly back to the large air tube ensuring there are no air leaks.
7. Check PH level of your system water. Your PH level should be between 8 and 10. (Refer to the "Water" section in the HEATMOR™ Operations and Maintenance Manual.)

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The water in the HEATMOR™ should be chemically analyzed once per year to ensure the proper levels of treatment are being maintained. Contact your local dealer as to where to have your water tested. Provide the testing person with an amount of water from your HEATMOR™, equal to approximately 20 ounces, in a clean container. The amount of water treatment that has to be added yearly is dependent on how much fresh water you have added to your system since the last test. Be certain to add a water treatment that is approved by your dealer and HEATMOR™ Inc.

NOTE: To keep the Control (water chemical) circulated and properly coated throughout the HEATMOR™ system, it is recommended to start pumps at least once a month for approximately 2 - 3 hours.

CAUTION: It is recommended to start your pumps AFTER you bring your furnace up to temperature. This helps ensure your system isn't air locked and ensure your water is circulating correctly.

FREQUENTLY ASKED QUESTIONS

1. Q. How much water should be in the bladder?

A. When the furnace is initially filled, there should be about one inch of water in the bladder with the water at a temperature of 50 degrees Fahrenheit. When the furnace is at its operating temperature, the bladder should be near full but not hard. Overfilling the bladder can shorten the life of the bladder.

Refer to:

- *Maintaining the correct amount of water in the bladder and in the HEATMOR™.*

2. Q. Why is water coming out of the overflow relief vent pipe?

A. When the furnace is initially filled and too much water is in the furnace, it releases through the relief vent pipe when the furnace is up to temperature. If this happens, a small amount of water should be removed from the furnace so the bladder is not hard.

Refer to:

- *Installation of the HEATMOR™ Furnace.*

3. Q. Why is my furnace wet on the inside of the firebox?

A. When your furnace is first fired up, and also at times during normal operation, the atmosphere inside the firebox will exceed the dew point causing condensation.

Refer to:

- *Furnace has excessive moisture in firebox (Located in Trouble Shooting and Solutions).*
- *Dew Point (Located in Safe Operating Guidelines).*

4. Q. Why does my furnace fail to respond to the switch at the front of the furnace? For example; the light will not come on and the fan will not operate?

A. The high limit aquastat has probably overridden the operating aquastat. If this has happened, it should also trigger your distribution system or high water temperature warning.

Refer to:

- *High Water Temperature Safety Shutoff Controller (Located in Electrical).*

A. The X Series Stove may have low water Refer to:

- *Water Level Maintenance*

5. Q. Why is it getting so warm in my house and I cannot reduce the temperature with the thermostat?

A. At this point the high limit aquastat has been tripped on. To detect the precise reason, please contact your local dealer.

Refer to:

- *High Water Temperature Safety Shutoff Controller (Located in Electrical).*

6. Q. My furnace is shut down but still continues to increase in water temperature?

A. There is an air leak somewhere in the furnace. Check all flippers and seals, ensuring that there is an airtight seal.

Refer to:

- *Checking for air leaks (Located in Air and/or water Leaks).*

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7. Q. Why am I experiencing an excess buildup of creosote in the furnace?

A. You more than likely are introducing unwanted draft into the firebox. This may be caused by several things, including a door ajar, ash auger tube cover loose, flipper assembly stuck or the A.R.D. flipper ajar. If your furnace is in a location where wind may affect the pressure differential across the furnace, it could cause draft to leak past the flipper.

Refer to:

- *Creosote Build-up (Located in Trouble Shooting and Solutions).*

8. Q. How do you change a door hose while the furnace is in operation?

A. Never change a door hose unless the furnace is cooled. Please refer to the firebox door hose section in the manual for further details or contact your local dealer.

Refer to:

- *Firebox Door Hoses and Elbows (Located in Firebox and Other Components).*

9. Q. My furnace combustion blower continues to run but the fire will not burn until I open the door?

A. Your flipper assembly is most likely stuck closed. Please refer to the combustion blower, flipper assembly section in the manual for further details or contact your local dealer.

Refer to:

- *Combustion Air Blower and Flipper Assembly (Located in Air Supply).*

10. Q. Water is coming out of the rectangular top chimney flue?

A. Similar to the firebox, when your furnace is initially fired up and also at times during normal operation, the atmosphere inside the firebox and chimney flue will exceed the dew point causing condensation.

Refer to:

- *Furnace has excessive moisture in firebox (Located in Trouble Shooting and Solutions)*
- *Dew Point (Located in Safe Operating Guidelines).*

TROUBLESHOOTING AND SOLUTIONS

Main Principles to Remember

- ♦ Enough Wood.
- ♦ Enough Water.
- ♦ Fans On – Air Must Get In.
- ♦ Fans Off – Air Must Stay Out.
- ♦ Water Temperature between 145 and 185 degrees Fahrenheit.

**PROCEDURES ARE REFERENCED TO HEATMOR™
“OPERATORS AND MAINTENANCE MANUAL” WHICH
COMES WITH EVERY NEW HEATMOR™
OUTDOOR WOOD FURNACE.
MANUALS ARE AVAILABLE SEPARATELY.**

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>	<u>PROCEDURE</u>
Furnace Boils	Draft flipper stuck open.	Remove blower and flipper assembly. Clean, lube or replace.	Refer to Steps to “Maintain your Blower and Flipper Assembly”
	Draft Flipper not closing 100%	Remove blower and flipper assembly. Clean, lube or replace.	Refer to Steps to “Maintain your Blower and Flipper Assembly”
	Blower, Flipper Assembly plate not tight	Tighten wing nuts.	Refer to Steps to “Maintain your Blower and Flipper Assembly”
	Ashes holding flipper open in air box(s).	Clean out ashes	Refer to “Air Box(s)”
	Firebox door improperly adjusted	Adjust Firebox Door	Refer to “Firebox Door”
	Firebox door ajar, not shut tight	Close Fire Door Tight	Refer to “Firebox Door”
	Ash Auger tube not sealed tight	Close Tube Cover Firmly	Refer to “Ash Auger Tube Cover Plate”
	Top flue cover plate not sealed	Tighten 1/2" nuts	Refer to “Flue”
	Door gasket damaged	Replace Gasket	Refer to “Firebox Door Gasket”
	Base leaks air	Reseal Base	Refer to “Caulking around the Firebox Base”
	Electronic Controller malfunction	Replace Electronic Controller	Refer to “Electrical (Electronic Controller)”
	Water Level is Low	Add Water	Refer to “Filling the HEATMOR™ Outdoor Furnace Initially with Water.”
	Creosote buildup on firebox door frame causing improper door seal.	Remove creosote from door frame.	Refer to “Fire-door Frame”
	Flipper assembly plate not tight.	Tighten thumb nuts and ensure a tight seal is established	Refer to Steps to “Maintain your Blower and Flipper Assembly”

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>	<u>PROCEDURE</u>
	Wrong type of sand or not enough sand.	Remove and replace or add sand.	Refer to "Sand (Firebox and other Components)"
	Too little heat draw off HEATMOR™	Consult Dealer.	Contact your Local Dealer
	Circulating Pump not Functioning	Replace Pump	Contact your Local Dealer
No Heat in Building	Fire Out	Light Fire	Refer to "Lighting your HEATMOR™"
	Water level low	Add Water	Refer to "Water Level Maintenance"
	Power loss	Check Power Source	Refer to "Electrical Supply"
	Pump malfunction	Replace Pump or Cartridge	Contact your Local Dealer
	Air trapped in water lines.	Bleed lines	Contact your Local Dealer
	Malfunction of heating appliances in building.	Repair, adjust or replace.	Contact your Local Dealer
Furnace will not burn properly or will not maintain water temperature.	Chimney plugged.	Clean Chimney.	Refer to "Chimney"
	Not enough wood in Firebox	Add wood	Refer to "Loading wood into the HEATMOR™"
	Poor quality wood.	Better wood.	Refer to "Types of Wood"
	Draft flipper stuck.	Remove blower and flipper assembly clean, lube or replace.	Refer to Steps to "Maintain your Blower and Flipper Assembly"
	Electrical power is off or not constant.	Check all electrical connections. Call dealer or licensed electrician.	Refer to "Electrical (Contact Local Dealer)"
	Fire is out.	Re-light Fire.	Refer to "Lighting you HEATMOR™"
	Flue plugged.	Clean Flue	Refer to "Flue"
		Clean Blowers	Refer to Steps to "Maintain your Blower and Flipper Assembly"
		Clean Air Box(s).	Refer to "Air Box(s)"
		Clean out ashes with Auger	Refer to "Ash Management and Ash Removal"
	Flue plugged.	Clean Flue	Refer to "Flue"
		Clean Blowers	Refer to Steps to "Maintain your Blower and Flipper Assembly"
		Clean Air Box(s).	Refer to "Air Box(s)"
		Clean out ashes with Auger	Refer to "Ash Management and Ash Removal"
		Verify HEATMOR™ furnace size for application	Contact your Local Dealer

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<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>	<u>PROCEDURE</u>
		Re-size fuel	Refer to "Wood"
		Add Water	Refer to "Filling the HEATMOR™ Outdoor Furnace Initially with Water"
		Use dryer wood.	Refer to "Types of Wood"
		Clean Chimney	Refer to "Chimney"
		Clean Flue	Refer to "Flue"
		Clean Air Box(s)	Refer to "Air Box(s)"
		Clean out ashes	Refer to "Ash Management and Ash Removal"
	Water temperature not being held in the 145-185° Fahrenheit range		Contact your Local Dealer
	Excessive Moisture in Fuel	Use dryer wood	Refer to "Types of Wood"
Furnace boils or rattles before reaching maximum operating temperature	Improper Anti-freeze	Use recommended Anti-freeze	Contact your Local Dealer
Firebox Door pops or rattles	Elbow(s) or hoses are clogged, restricting water flow through door hoses.	Unclog or replace elbow(s) or hoses.	Refer to "Firebox Door Hoses and Elbows."
	Loading fuel to close to the firebox door.	Load your fuel away from the firebox door.	Refer to "Loading wood into the HEATMOR™"
	Very hot burning fire.	Mix in some bigger or less cured wood.	Refer to "Wood"
Building too Warm	Defective in-house thermostat	Replace thermostat	Contact your Local Dealer
	Air leakage around Door.	Replace Door Gasket	Refer to "Firebox Door Gasket"
	Electronic Aquastat Controller malfunction.	Replace Electronic Controller	Refer to "Electrical (Electronic Aquastat Controller)"
	Outdoor furnace is over-heating	Check for air leaks	Refer to "Checking for Air Leaks"
	Controls for heating appliances in building need to be adjusted.	Adjust, relocate, add more controls to monitor and control heat.	Contact your Local Dealer
	Water Controls in building	Add controls to control hot water flow for heat.	Contact your Local Dealer
	Too much supply water going to certain heating appliances	Adjust water flow.	Contact your Local Dealer
	Outdoor temperatures are warmer and supply controls have not been adjusted.	Adjust water flow.	Contact your Local Dealer
	High limit switch set too low	Adjust setting.	Refer to "Electrical (High Water Temperature Safety Shutoff Control)"

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>	<u>PROCEDURE</u>
Creosote buildup	Air leakage around door.	Replace Door Gasket	Refer to "Firebox Door Gasket"
	Firebox receiving air somewhere when fans are off.	Check all seals for air leaks. Run a smoke check.	Refer to "Checking for Air Leaks."
	Fire is not burning hot.	Check type of wood burning and if blowers working properly.	Refer to "Types of Wood, Combustion Air Blower / Flipper Assembly"
	Burning high surface area wood (small pieces).	Add larger pieces of wood.	Refer to "Types of Wood"
	Air flow is not sufficient for the type of fuel.	Check and clean fan clean flipper assembly.	Refer to "Combustion Air Blower / Flipper Assembly"
	Ashes in Air Box(s)	Clean Air Box(s)	Refer to "Air Box(s)"
	Chimney Plugged	Clean Chimney	Refer to "Chimney"
	Burning wet wood.	Add dryer wood as fuel.	Refer to "Types of Wood"
	Burning unseasoned wood	Add seasoned wood to your fuel	Refer to "Types of Wood"
	Flue plugged	Clean Flue	Refer to "Flue"
	Water temperature not being held in the 140-180° Fahrenheit range	Consult Dealer	Contact your Local Dealer
Thermometer (temp gauge) exceeds 212° Fahrenheit. Furnace is not boiling.	Low water level.	Add water (Let Furnace cool first)	Refer to "Water Level Maintenance"
Charcoal buildup in rear of firebox.	Excessive ashes.	Remove ashes.	Refer to "Ash Management and Ash Removal"
	Failure to rake ashes periodically	Rake ashes.	Refer to "Ash Management and Ash Removal"
Blower continues to operate and display shows a higher than setting temperature	Water level is low	Add water	Refer to "Filling the HEATMOR™ Outdoor Furnance Initially with Water"
	Defective Electronic Controller	Replace Electronic Controller	Refer to "Electrical (Electronic Controller)"
	Defective temperature probe.	Replace temperature probe	Refer to "Electrical (Electronic Controller)"
Too much smoke comes out firebox door while loading	Opening firebox door when there is fuel still inside.	Do not add so much fuel all at one time.	Refer to "Loading wood into the HEATMOR™"
	Burning wet wood or poor quality wood.	Add dryer, seasoned wood.	Refer to "Types of Wood"
	Opening door within two minutes of blowers turning off.	Open door sooner or wait for next cycle to start	Refer to "Loading wood into the HEATMOR™"
	Firebox air leak	Check all seals for air leaks. Run a smoke check.	Refer to "Air and/or Water Leaks"
	Water temperature is low.	Fuel fire.	Refer to "Loading wood into the HEATMOR™"
	Furnace pad has not been raised above ground level.	Raise pad	Refer to "Loading wood into the HEATMOR™"

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PROBLEM	CAUSE	SOLUTION	PROCEDURE
	Draft fan has not been turned off while loading.	Turn off fan before loading.	Refer to "Loading wood into the HEATMOR"
Losing Water	Furnace is boiling (could happen when away, sleeping or at work)	Add water. Complete a full furnace check of all systems	Refer to "Filling the HEATMOR™ Outdoor Furnace Initially with Water"
	Very slow leak somewhere in the system.	Check and tighten any leaking fittings.	Contact your Local Dealer
	Someone is taking hot water from the system when needed.	Add water	Refer to "Water Level Maintenance"
	Someone has accidentally opened a valve and not told anyone.	Add water.	Refer to "Water Level Maintenance"
	Leaking water line.	Fix leak in water line.	Contact your Local Dealer
	Bladder is leaking.	Replace bladder.	Refer to "Bladder"
	Door hoses are leaking.	Replace door hoses	Refer to "Firebox Door Hoses and Elbows"
	Bladder gate valve needs adjusting	Adjust and tighten gate valve	Refer to "Bladder Gate Valve and Bladder Hose"
	Hose clamps are leaking.	Tighten hose clamps	Contact your Local Dealer
Smoke from chimney is an annoyance	Chimney is not high enough	Add Chimney Extension	Refer to "Chimney Extension(s)"
	Improper location of furnace (trees, buildings, winds, neighbors)	Possibly relocate furnace. Contact local dealer.	Contact your Local Dealer
	Built up creosote is burning off firebox surface. Wood pieces are too small - too much surface area.	Maintain hot fire	Refer to "Wood"
	Draft blower has just turned off	Smoke will dissipate	
	Burning garbage	DO NOT BURN GARBAGE	Contact your Local Dealer
	Wood stacked on top of the Air-box	Re-stack wood off Air-box	Refer to "Loading wood into the HEATMOR™"
Burning what seems to be a lot of wood	Losing heat into the ground. Poor insulation	Re-insulate water lines and maintain a dry perimeter	Contact your Local Dealer
	Ground water is extracting heat from the water lines.	Provide a method for ground water to drain	Contact your Local Dealer
	Wood is too dry	Burning too fast and hard	Refer to "Types of Wood"
	Pieces of wood too small	Add larger pieces of wood	Refer to "Wood"
	Tube flue is clogged	Clean Tube Flue	Refer to "Flue"
	Fire too hot - caused by too much air from blowers	Restrict air flow	Refer to "Combustion Air Blower / Flipper Assembly"
	Using more heat in building than you realize (heating more sq. ft. appliances, with one heat source than before)	Consult Dealer. Verify furnace size for complete applications.	Contact your Local Dealer. Refer to "Installation Manual"

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<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>	<u>PROCEDURE</u>
Cannot get building(s) warm enough	Insufficient heating devices in building	Consult Dealer	Contact your Local Dealer
	Improperly installed heating devices in building	Correct installation of heating devices.	Contact your Local Dealer
	Heating devices need maintenance.	Maintain heating devices	Contact your Local Dealer
	HEATMOR™ not running between operating range	Consult Dealer	Contact your Local Dealer
	Insufficient water circulation from HEATMOR™	<ol style="list-style-type: none"> 1. Check circulating pumps. Replace if necessary. 2. Line that is kinked. 3. Air in system. 4. Need a larger pump. 5. Lines are too small. 6. Pump has a restriction in the intake (piece of plastic or foil). 	Contact your Local Dealer Refer to "Installation Manual"
	Unbalanced supply water distribution	Re-balance and distribute water from outdoor furnace. Balance the system by adjusting the flows of water to the different heating appliances.	Contact your Local Dealer Refer to "Installation Manual"
	Once appliance getting more than its share of the total flow of hot water.	Balance the system by adjusting the flows of water to the different heating appliances.	Contact your Local Dealer
	Defective in house (building) thermostat and controls.	Replace thermostats and controls	Contact your Local Dealer
	Faulty electrical supply	Check electrical connections	Contact your Electrician
	Indoor forced air furnace fan is full of dirt or filter is plugged and therefore the air flow is reduced going through the coil.		Contact your Local Dealer
	Improper installation of coil in forced air furnace.		Contact your Local Dealer
	Too small a coil in forced air furnace		Contact your Local Dealer
	Inadequate Baseboard	When a water-to-water heat exchanger is installed, a temp drop of 20-30° across heat exchanger may be experienced.	Contact your Local Dealer
Not enough domestic hot water	Hot water heater is too small	Sidearm exchanger needs to have a pump installed	Refer to "Installation Manual"

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>	<u>PROCEDURE</u>
	Somewhere in the domestic water system of the house, the hot and the cold can mix (as in a single faucet outlet) and the resulting mixed warm water is being sent to the hot water taps instead of pure hot water		Contact your Local Dealer
	Manifold not balanced properly. Once appliance getting more than its share of the total flow of hot water	Balance the system by adjusting the flow of water to the different heating appliances.	Refer to "Installation Manual"
	Outdoor furnace water temperature is not consistently within operating range.		Refer to "Installation Manual"
	Over time, (approx. five years) with some water conditions, the sidearm will clog up with scale (lime) and restrict or shut off the flow completely through the sidearm.		Refer to "Installation Manual"
	Improper hook up of the sidearm exchanger.		Refer to "Installation Manual"
Water in Auger Tube	Condensation formation on cooler steel.	Maintain constant firebox temperature	Refer to "Ash Auger Tube"
Water Temperature doesn't correspond with controller settings.	Inadequate rate of flow of water allowing layering of water temperatures.	Flow should be at least 15 gallons per minute. Check pump and installation.	Refer to "Installation Manual"
	No contact paste applied to well of Temperature Probe and / or High Limit Aquastat	Remove Temperature Probe and well, apply paste.	Refer to "Electrical (Temperature Probe)"
	Faulty Electronic Controller	Replace Electronic Controller	Refer to "Electrical (Electronic Controller)"
Excess Smoke	Catalyst Plugged	Clean Catalyst	Refer to "
	Catalyst not working	Replace Catalyst	Refer to "
Excess Cycle Times	Catalyst Plugged	Clean Catalyst	Refer to "



Outdoor Heating Systems by

HEATMOR™

HEATMOR™ STAINLESS STEEL LIMITED LIFETIME WARRANTY

HEATMOR™ warrants this outdoor furnace, to the owner, to be free of defect in material and workmanship through the lifetime of the purchase. This warranty excludes the electrical components such as aquastats, thermostats, fans, and pumps, which are covered by their individual manufacturer warranty. The bladder, firebrick, cast iron grate gaskets and auger are all under warranty by HEATMOR™ for a period of one (1) year from the date of purchase.

HEATMOR™ does not warranty parts damaged by freezing, overheating, pressurization, use of unauthorized fuels, or abuse. The HEATMOR™ is designed to be least susceptible to corrosion; therefore corrosion is covered under this warranty. The initial five(5) years warranty coverage of the furnace weldment and ash pan is 100 percent. After five (5) years, HEATMOR™ will credit a percent of the original purchase price of the furnace weldment and ash pan. The percent credit from HEATMOR™ applied to the current price of a replacement unit is as follows: 70 percent in year 6, 60 percent in year 7, 40 percent in year 8, 20 percent in year 9, 15 percent in years 10 through 19 10 percent in years 20 and beyond. Customer will receive a percentage discount on the replacement furnace only. No cash surrender value.

The HEATMOR™ warranty only applies to the actual cost of the warranty part. The customer is responsible for the transportation cost and labor. No other warranty is expressed or implied. HEATMOR™ is not responsible for the cost of plumbing, replacement of antifreeze, shipping costs, or any other indirect costs associated with the replacement of the part. Outdoor furnaces are not intended to be the only source of heat. Therefore, it is recommended that a back-up system be in place to prevent damages caused by lack of heat. No unauthorized adjustment or repairs will be covered by warranty.

HEATMOR™ is not liable for any incidents or accidents, which can be prevented by the owner or that may occur from the operation of the outdoor wood furnace, or damage incurred due to heating system failure. The owner assumes all responsibility for the care, maintenance, and safe operation of the furnace.

HEATMOR™ specifically disavows any other representation, warranty, or liability related to the condition or use of the product.

To validate this warranty, your registration must be completed within thirty (30) days of purchase date and mailed to: HEATMOR™, 105 Industrial Park Ct. N.E., P.O. Box 787, Warroad, MN 56763.

REGISTRATION

(Please Print Clearly)

Purchaser's Name: _____
Last First Initial

Address: _____
Mailing Address/Box # City State/Province Zip/Postal Code

Phone: (____) _____ Model: _____
See inside of front door for data plate that has model information

Serial No. _____ Date of Purchase: _____
Month Day Year

Referred By: _____
Name and Address

"I have read and understand the conditions of this warranty."

Dealership Name: (please print) _____

Dealer Signature: _____ Customer Signature: _____

You will receive an acknowledgement from HEATMOR™ regarding the receipt of your warranty and registration forms. Please retain the acknowledgment in your records.

In the event of resale of a HEATMOR™ Stainless Steel Outdoor Furnace, HEATMOR™ will honor the remaining warranty if a fee of \$25.00 is submitted along with a Warranty Transfer Certificate.

Please contact your local dealer for information regarding the transfer of a warranty.

03/25/2014

Copy Distribution

White – Heatmor / Yellow – Distributor / Pink – Dealer / Gold – Customer



HEATMOR™ for Life Program

Any registered HEATMOR™ Outdoor Furnace owner listed as the 1st referral contact of a HEATMOR™ Outdoor Furnace **sold** after July 31, 2010 will receive a \$100 check for each confirmed referral after the sale of a new HEATMOR™ Outdoor Furnace is finalized and warranty of new outdoor furnace is received by HEATMOR™.

- Only HEATMOR™ owners that have sent in their warranty registrations are eligible.
- Referral will be verified by lead and warranty information.
- A \$100 check will be sent to the HEATMOR™ owner, verified from their warranty information.
- Unlimited number of referrals accepted under this program.

**NOTE: Only registered HEATMOR™ Outdoor Furnace owners are eligible.
HEATMOR™ Distributors/Dealers are NOT eligible under the referral program.**

Eligible referrals must submit the following sources in writing:

1. HEATMOR™ owners must be identified as the referral source in writing on lead information gathered through HEATMOR™ Inc., HEATMOR™ Distributors, or HEATMOR™ Dealers.
2. HEATMOR™ owners must be identified as the referral source in writing on a returned warranty registration from the NEW HEATMOR™ Outdoor Furnace owner after purchase.

All checks will be issued in U.S. Funds.

Contact your HEATMOR™ distributor with any questions.



NEW FURNACE DELIVERY CHECK SHEET

Copy Distribution
Pink – Dealer
White – Heatmor
Yellow – Distributor
Gold – Customer

Congratulations on your new furnace purchase! We are pleased you have chosen a Heatmor and we wish you many years of enjoyable wood heat. If you like your Heatmor, tell your friends and neighbors about it. A satisfied customer is our best salesperson!

Sincerely, _____
DEALER
(Please print)

DEALERSHIP NAME
(Please print)

DELIVERY CHECKLIST

- ☐ Review owners manual.
- ☐ Describe installations methods and recommendations.
- ☐ Review warranty and maintenance requirements.
- ☐ Explain required maintenance schedule.
- ☐ Demonstrate safety hazards and proper operation of Heatmor.
- ☐ Describe possible problems caused by different wood/conditions.

Model: 100CSS 200CSS 400DCSS 600CSS 800CSS

Serial No. _____ Date: _____

(Please print)

CUSTOMER APPROVAL

I have inspected my new Heatmor and acknowledge that all the items on the delivery checklist have been reviewed with me by the salesperson. I have been presented with a key for my locked Heatmor and assume the responsibility of operation and maintenance of it.

Customer Signature

Date

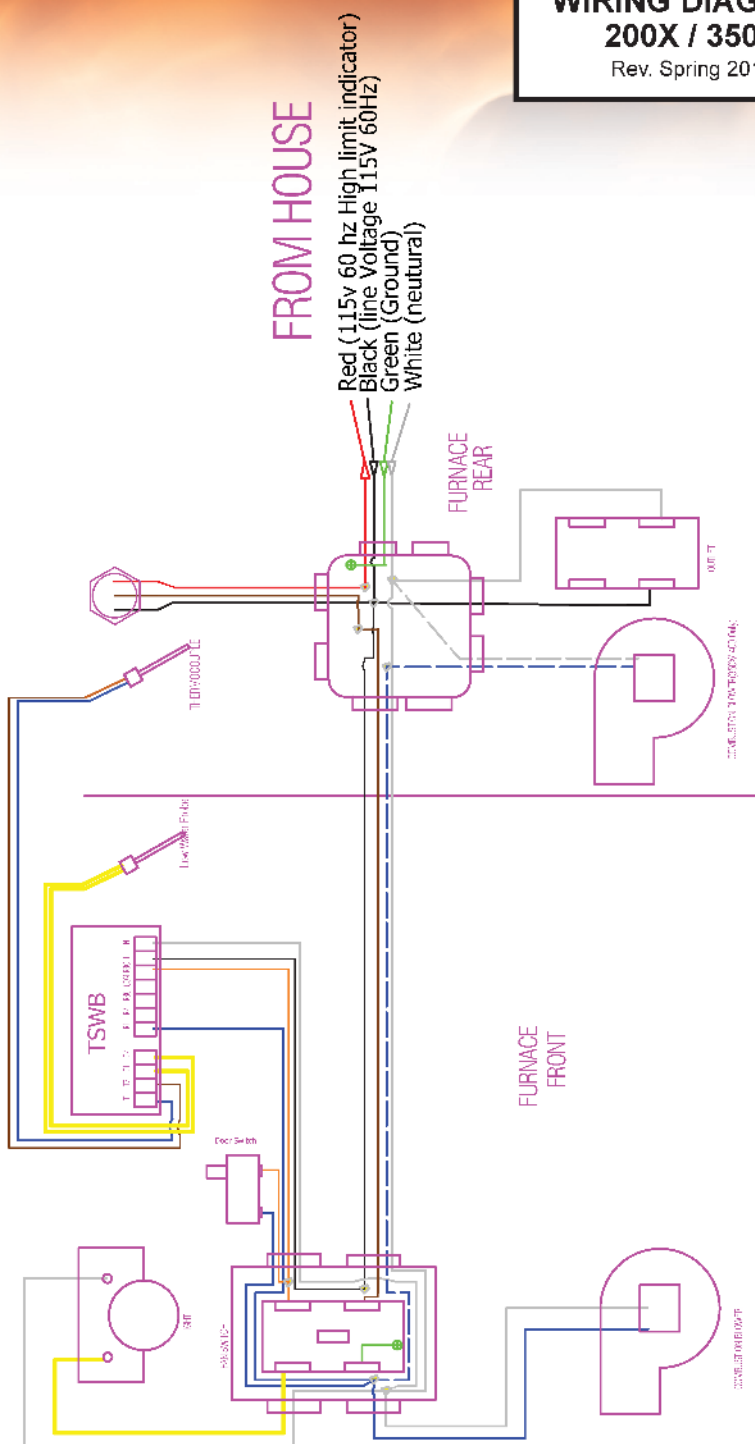




NOTES

Rev. Spring 2016

Rev. Spring 2016



Manufactured By:

HEATMORTM

105 Industrial Park Ct. NE
P.O. Box 787
Warroad, MN 56763

MY DEALER IS:

MADE IN USA