

SOLID FUEL BOILER INSTALLATION MANUAL



For Models:
275, 345 - Indoor and Outdoor

325 S Park Street
Reedsburg, WI 53959
608-768-8508
www.royallproducts.com
info@royallproducts.com

NOTICE

Please Consult
with your local HVAC company
for local city and state codes
prior to installing this system

Rev. 8/01/1 Form 90000-00

Rogue-Therm

SAFETY

ALL STATE OR LOCAL CODES TAKE PRECEDENCE AND MUST BE OBSERVED

Please Consult with your local HVAC Company for local city and state codes prior to installing this system

Before attempting installation, or starting the system, read and familiarize yourself with all instructions. Installation is to be performed only by qualified heating professionals.

DANGER: RISK OF EXPLOSION OR PERSONAL INJURY

Ensure that the draft fan is 'OFF' prior to opening the fuel door or ash door. Failure to do so could result in severe burns.

ALWAYS wait momentarily between the first and second latches when opening doors to allow unburned gases to ignite. Failure to do so can result in severe burns.

DO NOT use chemicals, or flammable liquids to start a fire, severe burns can result.

DO NOT store combustible liquids or materials near the system.

DO NOT store wood within the minimum clearance to the system.

DO NOT burn garbage, tires, railroad ties or yard waste. In many areas this is illegal and will damage the system. Burning anything other than wood can void your warranty.

DO NOT start a fire if flammable vapors or dust are present. An explosion may result.

Most anti-freeze is glycol based. Never store glycol of any kind near the system or any potential ignition source. All glycol is flammable when exposed to high temperatures.

Never use automotive anti-freeze or ethylene glycol in the system. Using these glycols can destroy rubber pump and valve seals leading to leakage and system damage.

NEVER operate without a properly installed pressure relief valve which will discharge water and relieve pressure at 30 psi. Failure to use the proper valve could result in an explosion if the valve should stick.

To avoid electric shock, disconnect the electrical supply before performing any maintenance.

To avoid severe burns, allow the system to cool before performing maintenance.

This system requires electricity when in operation. Operating the system without electricity can result in the system overheating.

Replacement Parts Available At ShopRoyall.com - 608-768-8508

SPECIFICATIONS

	275 INDOOR	345 INDOOR
HEIGHT	63-1/2"	63-1/2"
WIDTH	38-1/2"	38-1/2"
LENGTH	58"	73"
FIRE BOX LENGTH	42"	55-1/2"
FIRE BOX DIAMETER	32-1/2"	32-1/2"
FIRE BOX VOLUME	17 cubic feet	23 cubic feet
FUEL DOOR OPENING	19-1/2" x 25"	19-1/2" x 25"
WATER VOLUME	59 gallons	76 gallons
CHIMNEY SIZE	6" Pipe	6" Pipe
WEIGHT	955 lbs	1.105 lbs
OUTPUT (Btu/Hr)	80,000 Btu/Hr	100,000 Btu/Hr

	275 OUTDOOR	345 OUTDOOR
HEIGHT	73"	73"
WIDTH	48"	48"
LENGTH	72"	84"
CHIMNEY SIZE	6" Pipe	6" Pipe

Output values are based on a theoretical 12 hour sustained burn under optimal conditions and are provided as guidelines only. Actual output will depend upon a variety of factors beyond the manufacturer's control, including system location, wood species, wood moisture, wood size, ash management and combustion air temperature.

THANK YOU

Thank you for purchasing the AQUA-THERM Wood Boiler System

The installation and operation of the Aqua-Therm wood boiler system is quite simple. We recommend that instructions be carefully read and followed. If you have any questions on the installation or operation of your system, please contact your dealer.

OBSERVE AND FOLLOW ALL SAFETY INSTRUCTIONS

Failure to properly install, or follow safety instructions can result in severe personal injury, death or substantial property damage

Hazard Definitions

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels concerning the life of the system

DANGER

Indicates the presence of hazards that **will cause severe** personal injury, death or substantial property damage

WARNING

Indicates the presence of hazards that **can cause severe** personal injury, death or substantial property damage

CAUTION

Indicates the presence of hazards that **will or can cause minor** personal injury, or property damage

NOTICE

Indicates special instructions on installation, operation or maintenance that are important.

PLACEMENT

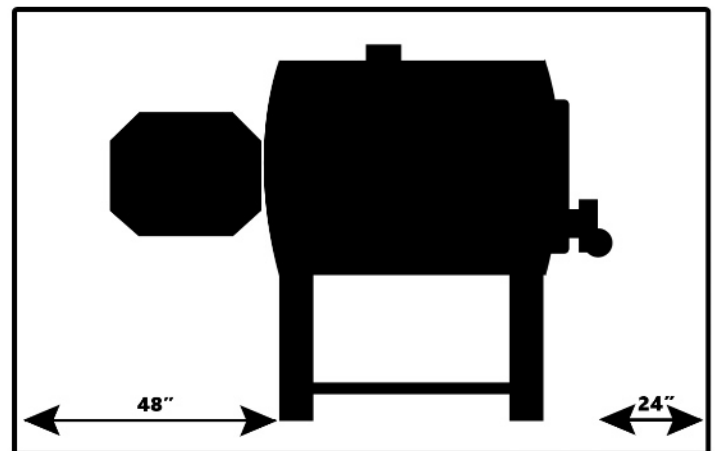
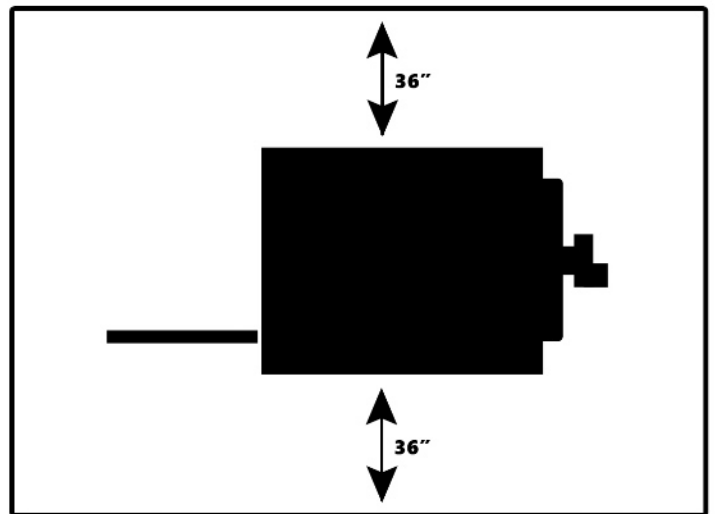
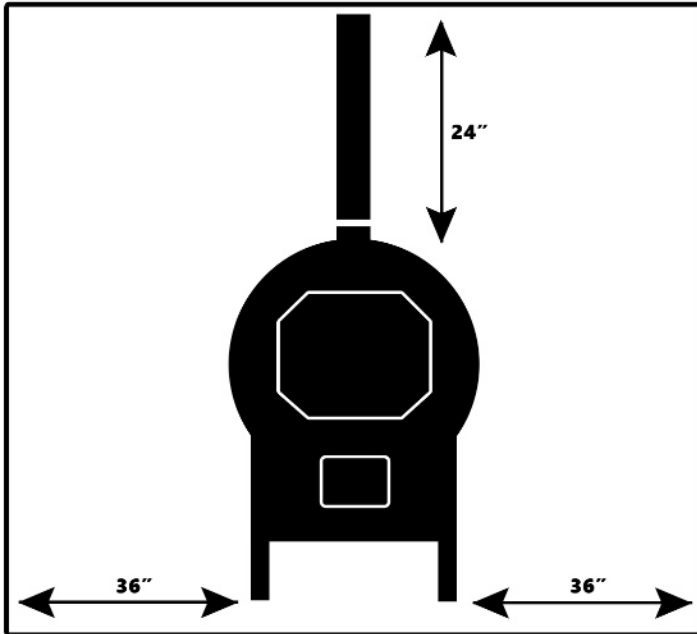
NOTE

CHECK WITH YOUR INSURANCE COMPANY PRIOR TO INSTALLATION. IT IS THE OWNERS RESPONSIBILITY TO ENSURE THAT THE SYSTEM IS ACCEPTABLE TO YOUR INSURANCE CARRIER

VERIFY ALL LOCAL CODES AND ORDINANCES PRIOR TO INSTALLATION. IT IS THE OWNERS RESPONSIBILITY TO ENSURE THE SYSTEM MEETS ALL LOCAL CODES AND ORDINANCES.

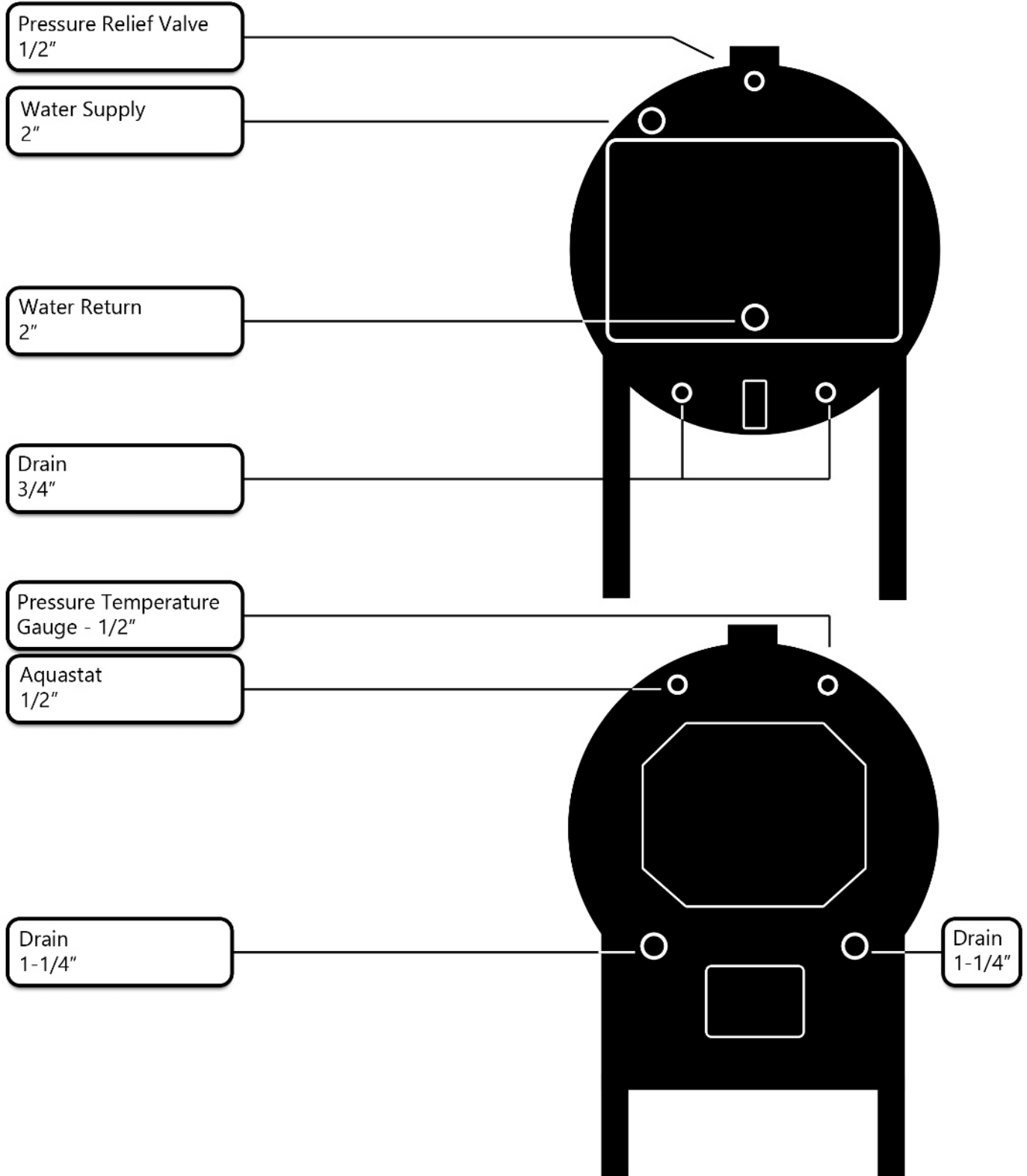
LOCAL CODE OR ORDINANCE PLACEMENT REQUIREMENTS TAKE PRECEDENCE AND MUST BE OBSERVED

Installation Distances From Combustible Surfaces



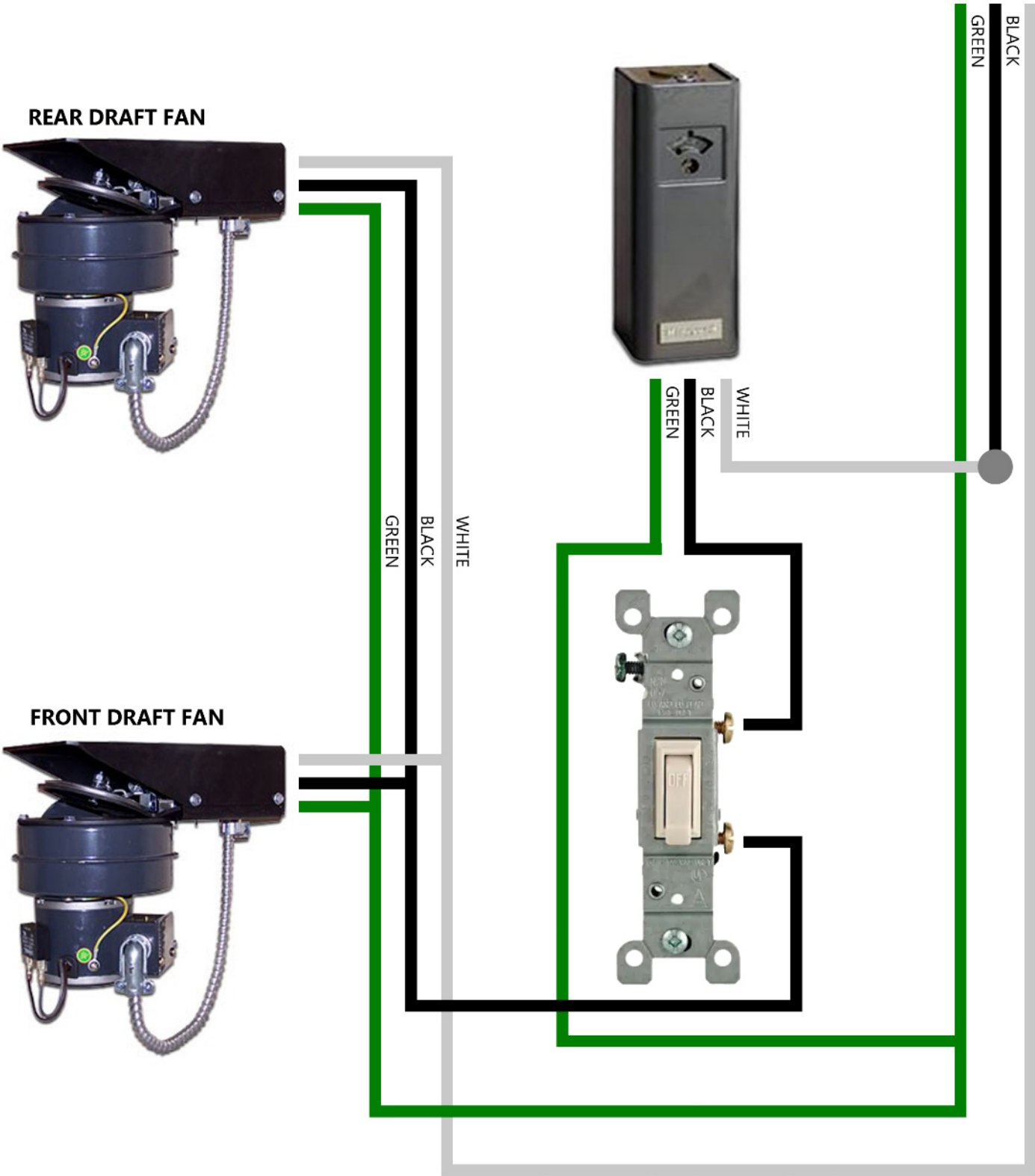
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FITTINGS



Replacement Parts Available At ShopRoyall.com - 608-768-8508

WIRING



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INSTALLATION

VENTING

DANGER

All single wall chimneys must be at least 18" from any combustible surface. Fire can result, causing severe personal injury, death or substantial property damage.

Chimney Material:

A 6" listed type "HT" double wall chimney approved for temperatures up to 1400° F is required. On unsheltered units, the chimney ring is sized to accept the Female (socket)end of the chimney.

Chimney Connectors:

Connectors shall be installed to join the appliance to the vertical chimney unless the chimney is attached direct. Use 6" listed type "HT" double wall chimneys or approved connectors. When installing, keep the connector as straight as possible. Assemble in accordance with the vent manufacturers instructions. Additional sections may required to clear the peak of the structure. Do not install more than one appliance per flue.

DANGER

Do not install more than one appliance per flue. Flue gas spillage and carbon monoxide emissions can occur causing sever personal injury and death.

Chimney Height:

- To prevent downdrafts, chimney or vent with a listed cap should extend at least 3 feet above the highest point where it passes through a roof and at least 2 feet higher than any portion of a building within a distance of 10 feet. A chimney or vent must not extend less than the distances stated above. Check local codes or ordinances for additional requirements. In general:
- Do not locate within 100 feet of any residence not served by the system
- If located between 100 to 300 feet to any residence, it is recommended that the stack be at least 2 feet higher than the peak line of that residence.
- Nearby structures, trees or hills can cause downdraft conditions which force smoke to the ground. Chimney height may have to be raised to overcome downdraft conditions.

NOTICE

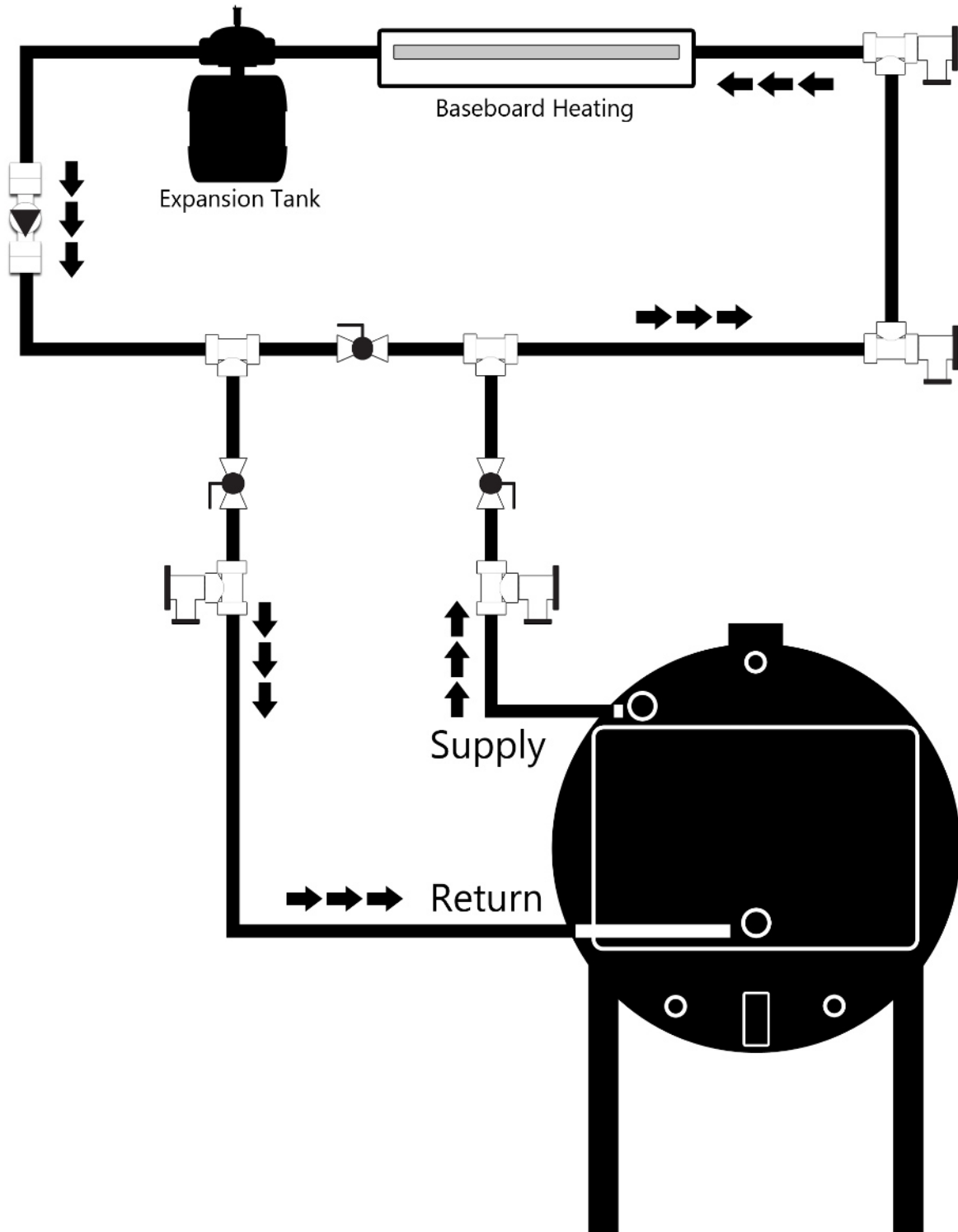
Improper use or failure to maintain the wood boiler may cause nuisance conditions. Persons operating this boiler are responsible for operation of the boiler so as not to cause nuisance conditions. Even proper use and maintenance, and meeting the distance and stack height requirements in state and local regulations may not always be adequate to prevent these conditions in some areas due to terrain or other factors.

**ALL SOLID FUEL APPLIANCES CREATE VISABLE SMOKE
DURING SOME OPERATING CONDITIONS**

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INSTALLATION

BASIC CONNECTIONS



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TROUBLESHOOTING

1. Problem: Losing Pressure in System.

- a. Air bleeding out of system will cause pressure loss. When the appliance is first filled, it may take 3 – 4 days to purge all the air. Add water as needed until pressure stabilizes.
- b. An undersized expansion tank will cause large pressure changes as the system water temperature changes.
- c. If pressure consistently drops, it indicates a leak in system. Check joints, fittings, relief valves, etc.

2. Problem: Unit Over Heats.

- a. Air leaks can cause appliance to overheat. Ensure loading and ash door are sealing properly.
- b. Chimney may be creating a natural draw even when the draft blower is not running. Consider installing a shutter on the draft blower.
- c. Fan control aquastat or safety limit aquastat may be set too high. Fan control aquastat must not be set over 180-degrees F. Maximum setting for safety limit aquastat is 190-degrees F.
- d. Water is not circulating. If pump is not running or an isolation valve is shut, or an air lock is stopping circulation, appliance can overheat.

3. Problem: Not Enough Heat Out of the Appliance.

If the appliance reaches operating temperature and draft fan shut off, it is working properly. (if draft fan does not shut off, see Problem 4)

Check the following:

- A. System water flow rate too low. This can be caused by:
 - The circulating pump may not have enough capacity.
 - There could be an air lock in the system (See Problem 5).
- B. The fan control aquastat may be set too low. Set aquastat up 10-degrees but not over 180-degrees F.
- C. The house heating system may not be extracting enough heat from the water. Dust buildup on the baseboard fins or forced air heat exchanger system will reduce heat output.
- D. The house heating system may not have enough capacity. More baseboards may need to be added to a hot water system. In a forced air system, more airflow through the heat exchanger will boost output.
- E. The fuel quality might be poor. Split, seasoned, hardwoods are recommended.

4. Problem: Water Temperature Does Not Reach Fan Control Aquastat Setting.

(Draft Fan Runs Continuously).

- a. Wood may be too wet or green. Try mixing woods.
- b. Check for obstructions in draft fan.
- c. A defective solenoid may cause flapper on fan not to open when fan comes on.
- d. A partially clogged chimney or exhaust plenum may be restricting air flow in the appliance.
- e. A buildup of ashes on in the ash trough can restrict the exhaust of combustion air.
- f. A buildup of ashes on top of the grates can restrict combustion air.

TROUBLESHOOTING

- g. Heat is being lost through underground pipes. Temperature coming into house should be no more than 2 -3 degrees different than temperature of water leaving the appliance.
- h. Appliance is undersized for building being heated.

5. Problem: No Water Flow

- a. Air could be trapped in the line.
 - Repeat filling and venting procedures
 - Temporarily add more water to system to bring pressure to around 25 psi. This will compress any air bubbles allowing them to more readily move to the air vents.
- b. Pump is not running. You should be able to feel the vibration of pump when it running.
 - Defective pump—check if installed properly. If installed incorrectly, pump will burn out. With 180-degrees water circulating through pump, it will be hot to the touch.
 - Pump is not wired correctly. Refer to wiring diagram.
- c. Pump flanges are closed. Flanges are open when screw slot is parallel with the pipe.
- d. The system is frozen somewhere.

6. Problem: Excessive Creosote is Building Up in Ash Trough

- a. Ash build up above grates or in ash trough area will cause restrictions in combustion air.
- b. Appliance may not be burning hot enough.
 - Set fan control Aquastat to 180-degrees F.
 - Set differential on fan control Aquastat to 20-degrees (if adjustable). This will let water temperature drop 20-degrees before fan is started, causing a longer burn cycle.
- c. Verify that the fuel is properly seasoned (20 -25% moisture content).
- d. Try burning small pieces of extra dry wood for a few days. Large pieces of wood can cause creosote.
- e. If problem persists call your installer or local Royall Representative.

7. Problem: Smoke “Puffs” From The Unit.

- a. Wood may be too wet or green. Try mixing woods.
 - b. Check for obstructions in draft path (Blower, Chimney Connector, Chimney).
 - c. A partially clogged chimney or exhaust plenum may be restricting air flow in the appliance.
 - d. A buildup of ashes in the ash trough can restrict the exhaust of combustion air.
 - e. A buildup of ashes on top of the grates can restrict combustion air.
 - f. Ensure that the Chimney has adequate draft (.06”w.c. minimum).
 - g. Ensure that no other appliances are connected to the Chimney.
 - h. A “Cold” Chimney could force cooler exhaust gases back into the Boiler. Verify that the Chimney is properly installed and insulated.
 - i. Check for possible Chimney “down draft” from taller surrounding trees, buildings or objects. It might be possible to correct with a Chimney cap.
8. Problem: Excessive Smoke or Flames Coming Out of Loading Door During Refueling
- a. Fully open the smoke damper rod prior to opening the fuel loading door.

TROUBLESHOOTING

- b. Open fuel door 1/2", then wait 30 seconds for draft to increase prior to fully opening the door (SLOWLY).
- c. Chimney could have insufficient draft:
 - Ensure that chimney draft is .06"w.c. or greater
 - Check the length of flue pipe to chimney. The appliance should be located within 6 feet of the chimney.
 - Ensure that the chimney cap is not too close to the top of the chimney, restricting air flow.
 - Clean chimney and chimney connector.
 - Raise chimney height to increase draft

TROUBLESHOOTING

Fire won't start or starts but won't stay lit, or does not hold out overnight

- Make sure all doors are closed tightly and all gaskets are in good condition.
- Ashes, if allowed to accumulate in the ash removal pan, will block the passage of combustion air. Verify that your ash removal pan is clean. Never allow ashes to build up to the level of the grates.
- Your exhaust or combustion air systems may be blocked. Verify all vents and pipes are free from obstruction and the draft controls are operating correctly.
- Check your chimney for downdraft caused by taller surrounding trees or building. The chimney may have to be extended or a chimney vent cap installed. Please contact your Royall dealer or heating contractor.

Fire is weak, lazy, or dirty, or start up is slow or smoky

- Your exhaust or combustion air systems may be blocked. Verify all vents and pipes are free from obstruction and the draft controls are operating correctly.
- Your home may have a negative pressure. If your home is too airtight, the Royall heating appliance cannot get enough combustion air to burn properly. You may need to bring outside air to the Royall heating appliance. Please contact your Royall dealer or heating contractor.
- Check your chimney for downdraft caused by taller surrounding trees or buildings. The chimney may have to be extended or a chimney vent cap installed. Please contact your Royall dealer or heating contractor.

Poor combustion or difficulty maintaining a "pilot" fire

- Check the quality of your fuel. Refer to the Fuel Requirements section.
- Your home may have a negative pressure. If your home is too airtight, the Royall heating appliance cannot get enough combustion air to burn properly. You may need to bring outside air to the Royall heating appliance. Please contact your Royall dealer or heating contractor.

Excessive Fire

- The chimney draft may be excessive. Adjust the barometric damper to maintain flue draft settings from 0.04" to 0.06" of water column. Do not operate with a flue draft exceeding .06" (14.95 Pa) water column

The Royall heating appliance is overheating or is burning without regard to the thermostat

- Your Royall heating appliance may have been installed incorrectly. Please contact your Royall dealer or heating contractor.
- The thermostat or thermostat wiring may be faulty. Please contact your Royall dealer or heating contractor.
- Your "heat dump" zone may have been closed off. Verify that your "heat dump" zone is open and all heat delivery systems are operating correctly.

TROUBLESHOOTING

Excessive Creosote

- During warmer weather, you may need to adjust your firing practices. For maximum efficiency and minimum emissions, try shorter, hotter fires rather than large, slow-burning fires.
- Your venting may be improperly installed. Verify that the Royall heating appliance is vented according to the instructions found in the Installation section. Please contact your Royall dealer or heating contractor.

Smoke is visible or you smell fumes in your home

- Make sure the fuel loading and ash removal doors are closed tightly and all gaskets are in good condition.
- Your exhaust or combustion air systems may be blocked. Verify all vents and pipes are free from obstruction and the draft controls are operating correctly.
- Your venting may be improperly installed. If the Royall heating appliance is smoking from vents or from the draft controls, immediately shut down the Royall heating appliance, ventilate the area, and contact your Royall dealer or heating contractor.

Too much ash

- Check the quality of your fuel. Refer to the Fuel Requirements section.
- Ash, soot, or fuel dust in the home
- Verify all doors are closed tightly and all gaskets are in good condition.
 - Always be sure to handle ashes and fuel with care and open doors slowly.
 - Be sure to check the exhaust system for leaks and repair as necessary.

Partially burned or unburned fuel in the combustion area

- More air for proper combustion may be needed. Verify that your draft controls are working properly and that your exhaust and combustion air systems are clean and free from obstruction.

The Royall heating appliance burns too much fuel, or the fuel burns off too quickly

- The chimney draft may be excessive. Adjust the barometric damper to maintain flue draft settings from 0.04" to 0.06" of water column. Do not operate with a flue draft exceeding .06" (14.95 Pa) water column.

The Royall heating appliance will not heat the whole house or doesn't produce as much heat as when first installed

- Verify that the venting and draft control system are clean and free from obstruction. Verify that all heat delivery systems are operating correctly.

TROUBLESHOOTING

The water level is low

- Excessive pressure in your Royall Wood/Coal Boiler may have triggered your Pressure Relief Valve. Allow the Boiler to cool and refill as necessary. Never fire a boiler that is low on water. Never add water to a hot boiler.
- If your heating system features auto-fill, verify that the auto-fill does not raise the water pressure above 15 PSI, as this could trigger the Pressure Relief Valve when the water temperature rises.
- Check for leaks in your Royall Wood/Coal Boiler and in your plumbing system.

The Royall Wood/Coal Boiler requires frequent refilling

- Your Pressure Relief Valve may be installed incorrectly, or may be faulty. Please contact your Royall dealer or heating contractor.
- Check for leaks in your Royall Wood/Coal Boiler and in your plumbing system.

The Royall heating appliance has power but is not responding

- Check the power supply for adequate voltage. See the Installation section for power supply requirements.
- Your Royall heating appliance, its electrical components, and/or thermostat may have been installed incorrectly. Please contact your Royall dealer or heating contractor.

The user is shocked when touching the Royall heating appliance

- Your Royall heating appliance may not have been properly grounded or may have loose wires or wiring components. Disconnect power to the Royall heating appliance at the breaker box or service panel and verify all connections. Please contact your Royall dealer or heating contractor.
- Your Royall heating appliance may have experienced a power surge or power short. Please contact your Royall dealer or heating contractor.

WARRANTY CLAIMS

We make every effort to ensure all heating appliances and components adhere to our strict standards and safety. However, should you receive a product or component that doesn't function as intended, please follow the instructions below for making a warranty claim. We will replace or repair the part, as outlined in the applicable warranty, as soon as possible to keep your system functioning safely and efficiently.

**To make a claim on faulty parts or systems, please contact your dealer for assistance.
If your dealer is unavailable - please contact us at 800-944-2516 x210**

When contacting us, please have the following information ready:

Model Number
Serial Number (located on faceplate)
Purchase Date
Purchasers Name, Address, and Telephone Number

We may also request any service and maintenance records for the system.

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LIMITED WARRANTY

Who is covered?

You are covered under this warranty if you are the original purchaser of a new system, and your purchase was made through an authorized dealer.

How long does the warranty last?

the term of this warranty begins on the date of original purchase as evidenced by your purchase receipt, subject to the terms, conditions, and restrictions of this agreement. Coverage is extended to you for the following time periods:

Burn Chamber

the burn chamber is warranted for six (6) years on a prorated basis. The replacement value will decrease each year until the maximum life of the warranty exhausts any replacement value. Replacement value is reduced according to the following schedule and will be calculated on the cost of the burn chamber at the time the part is repaired or replaced. We will provide you with a credit to be applied towards the cost of the repair or replacement part.

Year 1 - Full Warranty

Year 2 - 80% Credit

Year 3 - 60% Credit

Year 4 - 40% Credit

Year 5 - 25% Credit

Year 6 - 15% Credit

Grates and Doors

The grates are warranted for one (1) year and include the fuel loading door, ash removal door, and damper plates.

Electrical Components

The electrical components are warranted for one (1) year and include, but are not limited to, the auto damper or combustion fan, and all components of the control box.

What is covered by this warranty?

This warranty covers defects in materials or workmanship in your new heating system.

What is not covered by this warranty?

This limited warranty does not apply:

If your system has not been installed, operated and maintained in strict accordance with installation, operation, and maintenance instructions.

If any part has been damaged in shipment, modified, altered, tampered with, abused or has been subject to accident or misuse.

If your system has been altered or repaired in a manner which, in our sole judgement effects its performance, stability or reliability.

LIMITED WARRANTY

If parts not made by us have been used in connection with the system, if in our sole judgement, such use affects its performance, stability or reliability.

To transportation charges on systems and system parts submitted for repair or replacement under this warranty.

To expendable, replaceable or wear items, such as firebrick, gaskets/seals, paint, handles and other items that in our judgement are expendable, replaceable or wear items.

To any heating system or systems to which the appliance may be attached.

To any of the smoke pipes, heat pipes, chimney, hardware, ducting, vents, or other accessories used for the installation and venting or ducting of the system.

We are not responsible for installation and will not be liable in any respect under the terms of the warranty for injury or damage to the building structure in which the appliance has been installed, or to the person or persons and property therein, arising out of the use, or installation of the system. The system must be installed in compliance with the state, local national building and fire codes and regulations of the area and in strict adherence to the manufacturer's recommendations.

What will we do to correct problems?

We will repair, or at our option, replace and system or system part, which upon inspection shows a defect in materials or workmanship.

How can you get service?

If warranty service is needed during the warranty period, notify your authorized dealer. If there is no dealer in your area, contact Royall Products, LLC directly. Provide your name, address, phone number, system serial number and model number of the system, date of purchase, name and address of the installer, and a description of the issue.

Disclaimer of Implied Warranties & Consequential Damages

Our obligation under the limited warranty, to the extent allowed by law, is in lieu of all warranted, implied or expressed, including implied warranties of merchantability and fitness for a particular purpose and any liability for incidental and consequential damages with respect to the sale or use of the items warranted. Such incidental and consequential damages shall include but not be limited to: transportation / freight charges, cost of installation, duty, taxes, charges for service or adjustment, loss of income, rental or substitute equipment, and expenses due to loss, damage, detention or delay in the delivery of equipment or parts resulting from acts beyond our control.

Some states do not allow exclusion or limitation of incidental or consequential damages, or limitation of implied warranties, so the limitations or exclusions in the limited warranty may not apply to you.

NO EMPLOYEE OR REPRESENTATIVE OF ROYALL PRODUCTS, LLC, IS AUTHORIZED TO CHANGE THIS LIMITED WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGE IS MADE IN WRITING BY AN OFFICER OF ROYALL PRODUCTS, LLC, AT ITS HOME OFFICE.

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LIMITED WARRANTY

Your Responsibility Under The Warranty

It is your responsibility to ensure that the system is installed in compliance with local, state and national building and fire codes regulating installation and inspection.

It is your responsibility to read the manual and to install, operate and maintain the system in accordance with all instructions and safety procedures. Failure to do so is a misuse of the system.

It is your responsibility to inspect the system and have any part(s) repaired when continued operation would cause damage or excessive wear to other parts or cause a safety hazard.

It is your responsibility for any cost incurred by the distributor/dealer for travel or transportation of the product for the purpose of performing warranty obligation of inspection.

PARTS LIST

BOI80118	146CFM DRAFT FAN / AUTO DAMPER ASSEMBLY
BOI70528	146CFM DRAFT BLOWER ONLY
BOI80016	AUTO DAMPER ASSEMBLY ONLY
BOI71276	SOLENOID FOR AUTO DAMPER ASSEMBLY
BOI71262	AUTO DAMPER FLAP AND LINK ONLY
BOI51860	FIXED GRATE - 16-1/2" x 10-7/8"
BOI71246	HONEYWELL SINGLE ZONE AQUASTAT
BOI71245	HONEYWELL DUAL ZONE AQUASTAT
BOI71240	AQUASTAT WELL - 1/2"
BOI71263	30 PSI PRESSURE RELIEF VALVE
BOI71264	MILJOCO PRESSURE / TEMPERATURE GAUGE
BOI30357	FUEL DOOR - 275, 345
BOI30356	ASH DOOR - 275, 345
BOI50788	G-HOOK - FOR ASH DOOR
BOI30360	FUEL DOOR HANDLE
BOI30378	ASH PAN - 275
BOI30359	ASH PAN - 345
GAS71088	GASKET ROPE - 3/4" (FUEL DOOR / ASH DOOR)
GAS71249	HIGH TEMPERATURE GASKET CAULK

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