
MAXIM[®]

WOOD PELLET FURNACE
OWNER'S MANUAL



M255 P; M255 PE



Tested &
Listed By  Portland
Oregon USA
OMNI-Test Laboratories, Inc.
117-O-24-2

**Save This Manual
For Future Reference**

(p/n 9000311 - REV. A) - 15-MAY-2015

MAXIM[®]

by Central Boiler, Inc.

20502 160th Street • Greenbush, MN 56726

CentralBoiler.com • MaximHeat.com

The Maxim Wood Pellet Furnace is listed by OMNI-Test Laboratories to the following standards: CAN/CSA B366.1-M91-2007 Solid Fuel-Fired Central Heating Appliances, UL 391-2006 Solid Fuel and Combination Fuel Central and Supplementary Furnaces.

French Owner's Manual and decal set available upon request from your dealer.

(Manuel d'installation en français et décalcomanies disponible sur demande auprès de votre revendeur)

Manuel d'installation en français : p/n 9000269 Décalcomanies : p/n 9409

The Maxim Wood Pellet Furnace includes two 4-foot chimney sections (6" ASHT) listed to UL 103.

Maxim M255 P / M255 PE thermal output rating: 165,215 Btu/hr (47.5 kW) - maximum

Thermal Output Rating*: Manufacturer's Rated Heat Output Capacity: 180,000 Btu/hr

Annual Efficiency Rating*: 89% (lower heating value), 82% (higher heating value)

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

- This heater is certified to comply with the 2015 U.S. Environmental Protection Agency's particulate emission standards for wood heaters sold after May 15, 2015. Under specific test conditions this heater has been shown to deliver heat at rates ranging from 0 to 165,215 Btu/hr.
- This wood heater has a manufacturer-set minimum low burn rate that must not be altered. This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.
- DO NOT OVERFIRE THIS HEATER. Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater.
- This model is qualified for year-round use.
- Any person(s) operating a hydronic heater must comply with all applicable laws, including but not limited to local ordinances.
- Improper use or failure to maintain the hydronic heater may cause nuisance conditions. The person(s) operating a hydronic heater is/are responsible for operation in a manner that does not create a public or private nuisance condition. Check State and local regulations for stack height requirements, setback distances and for the time of the year the appliance may be operated before installation. 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.
- This outdoor furnace should not be installed in a building that could be damaged or where a financial loss could occur from smoke, soot or water.

Vermont certification is with wood pellets as a fuel source ONLY.

INSTALLATIONS IN MASSACHUSETTS:

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

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

Model	Serial Number	Installation Date
Dealership Name		Phone Number
Owner Name		

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INTRODUCTION

Labeling and Terminology

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

DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates presence of a hazard which can cause severe personal injury, death, or substantial property damage if ignored.

CAUTION: Indicates presence of a hazard which will or can cause minor personal injury or property damage if ignored.

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

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

Foreword

This manual is to be used as a guideline for the installation, operation and maintenance of the Maxim Wood Pellet Furnace. This manual is organized into thirteen sections for easy reference.

- Section 1 – General Information;
- Section 2 – Location and Foundation;
- Section 3 – Electrical;
- Section 4 – Gas Supply Connection and Ignitor Operation;
- Section 5 – Chimney;
- Section 6 – System Installation;
- Section 7 – Filling System with Water and Purging Air;
- Section 8 – Operating Instructions;
- Section 9 – Routine Maintenance;
- Section 10 – Troubleshooting;
- Section 11 – Decals;
- Section 12 – Wiring Diagram;
- Section 13 – Parts Listing.

Anyone owning or operating this outdoor furnace must read, fully understand, and follow all of the information in this manual.

NOTE: In higher populated areas, extend the chimney to a height above the roofs of surrounding buildings (see Chimney Height in the Chimney section).

NOTE: The outdoor furnace may be connected to an existing boiler system or hot water heating system by a qualified installer only. However, the outdoor furnace must not be pressurized.

IMPORTANT PRECAUTIONARY INFORMATION

The information contained on this page appears throughout this manual. Be sure to read carefully and understand these precautions before, during and after the installation, operation and maintenance of the furnace.

WARNING

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

WARNING

This outdoor furnace is not intended or certified to be installed inside habitable space. Do not install the outdoor furnace inside your home.

CAUTION

This outdoor furnace should not be installed in a building that could be damaged or where a financial loss could occur from smoke, soot or water.

WARNING

This outdoor furnace and/or chimney must not be installed inside or under any configuration or construction that contains combustible materials as part of the structure or configuration. The chimney is not intended or safety tested to be used or installed other than on the furnace located outside of any structure or enclosure.

WARNING

Installation of the outdoor furnace is to be performed by a qualified installer.

WARNING

When installing a heat exchanger on an existing hot water boiler, be sure none of the existing system safety controls are disabled.

WARNING

If this appliance is installed inside a building and the LP tank capacity exceeds one pound, the tank and regulator must be located outside.

WARNING

Maintain the following clearances from combustibles for the outdoor furnace installation:

- 8" (20 cm) from the transition box
- 6" (15 cm) from the sides
- 48" (122 cm) from the front
- 8" (20 cm) from the chimney
- 27" (68.5 cm) from the top
- The foundation must be noncombustible

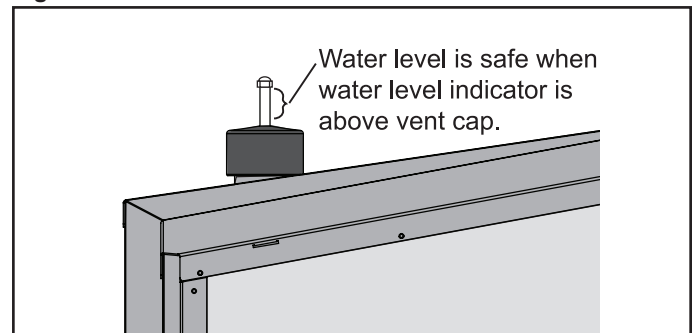
WARNING

Use only chimneys listed to UL 103 HT for installation. The chimney and flue pipe must be clean and in good condition.

WARNING

Be sure the outdoor furnace is filled with water before firing. Water level is safe when the water level indicator rod is above the vent cap (Fig. 1). Corrosion Inhibitor Plus™ must be added before the initial fill (see Water Quality and Maintenance).

Fig. 1



WARNING

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

WARNING

Never leave the firebox door or hopper lid open or ajar when unattended.

IMPORTANT PRECAUTIONARY INFORMATION

The information contained on this page appears throughout this manual. Be sure to read carefully and understand these precautions before, during and after the installation, operation and maintenance of the furnace.

WARNING

Use only those listed fuels recommended by the manufacturer of your unit. Never use the following: trash, plastics, gasoline, rubber, naptha, household garbage, material treated with petroleum products (particle board, railroad ties and pressure treated wood), leaves, paper products, and cardboard.

WARNING

Burn premium quality wood pellets only.

WARNING

This heater is designed to burn premium quality wood pellets only. Higher efficiencies and lower emissions generally result when burning premium quality wood pellets, as compared to standard pellets. **DO NOT BURN:** unseasoned wood, garbage, tires, lawn clippings, leaves, brush trimmings or general yard waste, materials containing asbestos, materials containing lead, mercury or other heavy toxic metals, materials containing plastic, materials containing rubber, waste petroleum products, paints and paint thinners, asphalt products, chemicals, coal, glossy or colored paper, construction and demolition debris, plywood, particleboard, salt water driftwood and other previously salt water saturated materials, manure, animal carcasses and asphalt products. Burning these materials may result in release of toxic fumes or render the heater ineffective and cause smoke.

WARNING

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

WARNING

Disconnect the electrical power to the furnace and remove all ash from the firebox before performing maintenance that requires draining the water or replacing an electrical component.

WARNING

Allow the outdoor furnace to thoroughly cool before draining water from the outdoor furnace. Never drain water from the outdoor furnace with live ash or fire in the firebox. If the water in the outdoor furnace ever boils, be sure to check the water level and restore to full. If water is added, the proper level of Corrosion Inhibitor Plus™ (p/n 1650) must be maintained.

WARNING

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

CAUTION

Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or 'freshen up' a fire in this outdoor furnace. Keep all such liquids well away from the outdoor furnace while it is in use.

CAUTION

Always wear the appropriate personal protective gear when cleaning ash from the firebox.

WARNING

Sulfuric acid in the test kit is a corrosive acid. Handle carefully. Carefully read and follow precautions on test chemical labels. Keep test chemicals away from children. Safely dispose of tested samples.

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

NOTE: Check with your insurance company to see if they have any location requirements.

NOTE: Any changes to an existing boiler should be done by a qualified installer in accordance with applicable codes.

NOTE: Do not connect this outdoor furnace to a chimney flue serving another appliance.

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

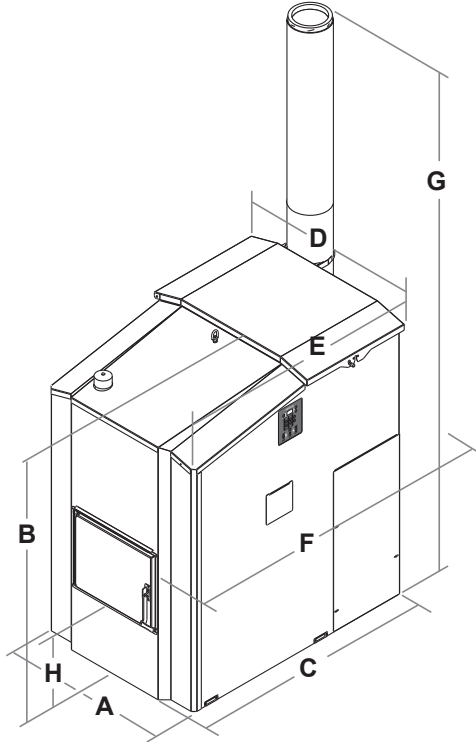
NOTE: If installed in a non-habitable building, adequate combustion air and ventilation must be provided.

SECTION 1 – GENERAL INFORMATION

Anyone owning or operating this outdoor furnace must read, fully understand, and follow all of the information in this manual.

Specifications and Dimensions

Fig. 2



Maxim M255 P; M255 PE Measurements								
	A	B	C	D	E	F	G	H
in.	34	57	49.5	36	48	59.5*	117.5**	14.5
cm	86	145	126	91,5	122	151*	298,5**	37
* Measurement (F) is from firebox door to chimney inspection cover.								
** Measurement (G) with two 4-foot chimney sections.								

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NOTE: See Section 5 for chimney installation guidelines.

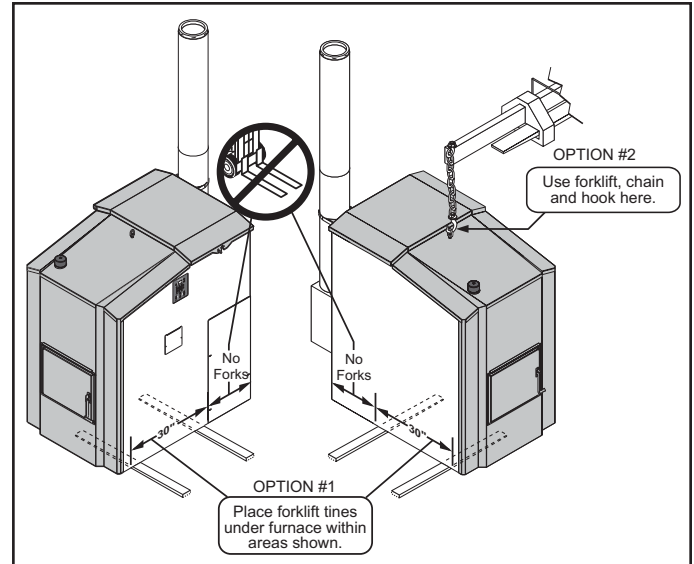
NOTE: The Maxim Furnace includes two 4-foot (1.2-meter) ASHT 6" in diameter chimney sections listed to UL103HT. For chimney sections or chimney replacement, use only genuine Central Boiler chimney components. Parts are available from an authorized Central Boiler dealer.

Removing from Pallet

The outdoor furnace is secured to the shipping pallet with four brackets. To remove these brackets, loosen (but do not remove) the two screws securing each shipping slot cover and slide the cover up. Remove the bolts securing the bracket to the pallet and remove the bracket.

NOTE: Lift the outdoor furnace only where specified by Fig. 3.

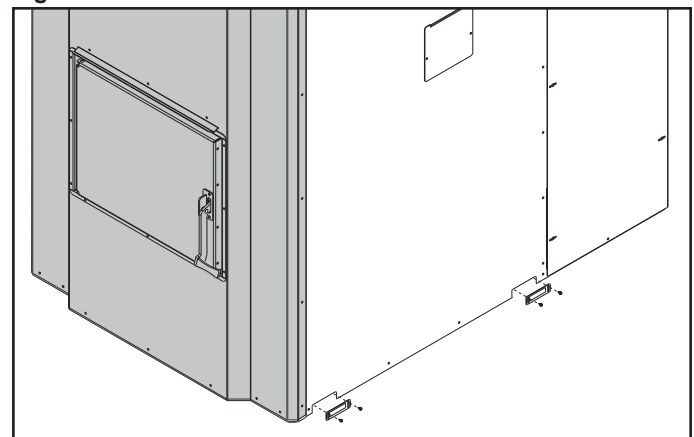
Fig. 3



Shipping Slot Covers

Position each shipping slot cover so it is flush with the bottom of the outdoor furnace; then secure the cover by tightening the two screws. Make sure all four covers are properly positioned and secured (Fig. 4).

Fig. 4



Options for Increasing Fuel Storage

An optional 48-Bushel Hopper is available (p/n 9660 or 9760) for increasing fuel storage. This hopper can be positioned to the side of the furnace using a 5-1/2' Auxiliary Auger Kit (p/n 9440).

A 6' Auxiliary Auger Kit (p/n 6453) and an 8' Auxiliary Auger Kit (p/n 9454) are also available for other applications. The auxiliary augers can also be used with larger external bins.

An optional Auxiliary Auger Vibrator with Timer Kit (p/n 9458) can be installed on the auxiliary auger connected to an external hopper. Vibration occurs based on a timer setting.

Potable Water

If the outdoor furnace is to heat potable water associated with commercial food preparation or for heating milk-house hot water, it is recommended to install a double-wall heat exchanger. Also, when filling the system with water, a backflow preventer must be installed in the line used for filling.

Antifreeze

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

To prevent freezing if the outdoor furnace is not fired for extended time periods or if lengthy power outages are anticipated during cold weather, a nontoxic propylene glycol boiler-type may be used in the system. Some types of antifreeze that contain various inhibitors have been known to create problems like coagulation and jelling. To prevent potential problems, **do not use** propylene glycol that is premixed with unknown inhibitors. Central Boiler Corrosion Inhibitor Plus (p/n 1650) is compatible with straight propylene glycol. It is important to use Corrosion Inhibitor Plus with straight propylene glycol for corrosion protection.

If adding antifreeze to the system, it is imperative that the entire system contain at least 30% antifreeze concentration mixed with softened water to prevent bacterial growth and minimize minerals in the system. Bacterial growth is likely to occur with low antifreeze concentrations and can cause corrosion in the furnace water jacket and/or clogging of heat exchangers. To confirm the antifreeze solution is adequate, allow the pumps to circulate for at least 24 hours and then obtain a sample of the system water. Using an antifreeze tester, the solution must be protected to 0°F (-18°C) or below.

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

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

NOTE: If using antifreeze, use Test Kit (p/n 597) when testing the treated water in the outdoor furnace (see Water Quality and Maintenance).

Corrosion Inhibitor Plus™

To aid in protecting the system from corrosion, it is imperative to add Central Boiler Corrosion Inhibitor Plus™ (p/n 1650). When initially filling the system (see Finalizing the Installation), add the Corrosion Inhibitor Plus™ **before adding water** to the system. Any time water is added to the system, Corrosion Inhibitor Plus™ must be added if a tested water sample indicates it is necessary (see Water Quality and Maintenance).

Corrosion Inhibitor Plus™ is composed of common materials and is biodegradable. However, in keeping with good safety and environmental practices, the supplier recommends the following if draining treated system water becomes necessary:

- You may drain the outdoor furnace to a home septic system. Central Boiler Corrosion Inhibitor Plus™ is biodegradable and can be properly treated in a residential septic system. If doing so, however, be careful not to overflow the septic system.
- Do not drain the outdoor furnace in such a manner that the drain water could in any way contact surface water, stream, river, estuary (where a river meets a sea), lake, pond, ocean or other types of waters.
- Do not drain to any location within 50 feet (15 meters) of any water well.

Shut-Off Valves

Shut-off valves must be installed on each hot supply and return water line so each line can be shut off individually for purging air from the system. Be sure all valves and fittings are metal. **Do not use plastic valves or fittings.**

SECTION 2 – LOCATION AND FOUNDATION

Selecting a Location

To ensure the Maxim Furnace functions as designed, careful planning and proper installation are imperative.

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

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

- This outdoor furnace is not intended or certified to be installed inside habitable space. Do not install the outdoor furnace inside your home.
- This outdoor furnace may be installed outdoors or in non-habitable structures and must be installed in accordance with all applicable codes and regulations.
- Check with your insurance company to see if they have any location requirements.
- This outdoor furnace should not be installed in a building that could be damaged or where a financial loss could occur from smoke, soot or water.

When selecting a suitable location, carefully consider each of the following:

- ☐ Must be installed in accordance with all applicable codes and regulations.
- ☐ A qualified installer must perform the installation of this supplementary outdoor furnace and must determine how to install it to be compatible with the existing heating source.
- ☐ Consider prevailing winds and the direction exhaust from the chimney will travel.
- ☐ The shorter the distance between the outdoor furnace and building(s) being heated, the lower the cost will be for the installation of the hot supply and return water lines and insulation.
- ☐ Be sure to maintain the required clearances to combustibles and recommended maintenance clearances.
- ☐ ThermoPEX pre-insulated piping is recommended for all underground installations. Other types of piping should not be buried in low-lying areas with standing water or with a very high water table, or under an area of heavy vehicle traffic unless protected from excessive compression.

- ☐ If the ground at the location is unstable or subject to frost heaving, consider installing 2" closed-cell insulation under the front portion of the concrete slab the outdoor furnace will be installed on, and under the area around the slab used for walking (see Fig. 6).
- ☐ Carefully consider the location of, and the distance to, the LP tank if one is to be used (see Gas Supply Connection and Ignitor Operation section).

Foundation

The outdoor furnace may be installed directly on **stable, level ground** without the necessity of a foundation.

If the ground is unstable, one option is to use patio blocks, bricks or pavers under the base as indicated in Fig. 5. Another option is to pour a concrete foundation.

Fig. 5

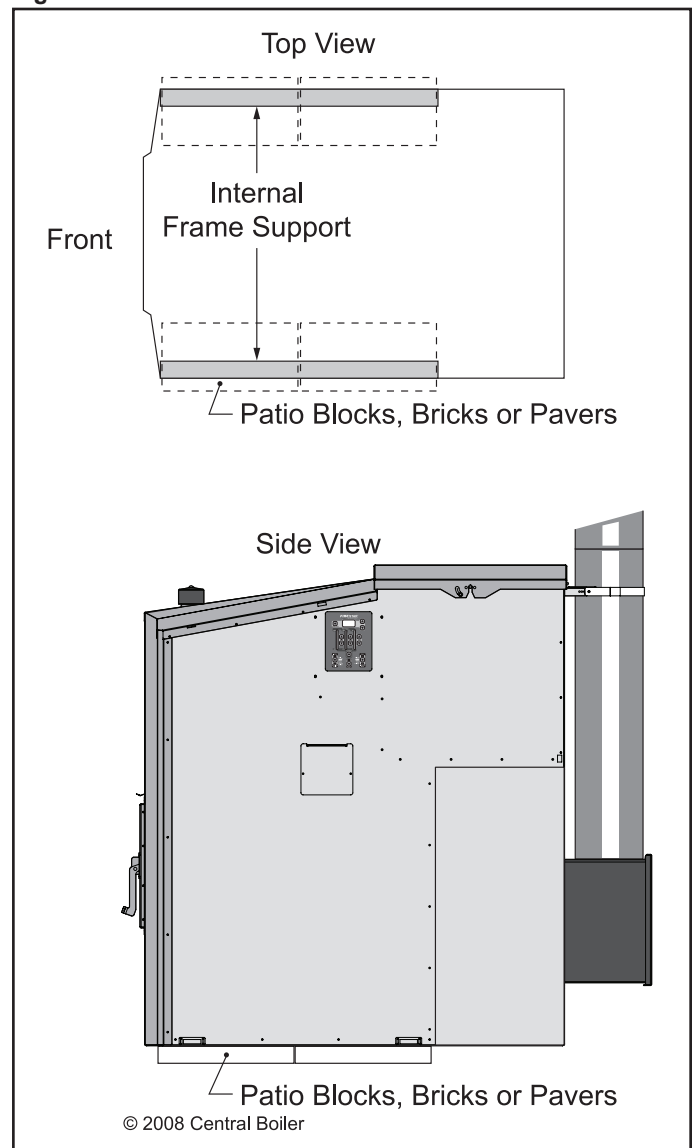
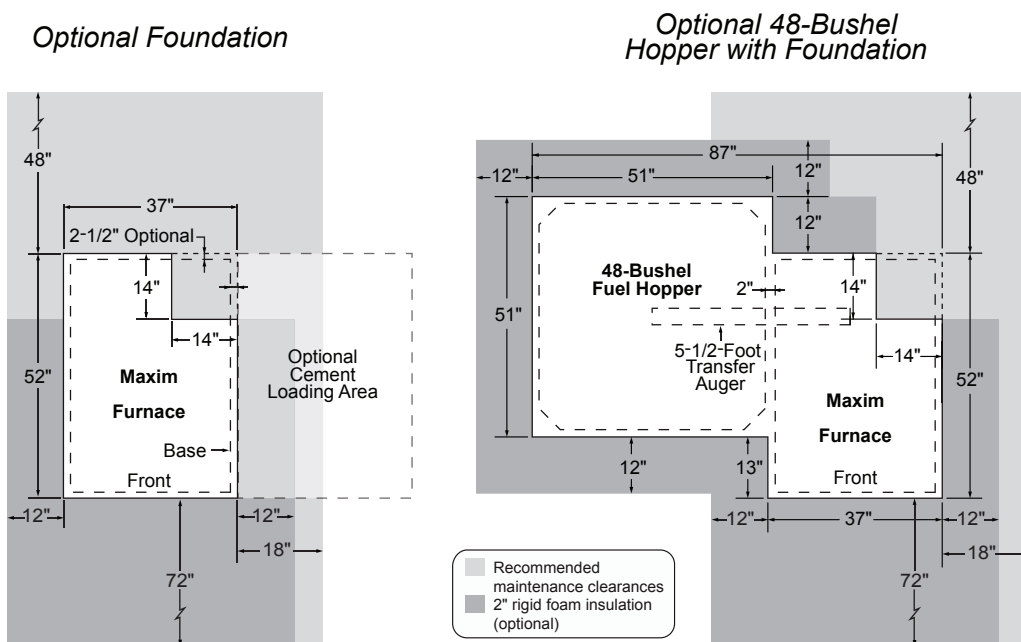


Fig. 6

Maxim Foundation Dimensions



Shown without optional hopper.

Foundations dimensions are 1-1/2 in. beyond the outside perimeter of the base.

CAUTION
Do not use any combustible materials for the foundation.

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

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

If installing on an existing slab, it may be necessary to use patio blocks, bricks or pavers (Fig. 5) to allow access to the water lines.

NOTE: In all installations, the outdoor furnace must not be operated with the back panels removed. Make necessary allowances for access to the back of the outdoor furnace.

If the area for the concrete slab is unstable or subject to frost heaving, consider installing 2" closed-cell insulation under the front portion of the concrete slab the outdoor furnace will be installed on, and under the area around the slab used for walking (see Fig. 6).

NOTE: The installation surface or foundation must be noncombustible. The hot supply and return lines must also be protected from possible exposure to sunlight, fire or physical damage. Foundations may consist of concrete, crushed rock or patio blocks.

Leveling the Outdoor Furnace

CAUTION

The back of the outdoor furnace must not be lower than the front of the outdoor furnace.

The Maxim should be leveled so that the back of the transition box (i.e., the burner auger motor end) is slightly higher than the front. Smoke can condense into creosote inside the burner auger tube. If the burner auger is not sloped down toward the front of the furnace, condensation can form in the burner auger tube and drip into the transition box.

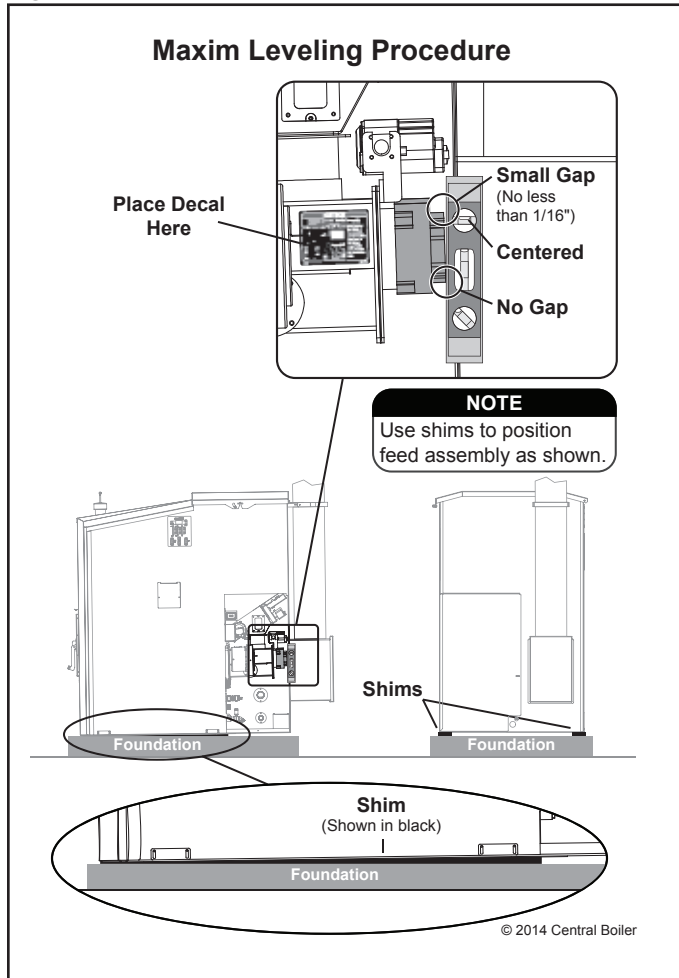
WARNING

Disconnect the electrical power at the main power source and turn off the gas supply at the appliance service valve.

1. Disconnect the electrical power at the main power source and turn off the gas supply at the appliance service valve.
2. Remove the access panels from the back corner of the furnace and set aside.

- Place a level on the back of the burner auger motor as shown in Fig. 7. The back of the transition box should be slightly higher than the front, indicated when the level is vertical and there is a small gap (from 1/16" to 3/32", or 1.6 mm to 2.4 mm) between the level and the top of the burner auger motor and no gap between the level and the bottom of the burner auger motor.

Fig. 7



- Use shims as necessary under the outdoor furnace in the locations shown until the procedure in Step 3 indicates that the back of the transition box is slightly higher than the front.

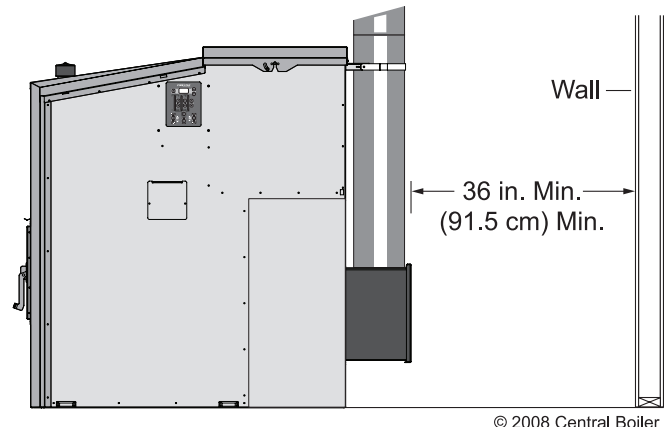
NOTE: Periodically check that the outdoor furnace is leveled as described in these instructions because frost can cause the foundation to move.

- Install the access panels on the back corner of the furnace.
- Connect the electrical power at the main power source and turn on the gas supply at the appliance service valve.
- Connect the electrical power at the main power source and turn on the gas supply at the appliance service valve.

Clearances

NOTE: Clearance to combustibles from the chimney transition box is 8" (20 cm); HOWEVER, if installing with the back of the outdoor furnace facing an immovable wall, object, etc., you must maintain 36" (91.5 cm) of clearance to the wall, object, etc. in order to perform periodic maintenance (see Fig. 8).

Fig. 8



WARNING

Maintain the following clearances from combustibles for the outdoor furnace installation:

- 8" (20 cm) from the transition box
- 6" (15 cm) from the sides
- 48" (122 cm) from the front
- 8" (20 cm) from the chimney
- 27" (68.5 cm) from the top
- The foundation must be noncombustible

SECTION 3 – ELECTRICAL

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

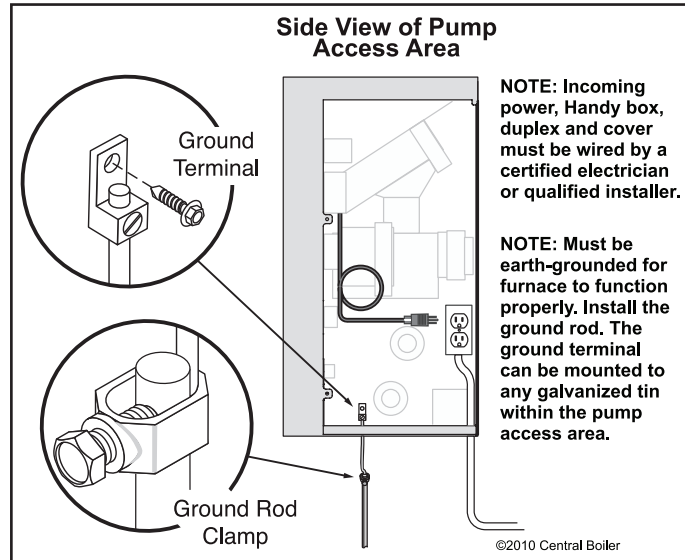
Ground Rod

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

Install the ground rod and connect it to the outdoor furnace.

1. In the water line trench near the outdoor furnace, drive the ground rod into the ground until the top of the ground rod is below the ground surface.
2. Remove the side and back panels; then route the ground wire from the ground rod under the outdoor furnace base and over to the bottom left corner at the back of the outdoor furnace.
3. Secure the ground terminal with the self-drilling screw provided. Secure the ground wire to the terminal; then secure the ground wire to the ground rod with the clamp. Tighten all hardware securely.

Fig. 9

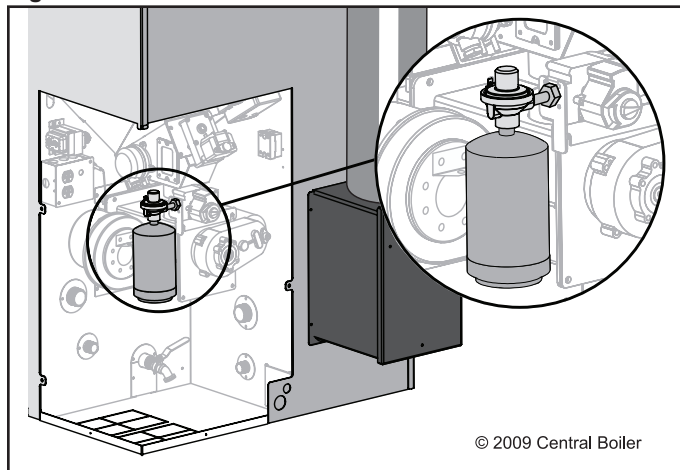


SECTION 4 – GAS SUPPLY CONNECTION (P Models) AND IGNITOR OPERATION

Gas Supply Connection

The M255 P is designed so that a one-pound propane cylinder may be connected to the gas ignitor. Thread the cylinder on to the regulator installed on the gas valve (Fig. 11). This configuration works well for all temperatures.

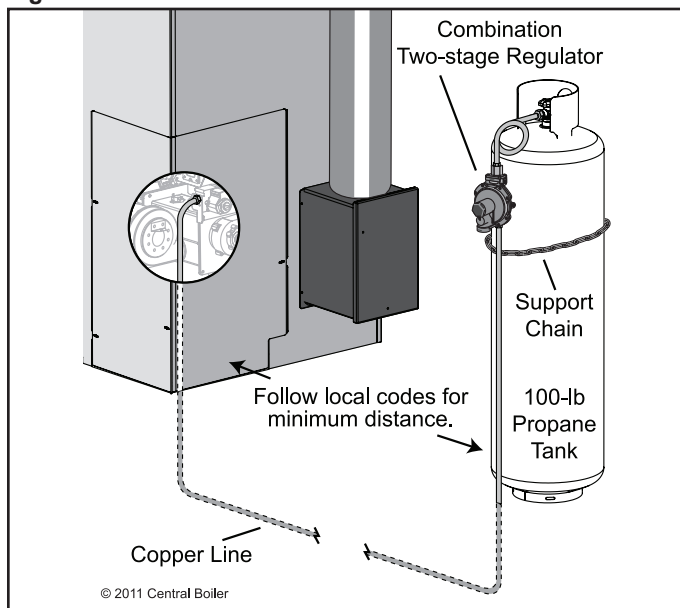
Fig. 11



Other sizes of portable propane cylinders may be connected to the regulator with the proper hose and fittings.

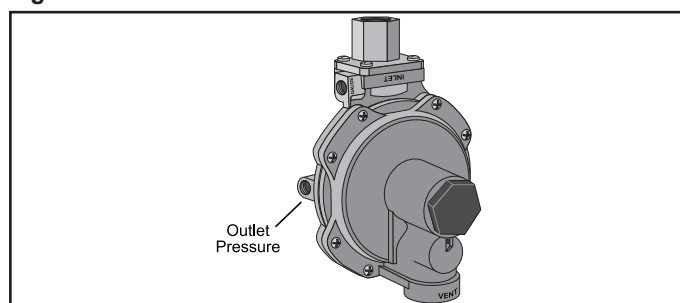
Because liquid propane (LP) evaporates and turns to gas at a slower rate when the temperature of the tank is lower, sustained temperatures below 0°F (-18°C) will lead to reduced gas pressure in small LP tanks. This will lead to a drop in burner manifold pressure while the burner is operating. If sustained temperatures below 0°F (-18°C) are expected, a properly installed tank of at least 100-lb capacity must be installed (see Fig. 12).

Fig. 12



Temperatures below 0°F (-18°C) also will cause small LP gas regulators to work incorrectly, outputting gas pressures that are too high or too low. A two-regulator system using a first-stage and a second-stage regulator, or a combination two-stage regulator (p/n 1930) such as the one shown in Fig. 13 should be used.

Fig. 13



CAUTION

Make sure all covers for the gas ignition system on the appliance are in place during operation and service.

WARNING

Once the gas supply is connected, the appliance and gas connection must be tested for leaks before placing the appliance in operation.

For temperatures below 0°F (-18°C), use either the configuration in Fig. 11 or the one in Fig. 13 with a 2-stage regulator system and a larger tank.

How to Operate the Gas Ignitor

The outdoor furnace utilizes a gas burner to ignite the fuel in the burn chamber. The FireStar controller can also be set to automatically relight the fuel if needed.

NOTE: For more detailed information, refer to the FireStar Controller Operating Instructions section.

There are two ways to start the gas burner:

1. Press and hold the Ignition button on the FireStar controller until the LED display indicates **995** and the burner fan operates.

NOTE: The gas burner will start regardless of the temperature of the burn chamber; however, if the temperature of the burn chamber is greater than 350°F (177°C), the gas burner will immediately shut off.

2. If Auto Relight is enabled and the controller is in NORMAL or MEDIUM mode, the ignition process will start if the burn chamber temperature falls below 300°F (149°C).

Ignition Sequence - P Models

The ignition sequence is a series of steps that automatically occur to ensure the gas ignitor starts properly before the system begins to operate. During ignition, the following will take place:

1. The burner fan will operate to provide air flow for combustion.
2. Once the pressure switch senses air flow, it will energize the gas ignition module.
3. The gas ignition module turns on the gas valve and spark electrode, igniting the gas burner to light the wood pellets in the burn chamber.
4. The feed and burner augers run for 60 seconds, delivering fuel to the burn chamber.
5. The gas burner will continue to burn until the burn chamber reaches a high enough temperature to sustain burning the wood pellets, or for 10 minutes, at which time the controller will turn off the gas burner.

Ignition Sequence - PE Models

The ignition sequence follows a control logic to ensure safe and effective ignition. The ignition sequence is as follow:

1. The water temperature must be low enough for the furnace to shift into demand mode.
2. The fan will start and operate at the ignition fan speed and the Firestar control will send voltage to the igniter relay.
3. The air proving switch will close, completing the ignition relay control circuit.
4. The electric ignitor will warm up and heat the air blowing across it into the burn chamber.
5. The auger will cycle periodically to feed the required amount of fuel into the burn chamber, and to agitate any pellets already present in the burn chamber.
6. The ignitor will operate until the burn chamber reaches a temperature that is high enough to sustain itself, or for ten minutes, at which time the ignitor will turn off.

SECTION 5 – CHIMNEY

Chimney Height

The minimum recommended chimney length is eight feet (2.4 m). Two 4-foot (1.2 m) sections are standard. Additional sections may be needed (see Chimney Draft section).

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

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

If located within 300 feet (91 m) of any residence not served by the outdoor furnace, it is recommended that the chimney be at least 2 feet (0.6 m) higher than the peak of the residence served.

Fig. 14

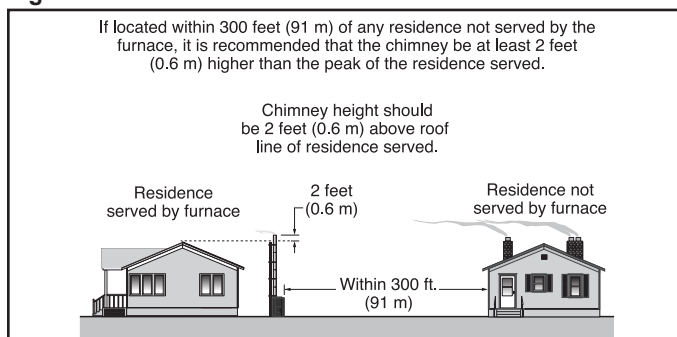
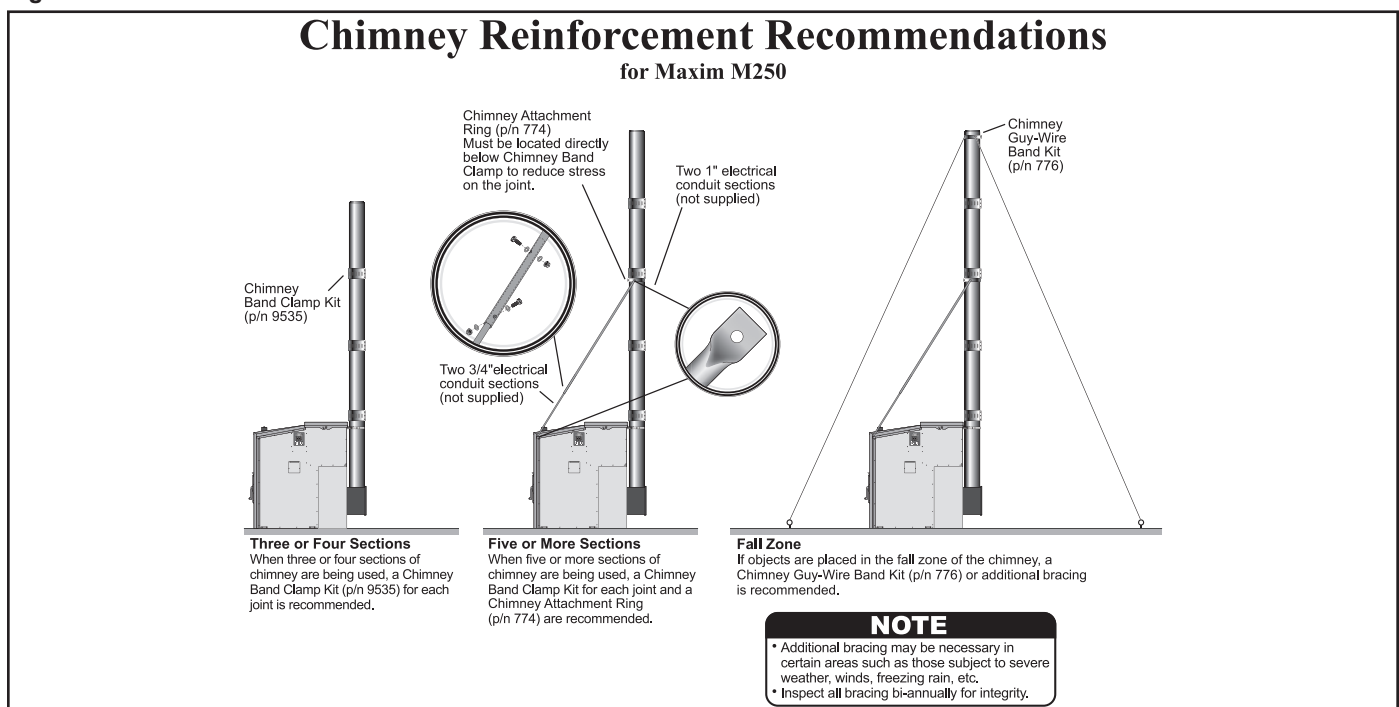


Fig. 15



NOTE: If more than three 4-foot (1.2 m) sections of chimney are used, a support (e.g., a pole, pipe or other structural support) may be installed from the ground that can withstand wind. Other reinforcement recommendations are shown in Fig. 15.

If extensions are added to the standard eight feet (2.4 m) of chimney, the chimney should be reinforced appropriately. Fig. 15 shows chimney support recommendations when three or more sections are used. When adding sections of chimney, make sure that there is nothing within the fall zone of the chimney that could be damaged. If something is located within the fall zone and cannot be removed, guy wires or braces may need to be installed to prevent a falling chimney from causing damage (see Fig. 15).

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

The installation of a spark arrester is recommended, particularly where there are dry conditions or where there is combustible material near the unit, unless the installation of a spark arrester is prohibited by local requirements. Use common sense to avoid potential fires, including exercising caution when disposing of ash, cleaning and refueling. Keep all highly combustible materials (e.g., gasoline, propane, leaves, pine needles, etc.) away from an operating unit at all times. Take special precautions in windy conditions.

Chimney Draft

Proper draft is necessary for the Maxim to operate optimally. Draft occurs when the temperature in the chimney is high enough and/or the chimney is high enough to cause a negative pressure that "pulls" the exhaust up and out the chimney. The higher the burn rate and fan settings, the more sections of chimney that will be required to provide proper draft.

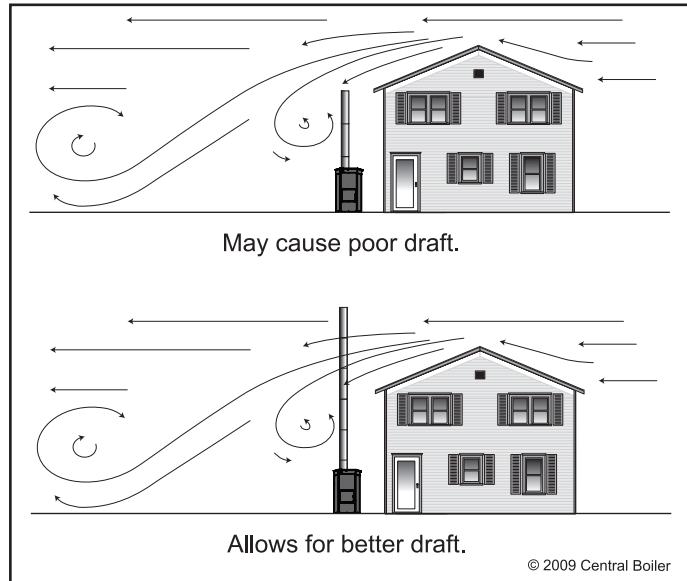
NOTE: Adding more chimney sections increases the amount of negative pressure in the chimney.

NOTE: A qualified installer may perform the following test to check for proper draft.

1. Drill a hole in the chimney inspection cover; then with the outdoor furnace and chimney at normal operating temperature, use a manometer to check draft. Flue draft should be between -0.02 in. WC (-5 Pa) and -0.05 in. WC (-12.45 Pa). If the flue draft is lower, add more chimney sections.
2. After the test, fill the hole in the chimney inspection cover with high-temp silicone.
3. If a spark arrestor is being used, make sure it is clean and unobstructed.

4. Objects like buildings and trees in close proximity or nearby terrain (e.g., hills, valleys, etc.) can adversely affect air flow in the chimney (see Fig. 16). Adding chimney sections may overcome these factors.

Fig. 16



SECTION 6 – SYSTEM INSTALLATION

SUPPLY AND RETURN LINES

Determine the configuration of the supply and return lines from the outdoor furnace to where the supply and return lines will connect to the existing heating system. Central Boiler recommends using the ThermoPEX® piping system.

ThermoPEX is a fully assembled, pre-insulated piping system consisting of two 1" Central PEX lines or two 1-1/4" PEX lines. The two lines (one a supply and one a return line) are insulated with high-density urethane insulation and a thick, durable, waterproof, polyethylene outer jacket. One of the lines is marked with a black stripe for identification.

NOTE: To prevent ground water from entering the house, do not use drain tile, PVC pipe with bubble wrap, or any other inferior material for insulating the water lines.

NOTE: If the outdoor furnace supply and return lines are not insulated properly, or if other brands of insulated piping are used, there can be excessive heat loss. This heat loss can greatly increase the fuel consumption.

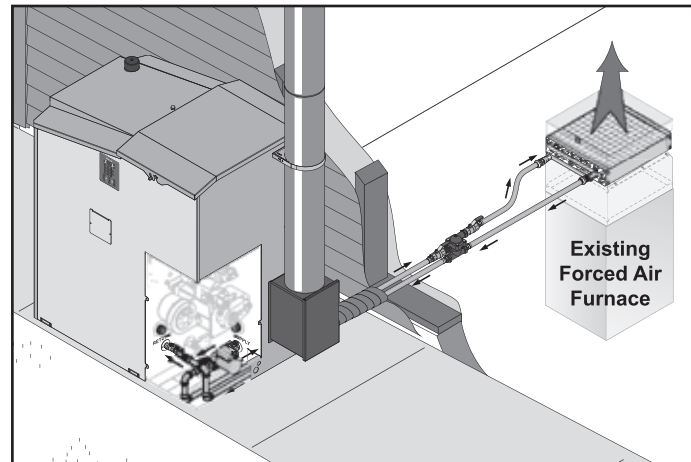
NOTE: If it is unavoidable that the supply and return lines will run through an area of ponding water, use ThermoPEX instead of other materials. ThermoPEX should also be used for above-ground or winter installations, and if the area is likely to be affected by compaction.

Above Ground or Winter Installations

For above ground or winter installations in which the supply and return lines can not immediately be buried underground, Central Boiler recommends using ThermoPEX. Be sure that both the insulation and the supply and return lines will not be exposed to ultraviolet rays. The ThermoPEX black exterior jacket has UV protection but the insulation and water lines inside do not. Use a ThermoPEX termination cap at each end of the installation to protect and seal the insulation from water.

If installed next to the building being heated, the supply and return lines can be installed above ground provided they are properly insulated and not exposed to ultraviolet rays (see Fig. 17 as an example).

Fig. 17



NOTE: If an above ground installation is temporary, bury the ThermoPEX as soon as conditions permit (e.g., once the ground has thawed).

NOTE: If ThermoPEX is installed temporarily above ground, provisions should be made (i.e., a firestop) to prevent possible risk of fire coming into contact with the ThermoPEX. ThermoPEX is constructed of materials that can burn and transfer a fire.

CAUTION

If ThermoPEX is installed temporarily above ground, do not cover with combustible materials (e.g., straw, hay, leaves, etc.).

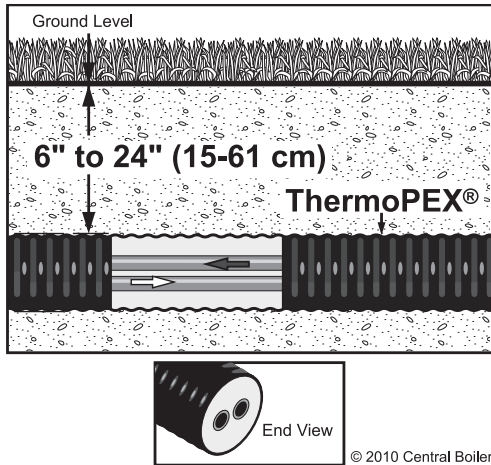
Digging the Trench

WARNING

Before digging, be sure to call for utility locator service.

The trench depth for ThermoPEX should be between 10" and 28" (25 and 71 cm).

Fig. 18



Underground Electric Wire

A 12-2 (two wires plus ground) underground rated wire should supply the outdoor furnace with electricity. A heavier gauge wire may be needed if the run is over 200 feet (61 meters). Check local codes and requirements. A 20-amp circuit is recommended.

Connecting to Existing Heating System

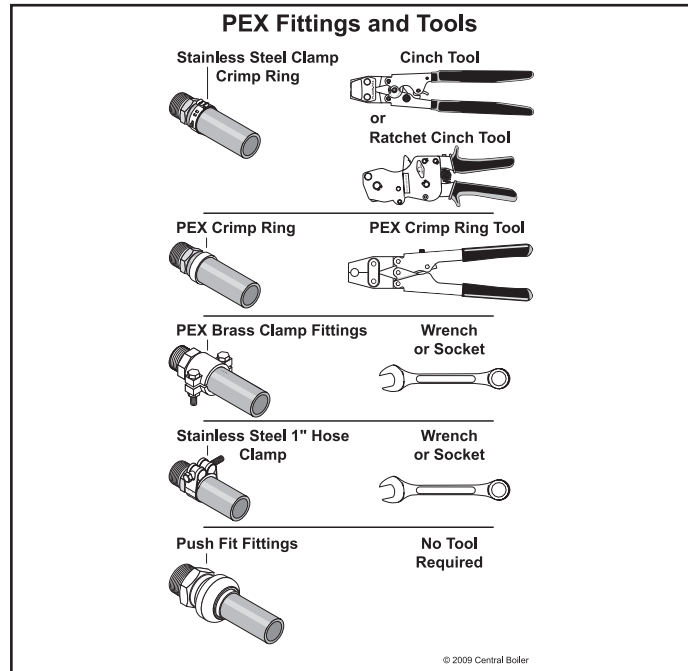
1. Make an entrance into the building(s) where the supply and return lines are to enter.
2. Lay the ThermoPEX assembly in the trench and feed one end into the building. Apply sealant around the supply and return lines where they enter the building.
3. Purge the supply and return lines before connecting any fittings to ensure there is no debris or foreign matter present.

NOTE: All holes made in basement or building walls must be sealed completely to prevent water from entering the building.

4. Close all valves on the outdoor furnace.
5. Install fittings to allow pressure-testing of both supply and return lines. Pressurize with 50 psi (3.5 kg/cm²) of air; then check after 30 minutes to see if pressure has dropped. A drop in pressure indicates a leak; repair as necessary.
6. Connect the supply and return lines to the outdoor furnace and the existing heat emitter(s). Fig. 19 shows some of the PEX fittings and tools used in making connections.

NOTE: The base on the back of the outdoor furnace is removable if necessary for connecting the supply and return lines to the outdoor furnace.

Fig. 19



CAUTION

Allow for expansion and contraction of the supply and return lines at each end. Without an allowance for expansion and contraction, the lines may kink or the fittings may be pulled apart, causing an immediate water loss from the outdoor furnace. Central PEX water lines can have an expansion and contraction rate up to .095" per each 100 ft and each 10°F (2.4 mm/30 m/5.5°C).

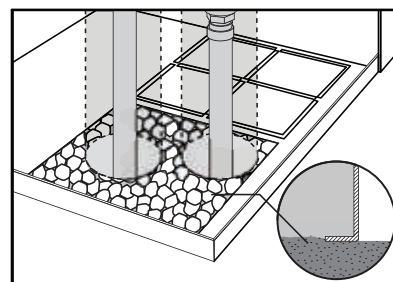
7. Make sure there are no leaks in the supply and return lines; then backfill the trench.

NOTE: Do not backfill the trench until the supply and return lines have been tested to ensure there are no leaks.

Backfilling Water Line Enclosure

Using gravel or small rock, backfill the perimeter of the water line enclosure to the top, inner edge of the base (Fig. 20) to keep out rodents. Install the back and side panels.

Fig. 20



CIRCULATION PUMPS

NOTE: The direction of water flow is very important for the proper operation of the outdoor furnace. Installing a swing check valve in the return line can prevent possible reverse flow.

Water Flow

For a single building using a water-to-air heat exchanger system with a domestic water heater, the direction of water flow must go from the hot outlet on the outdoor furnace to the lower side fitting of the domestic water heater exchanger, to the lower fitting of the heat exchanger on the existing furnace, and then to the return port of the outdoor furnace.

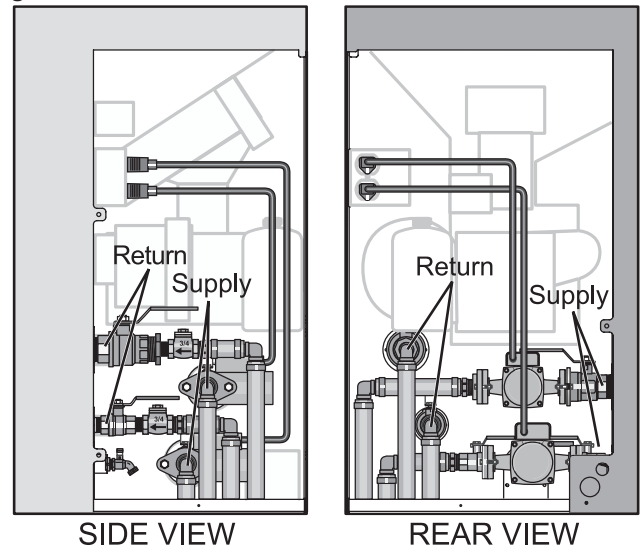
NOTE: if there is a high heat draw with a single set of lines, a wraparound pump (as shown in Fig. 21) may be needed in order to keep the supply water temperature the same temperature indicated by the FireStar controller.

NOTE: Some systems may have different flow patterns.

Access to Ports on Furnace

Access to the hot supply and return ports is gained by removing the access panels on the lower right-hand side and back of the furnace. There are two hot supply and two return ports on the furnace. This configuration allows for mounting the circulation pumps on the furnace (Fig. 22).

Fig. 22

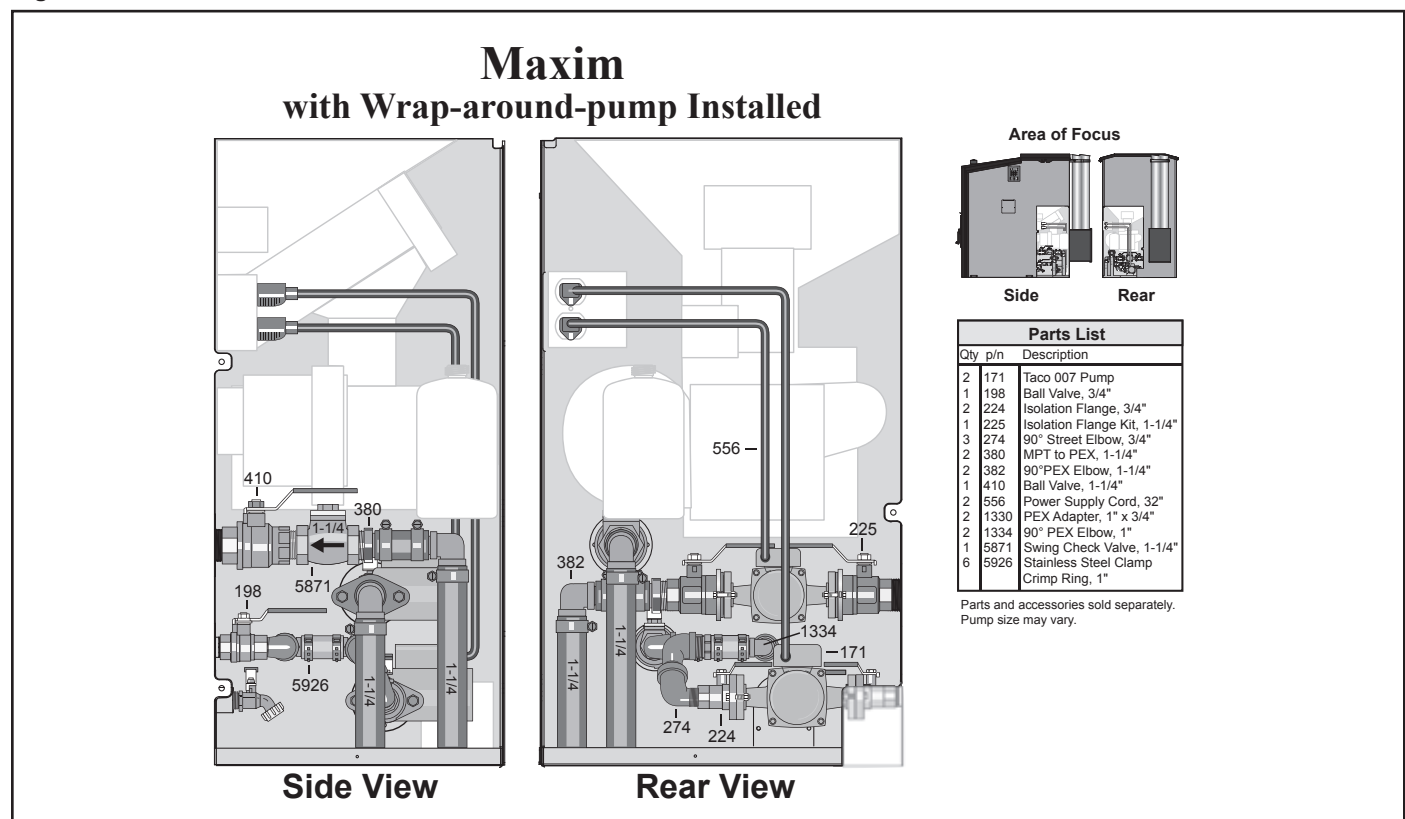


There are eight knock-out tabs on the floor panel of the furnace to accommodate the water lines. These align with the hollowed-out area in the foundation specifications (Fig. 6). The pump access area in the back right corner must align with the blocked out area of the foundation.

Installing Circulation Pumps

The Taco 009 is a medium flow, high head pressure pump that requires an adequate amount of pressure on the outlet side to prevent the motor from overloading.

Fig. 21



The Taco 014 is a high flow, high head pressure pump that requires an adequate amount of head pressure on the inlet side to prevent cavitation. Therefore, a Taco 014 may need to be mounted lower near the base of the furnace, and on the 1-1/4" bung.

The Taco 007 is a medium to high flow, low head pressure pump. In a very low-resistance system (e.g., short length of supply and return lines, only a flat plate heat exchanger, etc.), the 007 pump may need to be mounted lower near the base of the furnace or on the 1-1/4" bung to prevent cavitation at high water temperatures.

NOTE: See the Hydronic Component Selection Guide (p/n 2482) for more detailed information.

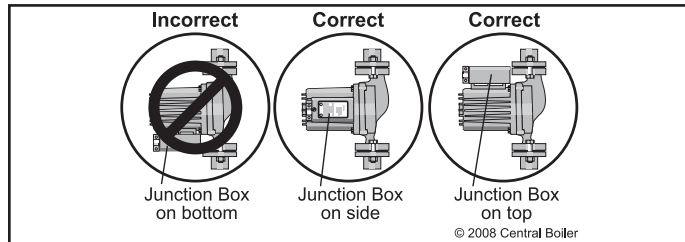
The following guidelines must be adhered to when installing the circulation pump(s).

WARNING

Maximum load of the outlet on the outdoor furnace is 10A, 120VAC, and 60Hz.

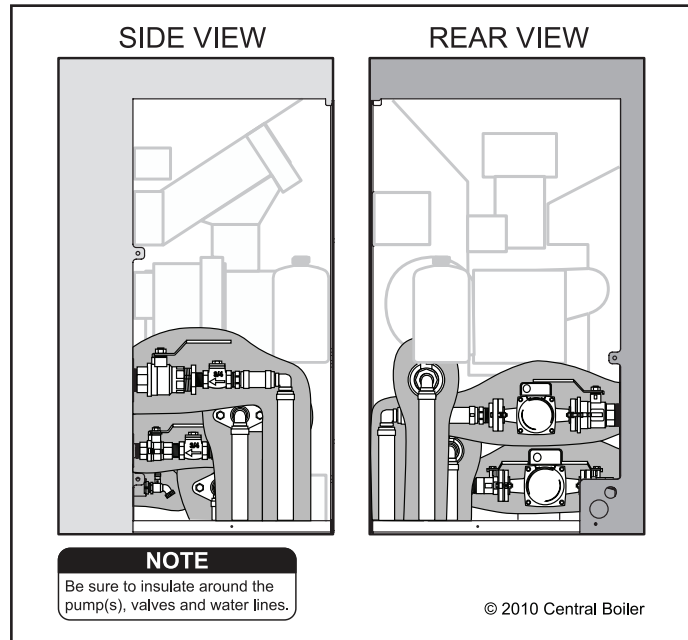
- A. The pump motor must be installed in a horizontal position.
- B. The junction box must not be located below the pump motor (see Fig. 23). If necessary, remove the four screws and rotate the pump body.

Fig. 23



- C. Do not operate the circulation pump until the entire system has been filled with water and checked for leaks or the pump may be damaged.
- D. Insulate the areas around the supply and return lines (Fig. 24) and pump(s) being careful not to block the area around the louvers; then install and secure the side and back panels.

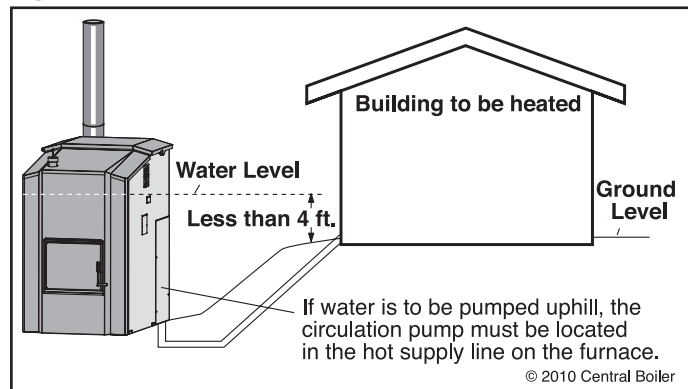
Fig. 24



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

The circulation pump(s) **must be installed in the supply line(s)** with the arrow on each pump pointed away from the outdoor furnace. In order to avoid circulation problems, do not install the pump(s) in the return line(s).

Fig. 25

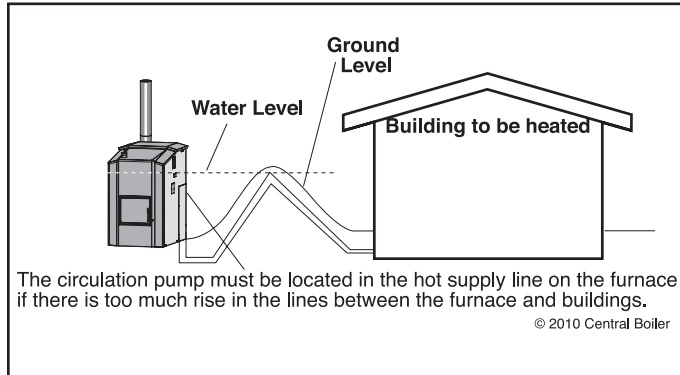


The pump(s) must be located near the base of the outdoor furnace if the system has a high-flow pump or very low resistance on the outlet side of the pump. For example, if the outdoor furnace is 20 feet (6 meters) from the building and pumping water through one-inch pipes, a heat exchanger, and back to the outdoor furnace, the pump needs to be mounted with four feet of water above the pump.

NOTE: See the Hydronic Component Selection Guide (p/n 2482) for more detailed information.

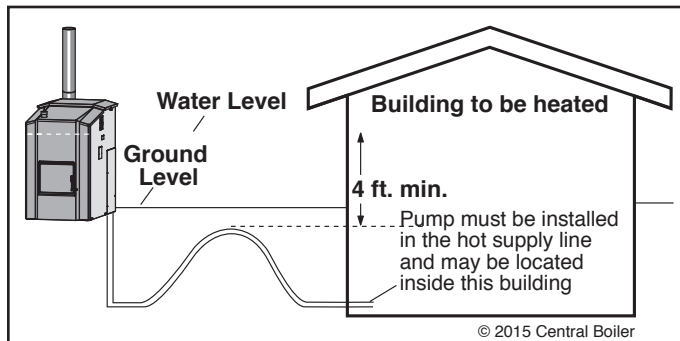
Installing the circulation pump(s) at the outdoor furnace is recommended, but required if the building being heated is higher than the outdoor furnace or if there is a large rise in the water lines between the outdoor furnace and building (see Fig. 26 and 27). Hot water boils at a lower temperature when pulled uphill (because it is at a lower pressure); therefore, hot water must be **pushed** uphill to ensure proper circulation.

Fig. 26



If not mounted on the outdoor furnace, the circulation pump(s) must be mounted 4 to 5 feet (1.2 to 1.5 m) lower than the top water level in the outdoor furnace (see Fig. 27).

Fig. 27



Shut-Off Valves

Shut-off valves should be installed on both sides of each pump so if it becomes necessary to repair or replace the pump, the pump can be isolated.

Filters

A Y-strainer or filter may be installed at the outlet side of the pump to remove foreign particles which may be present in the water. Always install Y-strainers with the cleanout in the lowest position.

Thermostatic Valves

NOTE: A 3/4" thermostatic valve must be installed on each set of supply and return lines or warranty can be voided.

NOTE: For additional thermostatic valves, or for 1-1/4" thermostatic valves, contact your authorized Central Boiler dealer.

NOTE: The thermostatic valves illustrated throughout the manual may vary from your installation. See the installation instructions provided with the thermostatic valve.

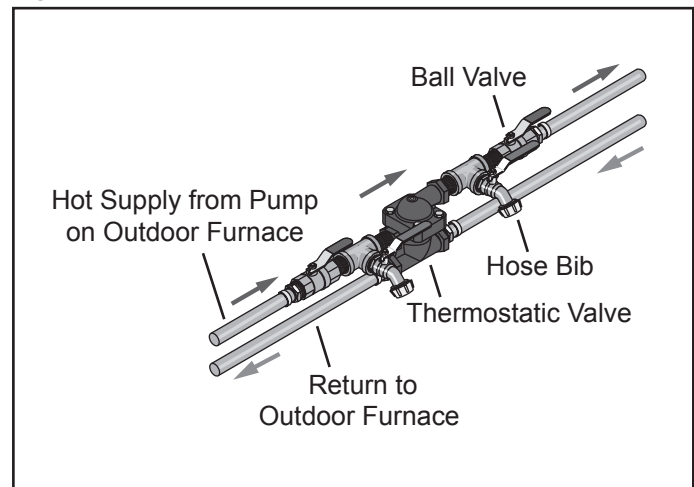
CAUTION

DO NOT operate the outdoor furnace with the water temperature less than 150°F (65°C).

A thermostatic valve must be installed on each set of supply and return lines in the system to maintain the outdoor furnace water temperature above 150°F (65°C). Operating the outdoor furnace with the water temperature less than 150°F (65°C) may result in more condensation in the firebox that can lead to corrosion.

It is recommended that the water temperature setpoint of the furnace be set to 185°F (85°C) to decrease the likelihood of the water temperature falling to 150°F (65°C). As a result, the outdoor furnace will operate with a greater efficiency and require less maintenance. Failure to follow proper operating instructions may result in furnace damage.

Fig. 28



MAXIM THERMOSTATIC VALVE - HOW IT WORKS

NOTE: With higher heat loads, it may be necessary to change the water temperature setpoint on the FireStar controller to be no less than 185°F.

NOTE: When the thermostatic valve allows a trace flow, enough water will pass through for the backup indoor heating system to backfeed heat to the outdoor furnace and water lines, protecting against freezing.

Thermostatic Valve - How It Works

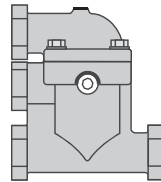
(arrow indicates water flow)

NOTE

Install a Thermostatic Valve on each set of supply and return lines in the system. Each Thermostatic Valve must be installed inside the building to be heated.

NOTE

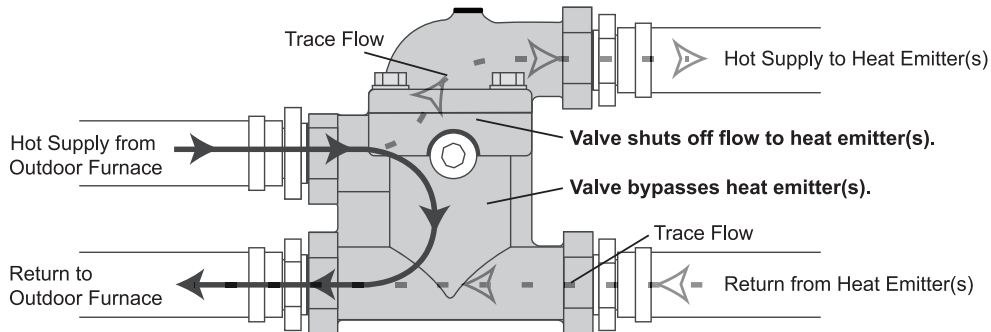
The proper level of Corrosion Inhibitor Plus™ (p/n 1650) must be maintained (see Owner's Manual for more information).



Note: Top of valve can be installed to face either direction. As shown here or as shown below.

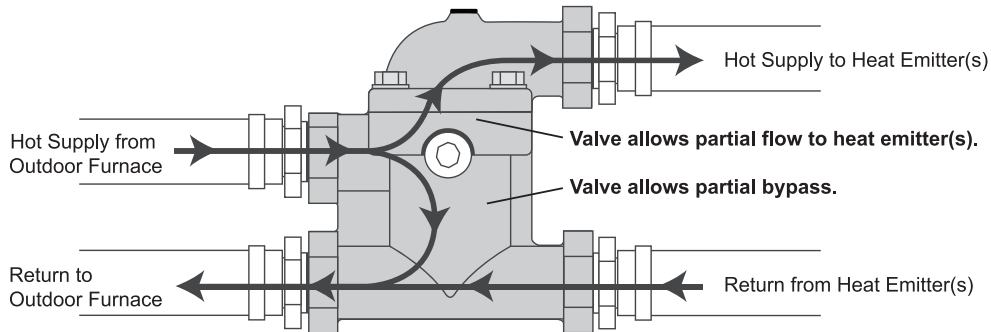
Water Below 150°F at Thermostatic Valve

(water returns to furnace to be reheated)



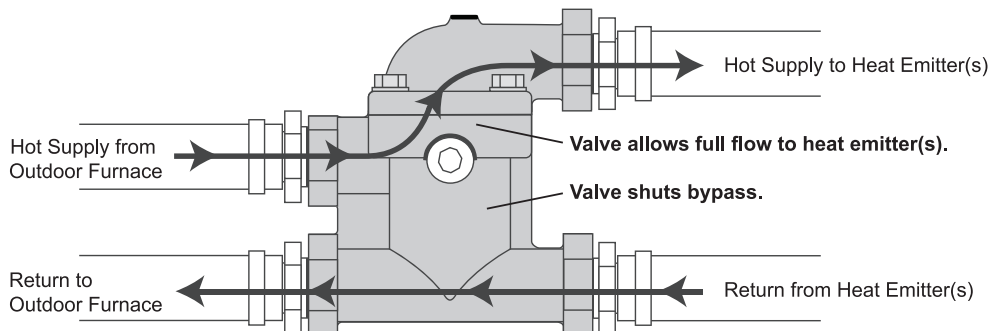
Water at 150°F up to 170°F at Thermostatic Valve

(water is partially released to heat emitter(s) and partially bypassed)



Water Above 170°F at Thermostatic Valve

(water is released to heat emitter(s))



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Purging Air from the System - Manual Air Bleeders

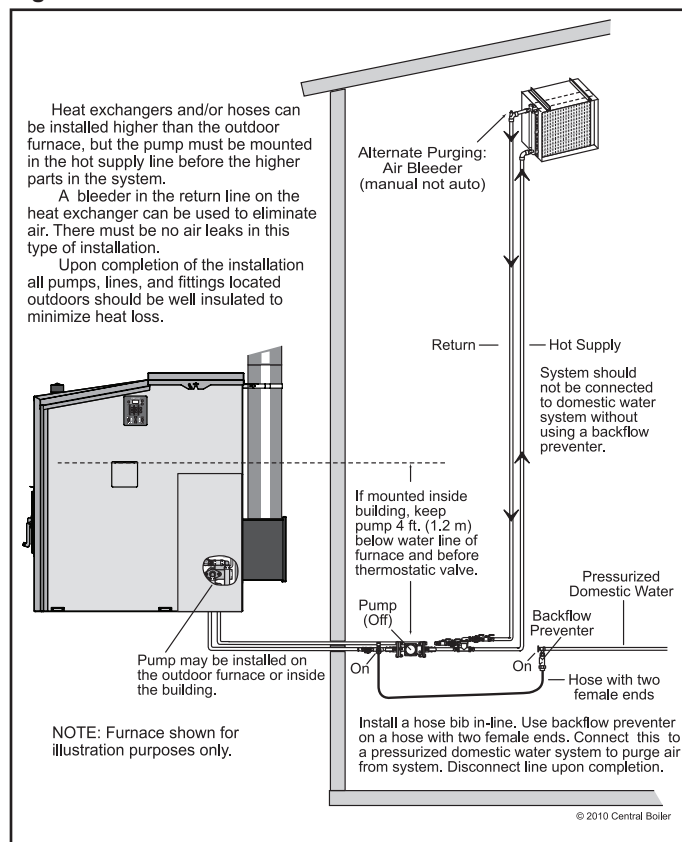
Manual air bleeders may be installed in the high points of the water lines where air may get trapped and cause circulation problems. Water can be pumped to levels higher than the outdoor furnace as long as the pump is **pushing** the water to the higher level and there are no air leaks in the system. Additionally, air should be purged from the system using pressurized domestic water and a hose with two female ends (see Fig. 29).

WARNING

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

If any auto float vents are present in the system, they must be capped off tightly to prevent air from entering the system.

Fig. 29



NOTE: See the Hydronic Component Selection Guide (p/n 2482) for more detailed information.

WATER HEATER INSTALLATION

WARNING

DO NOT disable or remove any safety reliefs or controls. Turn off the power to the water heater before installation.

When installing a domestic hot water heat exchanger, the hot supply line from the outdoor furnace should be plumbed first to the water heater heat exchanger and then to the balance of the heating system.

A manual 3-way valve may be installed so that during the non-heating season, the water heater may be operated without operating the entire heating system (see Fig. 30). A tempering valve (or thermostatic mixing valve) is to be installed in the hot water outlet from the water heater. Install a tee in a fitting on the top of the water heater (see Fig. 32) for the hot water heat exchanger.

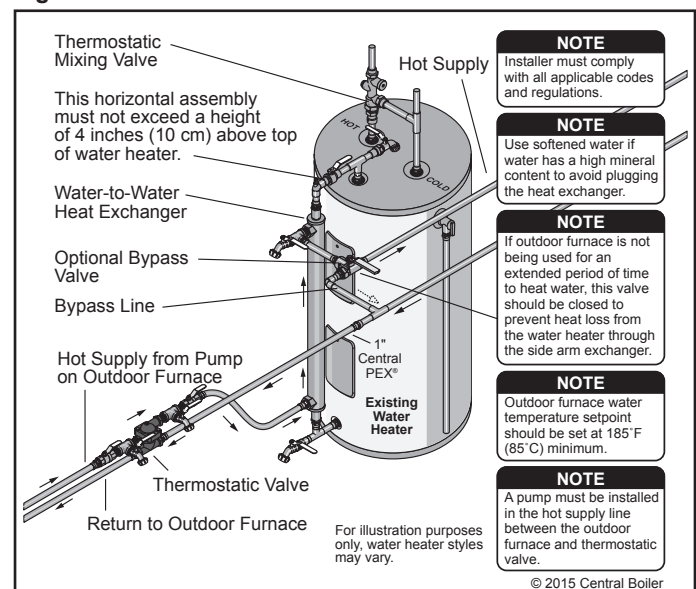
NOTE: If the water heater has been in service, flush the water heater prior to installing the hot water heat exchanger. Anode rod residue or other sediments in the water heater may plug the heat exchanger.

NOTE: Some gas water heaters are equipped with a high water temperature probe that is connected to the gas valve. When the water temperature exceeds the high limit, the gas valve enters a non-resettable lock out condition. This requires replacement of the entire valve. The installer must determine if this type of valve is present before installation of a water-to-water heat exchanger.

CAUTION

Costly maintenance may be incurred if steps are not taken during installation to reduce or eliminate the possibility of the water temperature in the water heater exceeding the high limit.

Fig. 30



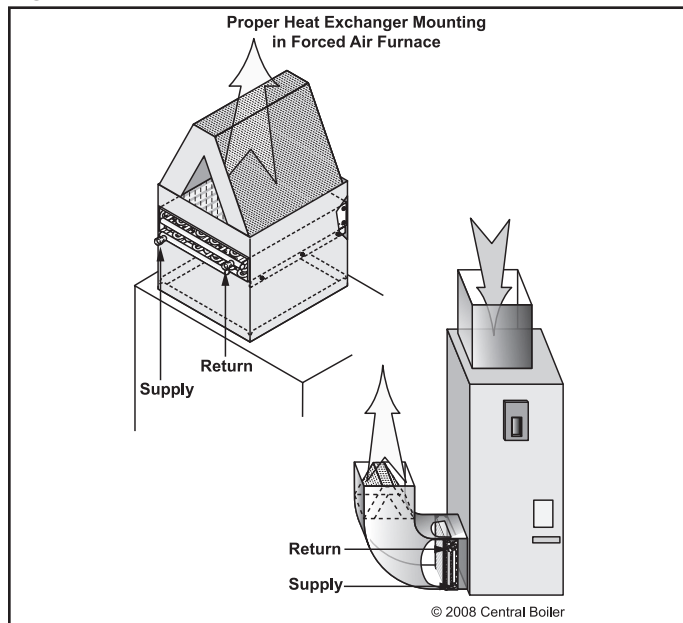
EXISTING FORCED AIR INSTALLATION

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

Following are several important items for this type of installation.

- Plenums installed to the furnace must be constructed of metal in accordance with NFPA 90B, 2-1.3.
- If an air conditioning coil is located in the plenum, the heat exchanger should be mounted between the fan and the air conditioning coil so the heat exchanger will not freeze when the air conditioner is being used.
- The heat exchanger should **not** be installed in the cold-air return of the existing forced air furnace because components of the existing furnace could overheat.
- The heat exchanger may be mounted either horizontally or vertically with the outlets on the side (see Fig. 31).

Fig. 31



- In all applications, the heat exchanger must be mounted level from front to back, with the outlets on the side. If the outlets are positioned upward or if the exchanger is not level, an air lock can restrict the water circulation and reduce the amount of heat transfer.

- The **lower fitting is the inlet/hot supply** from the outdoor furnace and the **top fitting is the outlet/return** back to the outdoor furnace.
- It is best to install a heat exchanger that fits the plenum.
- If the plenum is larger than the heat exchanger, it should be mounted in the center **without** gaps on the sides that would allow air to flow around the heat exchanger. All air must be directed through the face of the exchanger. Air flow deflectors need to be installed in the plenum on the outlet side of the heat exchanger if air flow is funneled into the heat exchanger.
- Be sure to consider the airflow through the ductwork so air circulation is not blocked off to parts of the building.
- Adding a heat exchanger coil in the hot air plenum or ductwork of the existing furnace may decrease the air flow in the system. The existing heat emitter(s) (gas or electric) should be operated before adding the heat exchanger.
- The air temperature rise should be measured with the heat emitter(s) running for an adequate amount of time to get a stabilized temperature reading. The heat exchanger can then be installed in the system. The existing heat emitter(s) should be operated again and the air flow should be adjusted to maintain the same temperature reading. The air flow may have to be increased to accomplish this.
- On a belt-drive system, the blower pulley and/or motor pulley may be changed; however, the electrical current flowing through the motor must not be changed to exceed the nameplate rating. A larger blower motor may be used. On a direct-drive system, in most cases the blower motor will not need to be replaced; however, the speed of the blower motor may have to be increased.

CAUTION

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

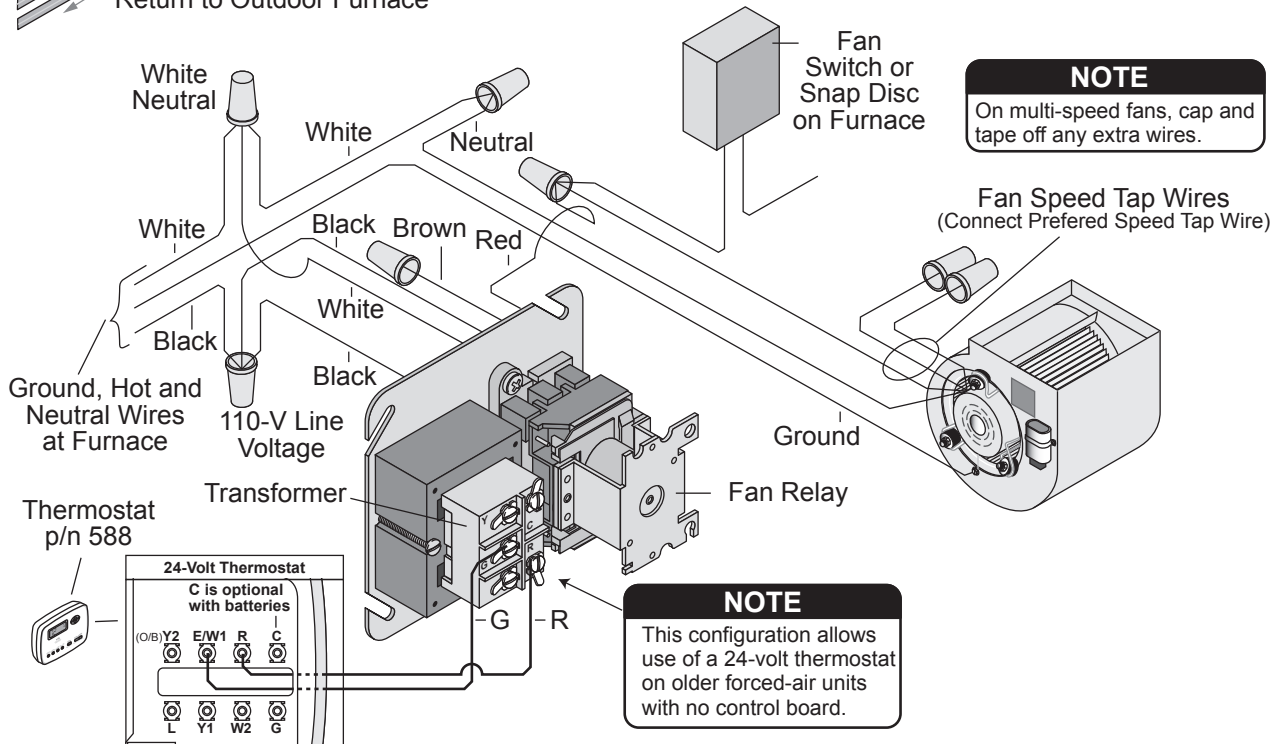
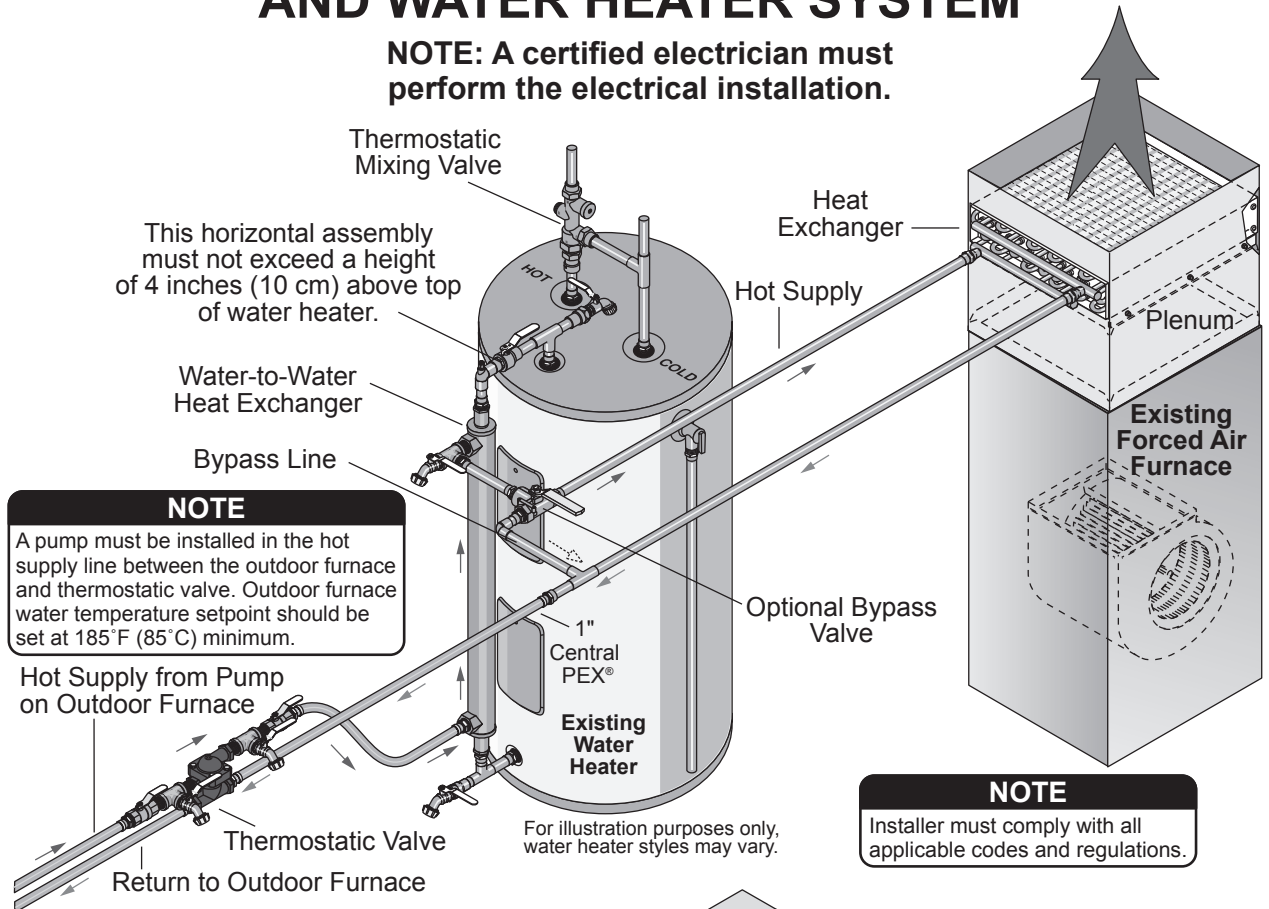
NOTE: Any electrical installation should be done by a certified electrician in accordance with all applicable codes.

- Due to the internal circuitry of some thermostats, a snap disc temperature control may have to be installed on the heat exchanger manifold to provide an interlock for the air conditioner. This prevents the air conditioner from operating when the water temperature is higher than 140°F (60°C).

Fig. 32

WATER-TO-AIR HEAT EXCHANGER AND WATER HEATER SYSTEM

NOTE: A certified electrician must perform the electrical installation.

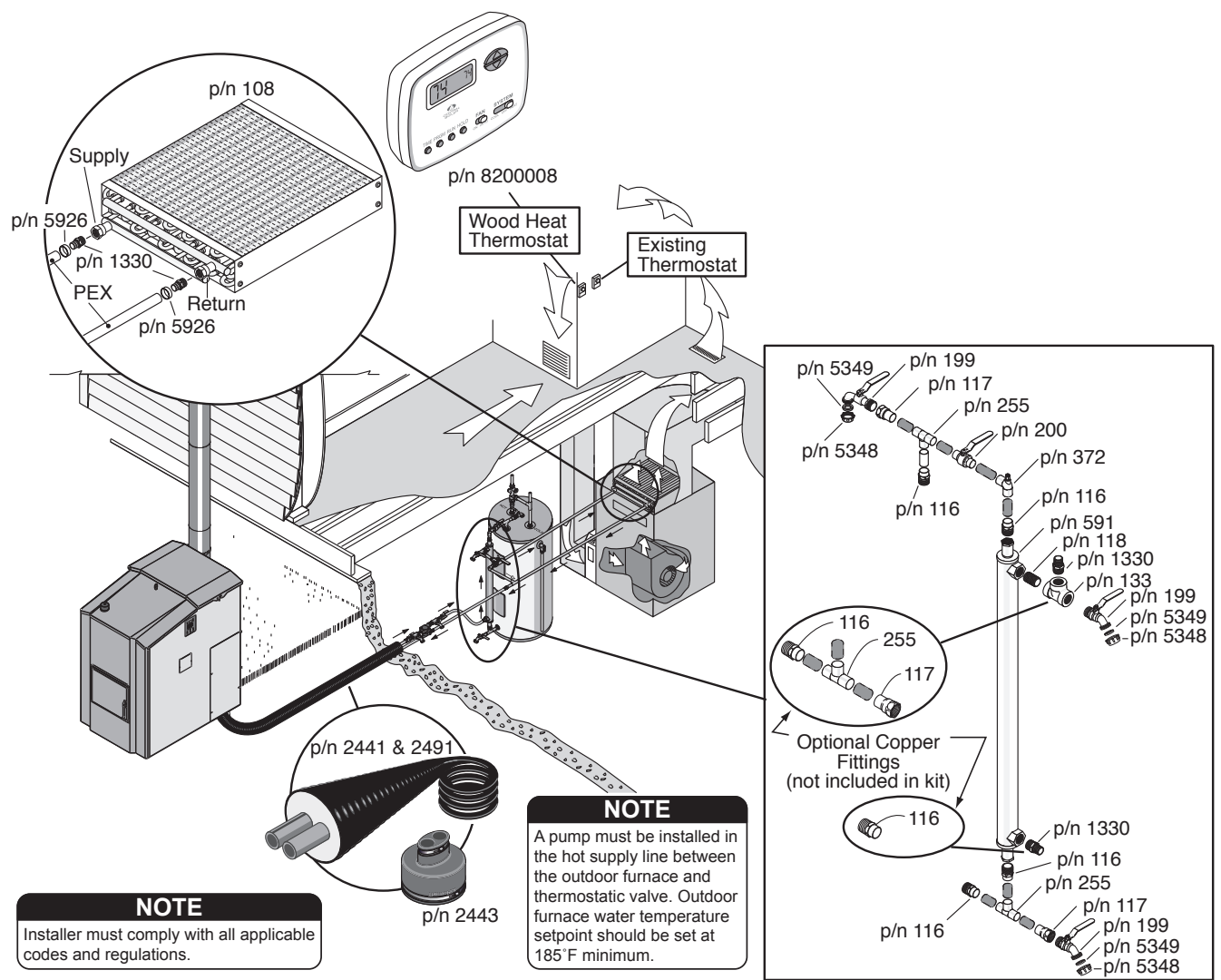


For illustration purposes only.

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Fig. 33

Forced Air Heating and Water Heater System



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Thermostatic Controls

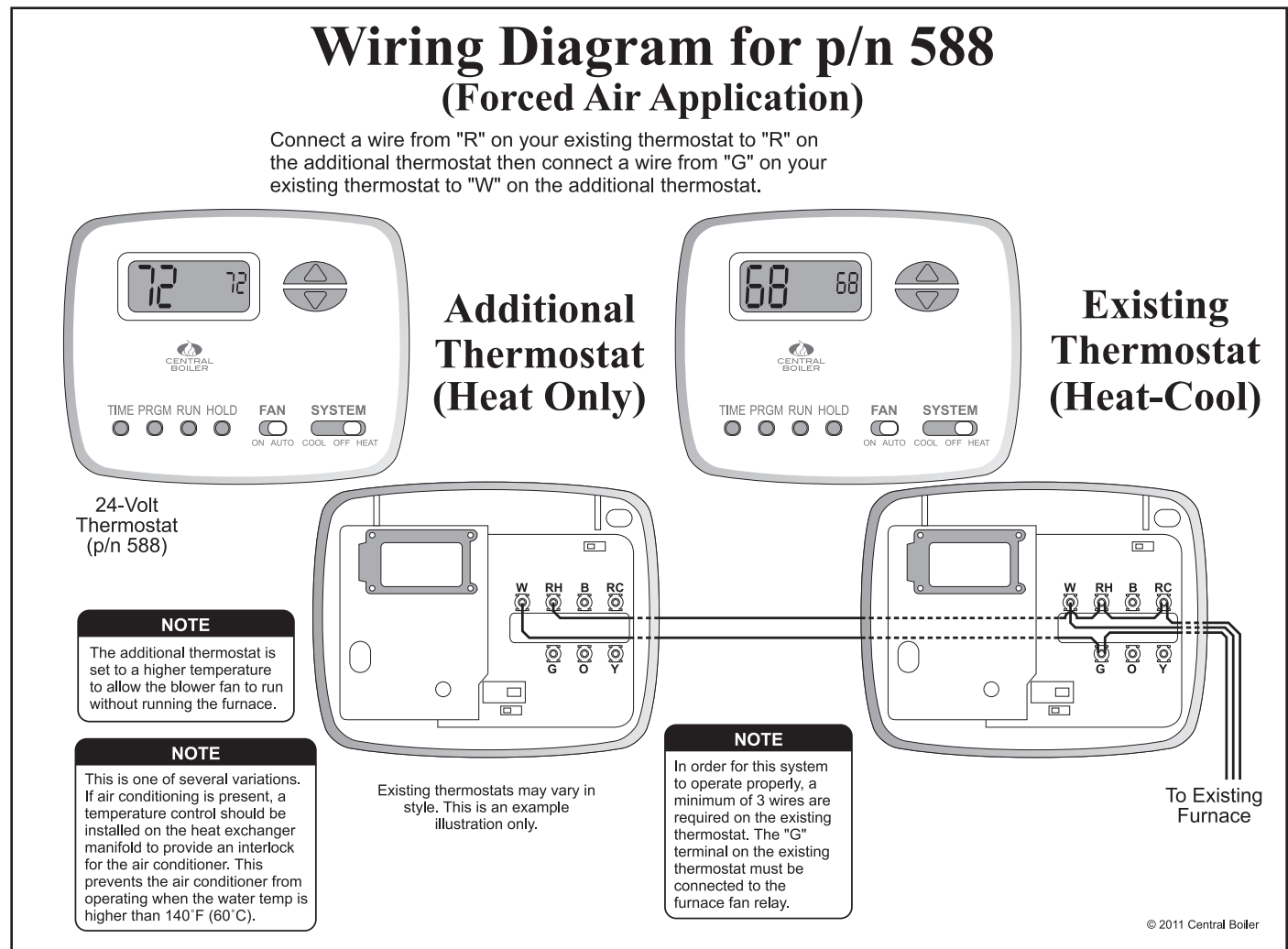
There are several methods for installing thermostatic controls for this type of installation.

1. If the forced air furnace has connections for control of the blower from a thermostat or switch, the simplest method is to add a second 24-volt thermostat. Wire the thermostat to the forced air furnace so that upon a call for heat, the thermostat closes the connection between power (usually 'R' or red) and the fan terminal (usually 'G' or green). By setting the new thermostat to the desired room temperature, it will control when the blower operates, drawing heat from the outdoor furnace. The existing thermostat should be set a few degrees below the new thermostat. This setting will be the temperature at which the existing forced air heating system will operate if the outdoor furnace is out of fuel. Refer to Fig. 34 for one possible arrangement.

2. An alternative method is to install a line voltage thermostat to control the blower on the forced air furnace. In this installation, a 120-volt wire is run from the thermostat to the forced air furnace. One wire is connected to the hot (line feed) and the other wire is connected to the forced air furnace blower wire. A low water temperature switch may be installed to shut off the blower if the temperature of the water is too low. The switch is connected in series to the wire coming from the line voltage thermostat and must be installed so that it does not affect the forced air system thermostat.

NOTE: If the low water temperature switch is not installed, the fan will run continuously even when the outdoor furnace is out of fuel. This will keep the water in the outdoor furnace approximately the same temperature as the air in the house (to prevent the water in the outdoor furnace from freezing). This will also work with the thermostatic valve installed.

Fig. 34



HEATING MULTIPLE ZONES OR BUILDINGS

A single pump and manifold may be used to heat more than one zone as long as the return water can be maintained above 150°F (66°C). If the return water temperature can not be maintained above 150°F (66°C), then a separate pump should be used for each zone. A thermostatic bypass valve must be installed to ensure that the water temperature in the outdoor furnace is maintained above 150°F (66°C).

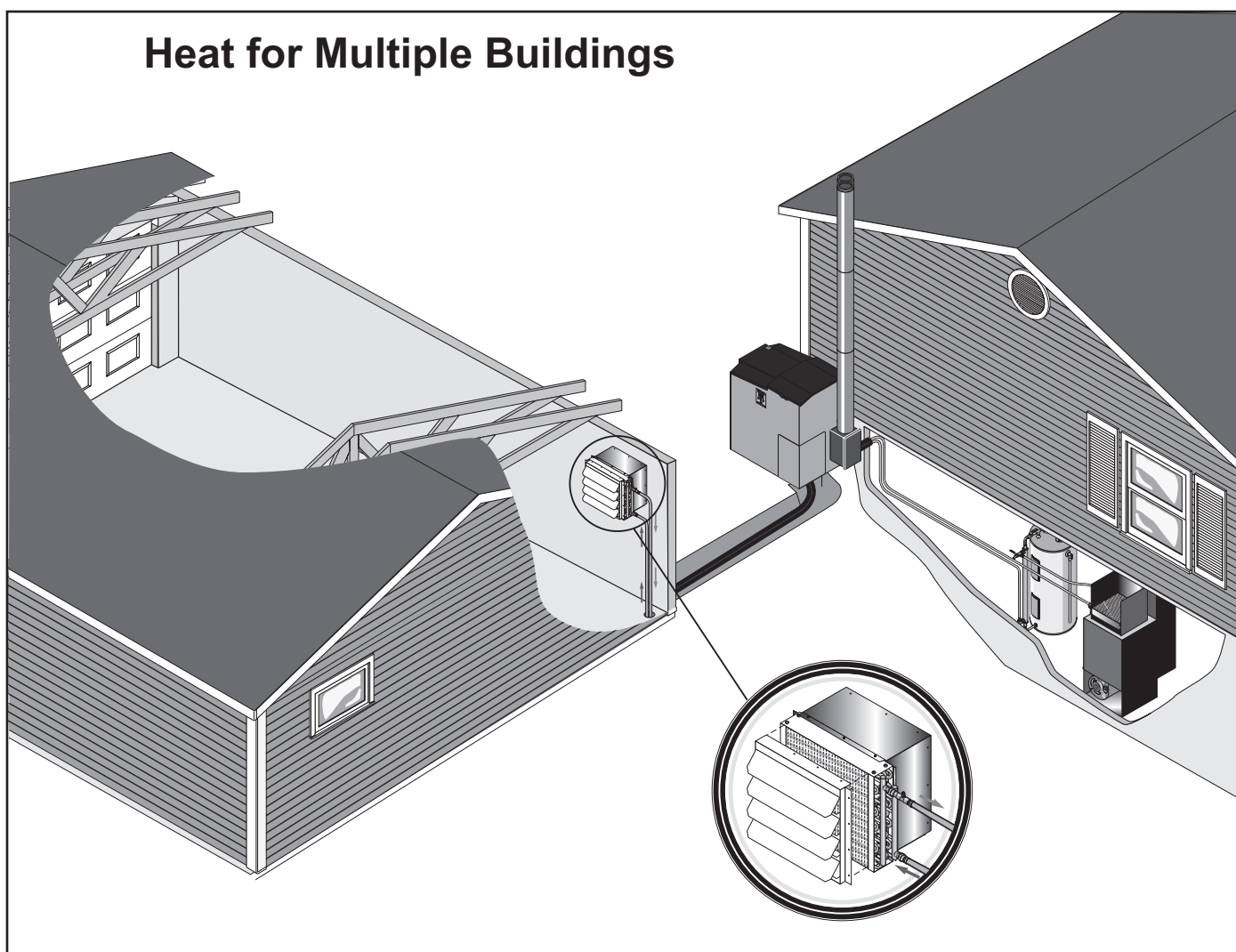
If a manifold is used, a swing check valve (p/n 296) should be installed in the line at the outlet of the pump. The swing check valve must be installed in a vertical position with the direction of flow as designated by the arrow on the swing check valve. This will prevent reverse circulation and loss of heat on multiple zones if one pump fails. Hose bibs (p/n 199) should be installed on each supply and return manifold to allow for purging air from the zones.

The Maxim offers two sets of outlets (for up to two zones or buildings without the need for manifolds) for mounting up to two pumps. Fig. 35 illustrates one possible configuration.

NOTE: If the outdoor furnace is unable to maintain a water temperature of 150°F (66°C) or higher, inspect the thermostatic valve and replace if necessary.

NOTE: A properly-sized backup furnace or boiler should be configured to provide heat if the outdoor furnace is out of fuel or the heat load exceeds the capacity of the outdoor furnace.

Fig. 35



HYDRONIC INSTALLATIONS

NOTE: It is recommended that the circulation pump in all hydronic systems be located in the hot supply line, not in the return line (see Fig. 36 and 37).

Evaluate the existing hot water heating system before starting the installation. If the existing hot water heating system has been unable to maintain the temperatures in the home at any time during cold weather before installing the outdoor furnace, then the hot water heating system is not adequate. More baseboard or other type of heat exchanger must be added.

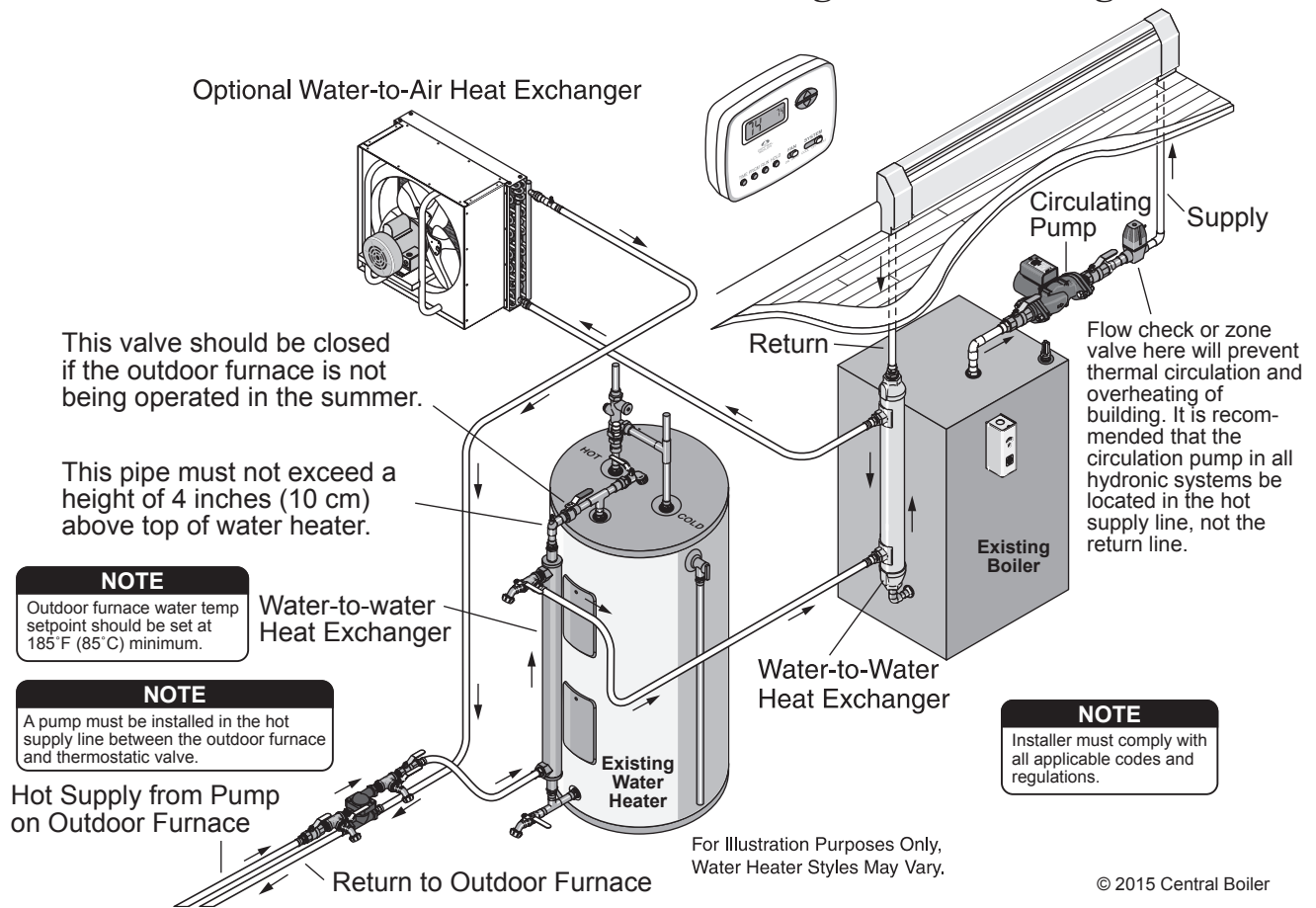
If a water-to-water heat exchanger is to be used with an existing heating system, the existing heating system must be able to adequately heat the building with a water temperature of approximately 165°F (74°C). Some existing finned tube baseboard hot water heating systems are designed to operate with water temperatures up to 220°F (104°C) or higher.

If the existing heating system is marginal or designed to operate with water temperatures above 165°F (74°C), there are alternative installation procedures that will make the existing system work very well with the outdoor furnace. These include:

1. Add more finned tube water baseboard heaters or panel radiators.
2. A water-to-air heat exchanger with a thermostatically controlled fan can be installed in the lower part of the building being heated (Fig. 36). This can increase the amount of heat added to the building, helping to maintain a constant temperature. This heat exchanger can be added in the return line of the system after the water-to-water heat exchanger.
3. An additional radiant heating circuit can be added to heat areas that require additional heat.

Fig. 36

Water-to-Water Shell & Tube Exchanger with Existing Boiler



Pressurized Water System Installations Water-to-Water Heat Transfer System

To keep the existing system pressurized, a plate exchanger or tube & shell water-to-water heat exchanger installed in the return line of the existing system may be used (see Fig. 37 and 38). The water from the existing system passes through the heat exchanger when the thermostat calls for heat. The water from the outdoor furnace circulates through the other side of the heat exchanger continuously.

It may be necessary to lower the water temperature at which the burner in the existing boiler starts to a setting that prevents the burner in the existing boiler from cycling on when the outdoor furnace is heating the home. Another option is to install a thermostatically controlled interlock switch that prevents the burner in the existing boiler from operating when the water temperature in the outdoor furnace is above 150°F (66°C).

Water-to-water heat exchangers will produce transfer temperatures approximately 20°F (11°C) less than the outdoor furnace water temperature; therefore if the outdoor furnace water temperature is 185°F (85°C), it will produce approximately 165°F (74°C) of water temperature transfer. The temperature controller on the outdoor furnace may be adjusted to allow the outdoor furnace to reach water temperatures up to 195°F (91°C). Each system will vary in water temperature transfer depending upon the heat load of the existing heating system.

Fig. 37

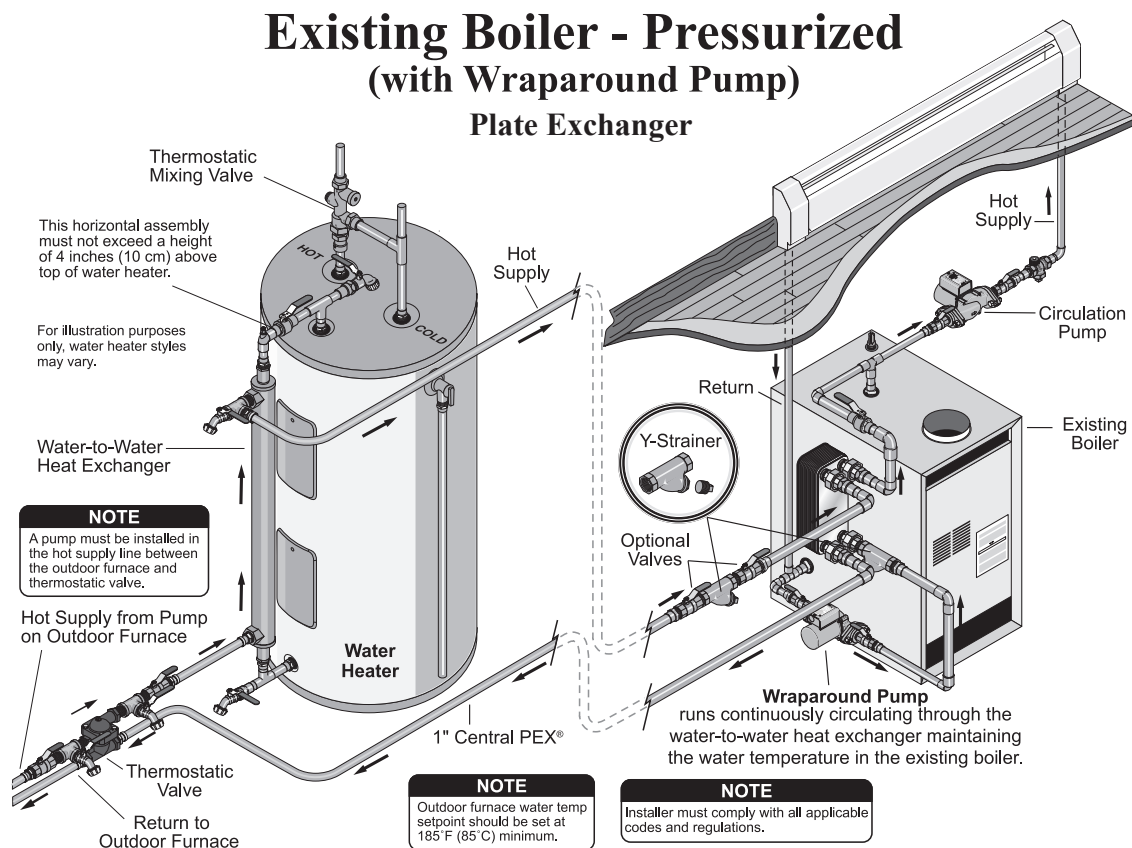
The addition of a wraparound pump with a water-to-water heat exchanger (see Fig. 37) may increase heat transfer by allowing circulation continuously through the existing boiler and heat exchanger. This will maintain the maximum temperature in the heat exchanger for heat transfer to the existing boiler. Note the water flows in opposite directions through the heat exchanger.

With this type of installation, the exchange temperature may be more than 165°F (74°C) and may eliminate the need for additional baseboard heaters, panel radiators or heat exchangers.

When installing water-to-water heat exchangers, be sure to flush any rust particles or sediments out of the existing boiler and install a Y-strainer as illustrated in Fig. 37. Also be sure to add Corrosion Inhibitor Plus™ (p/n 1650).

A Taco 007 or 014 pump can be used as a wraparound pump when a plate exchanger is installed. A Taco 009 or 014 pump should be used when a shell and tube heat exchanger (i.e., p/n 148, 151 or 177) is installed.

NOTE: See the Hydronic Component Selection Guide (p/n 2482) for more detailed information.



Vented System Installation

The Maxim may be connected directly into an existing hot water system, changing it to an atmospheric vented system.

NOTE: Any changes in the existing boiler and/or system should be done by a certified installer in accordance with applicable codes. Be sure the system water is properly maintained with Corrosion Inhibitor Plus™ (see Water Quality and Maintenance section).

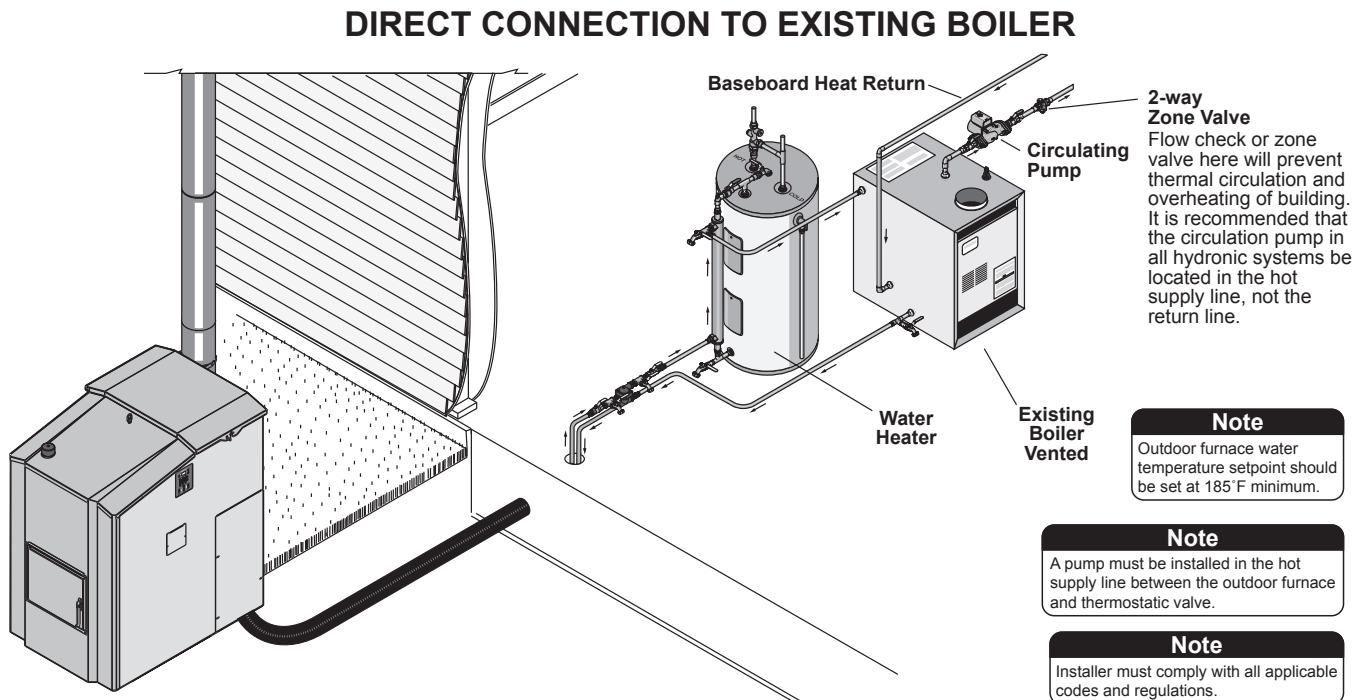
The hot supply line from the outdoor furnace can be connected into the top of the existing boiler and returned to the outdoor furnace from the bottom of the boiler (see Fig. 38). Use one pump to continuously circulate the water from the outdoor furnace through the existing boiler and back to the outdoor furnace.

CAUTION

The outdoor furnace must NEVER be pressurized. The vent cap must always be loose. Do not extend the vent pipe. The outdoor furnace will be damaged if it is pressurized.

When the existing system is connected to the outdoor furnace as illustrated in Fig. 38, the circulating pump(s) in the existing system must be located in the hot supply line(s), **not** in the return line(s). A flow check or zone valve will prevent thermal circulation and overheating of building.

Fig. 38



It is very important to eliminate all air and water leaks (valve packings, bleeders, etc.) and purge all air from the existing system.

1. **After filling the outdoor furnace** (see Initial Start-Up Procedures section) and existing system with water, purge the air from the indoor system **by closing the valves on the outdoor furnace**; then pressurize the indoor system with water from the domestic water line.

CAUTION

Do not apply more pressure to the indoor system than the pressure relief valve on the existing boiler is rated for.

2. Bleed air from the pressurized indoor system; then operate the circulating pump(s) on the indoor system. Perform this procedure twice. If any auto float vents are used in the existing system, they must be capped off tightly after the air bleeding is completed. This eliminates the possibility of allowing air to enter after the system is depressurized.
3. When the indoor system is completely purged of air, close the valve on the water line used to pressurize the indoor system. If any air is trapped in the system, it can reduce water flow. This will prevent the system from heating properly.
4. Open valves on the outdoor furnace, turn on the pump and proceed to start the fire in the outdoor furnace.

Direct Circulation Baseboard Installation

Baseboard heaters, as either the main source of heat or as supplements to forced-air or boiler applications are easily plumbed into the water lines from the outdoor furnace.

Refer to Fig. 39 and 40 for proper plumbing methods.

Fig. 39

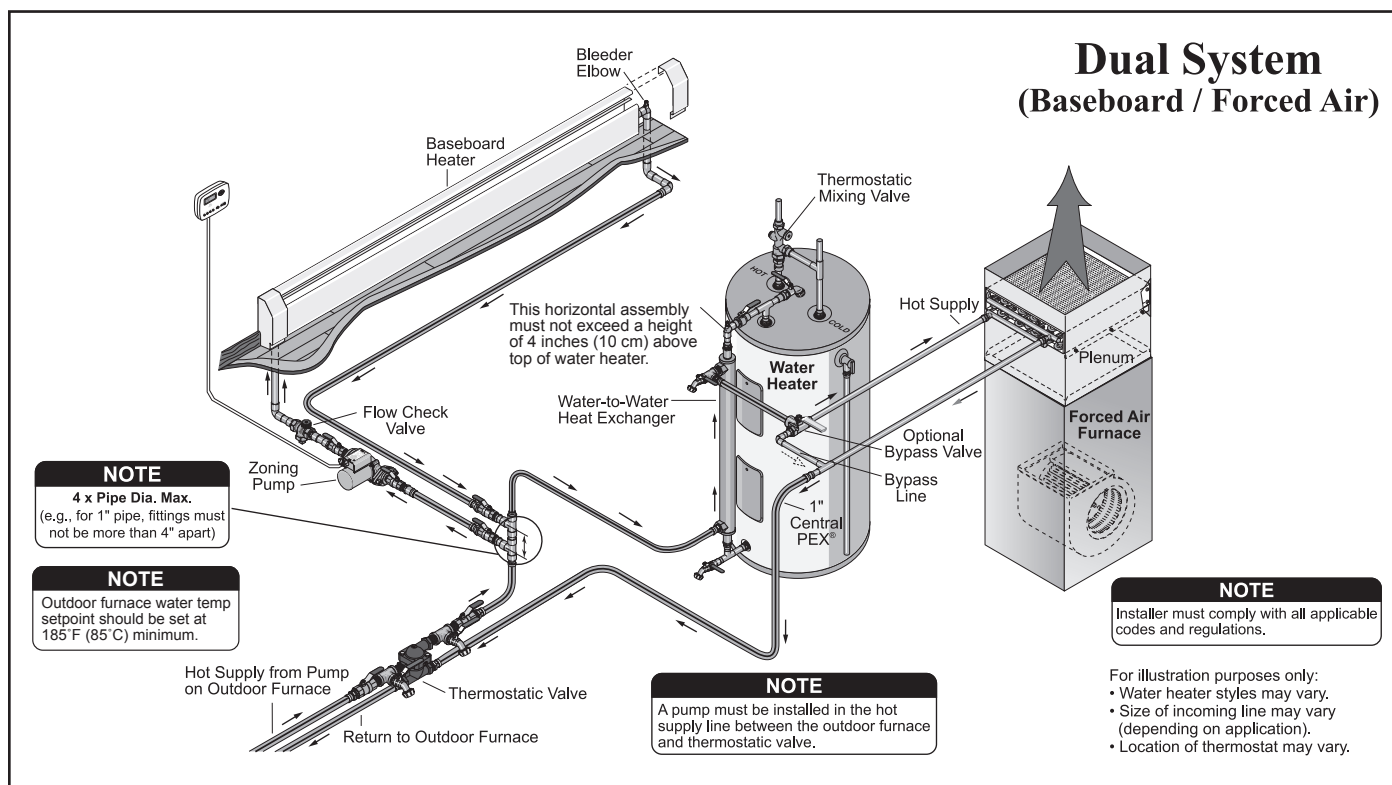
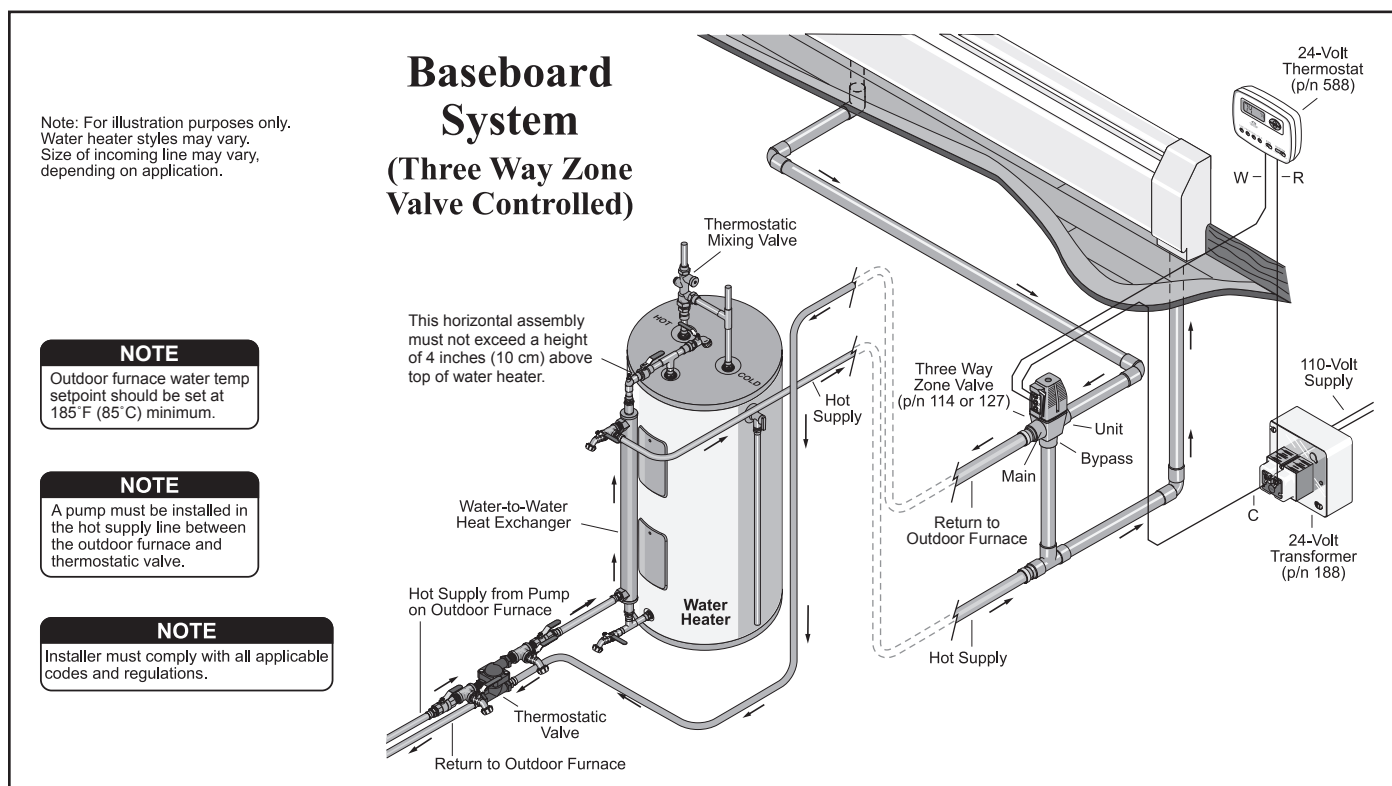


Fig. 40



Radiant Floor System Installations

Radiant heat can be a great option for new construction or for adding to an existing home if the floor joists are exposed (as in an unfinished basement). Piping may be installed in a wide variety of configurations and locations including, but not limited to, the following:

- In a concrete slab
- Within the subfloor system (e.g., Gyp-Crete®)
- Within the floor joist system
- Within the walls or ceilings

Carefully consider each of the following before beginning construction and installation:

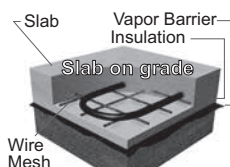
1. When installing piping between floor joists (16" or 41 cm on center) run two 1/2" pipes between each joist. Insulate below the piping to prevent excessive heat in the lower level.
2. Proper insulation is key to effective radiant heating and controlling large heat demands. Heat from this type of system radiates equally in all directions. As an example, if piping is installed in a slab, the ground below the slab must be dry and well-insulated. If not properly insulated, nearly 50% of the heat will be wasted warming the ground below the slab. Two inches (5 cm) of blueboard insulation is recommended. Two 1" (2.5 cm) layers of blueboard can be used. This allows lapping of the joints in the 4' x 8' (122 x 244 cm) sheets.

NOTE: Do not use beadboard (expanded polystyrene), bubble foil or roll-out foam insulation.

NOTE: A minimum of one inch (2.5 cm) of insulation should be used. Two inches (5 cm) of insulation with vapor barrier below the insulation is recommended.

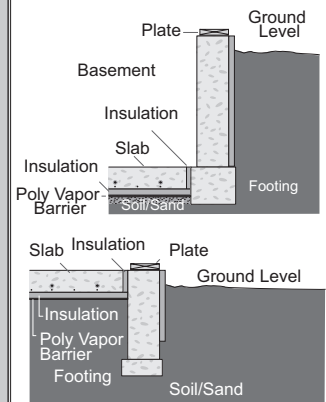
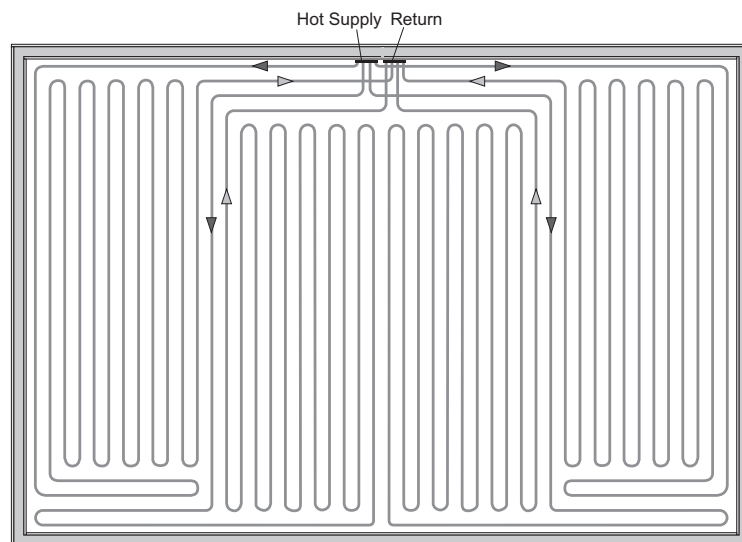
Fig. 41

NOTE: If the temperature of the concrete slab is below freezing (32°F), there must be adequate antifreeze in the system, or the slab must be pre-heated, before water is circulated through the radiant slab system.



2" Blueboard Styrofoam® is recommended (minimum of 1" Blueboard Styrofoam®).

Radiant Floor Heat (For Slab on Grade or Basement)



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3. Areas with high water tables need to be prepared properly to prevent contact between the ground water and insulation.

NOTE: For examples of radiant heating systems using 1/2" piping in the loops, refer to Fig. 42 through Fig. 45.

4. The spacing of each circuit is 12" (30.5 cm) between pipes. The water circulates in opposite directions to provide an even distribution of heat. The mixing valve regulates the temperature of the water circulating through the loops by mixing return water with the hot supply water. In applications where high heat loss is expected, loop spacing may be reduced to 10" (25 cm) or less. If additional information is desired, contact your dealer.

NOTE: The longer the loop length, the lower the flow rate and the lower the heating capacity. Loop lengths greater than 350 feet (107 m) are not recommended.

NOTE: The temperature of the water used in radiant heating should be determined by the installer in accordance with the application.

5. It is not uncommon that it can be very difficult to get a concrete slab up to temperature in late fall or early winter in a new building that is not completely sealed and not well insulated. Once the building is completely sealed and well insulated, bringing the slab up to temperature can still take a considerable amount of time and fuel; however, once warm, fuel consumption will be reduced if the concrete slab and building are insulated properly.

NOTE: For zone installations, refer to Fig. 42 (multi-zone) or Fig. 44 (single zone).

Fig. 42

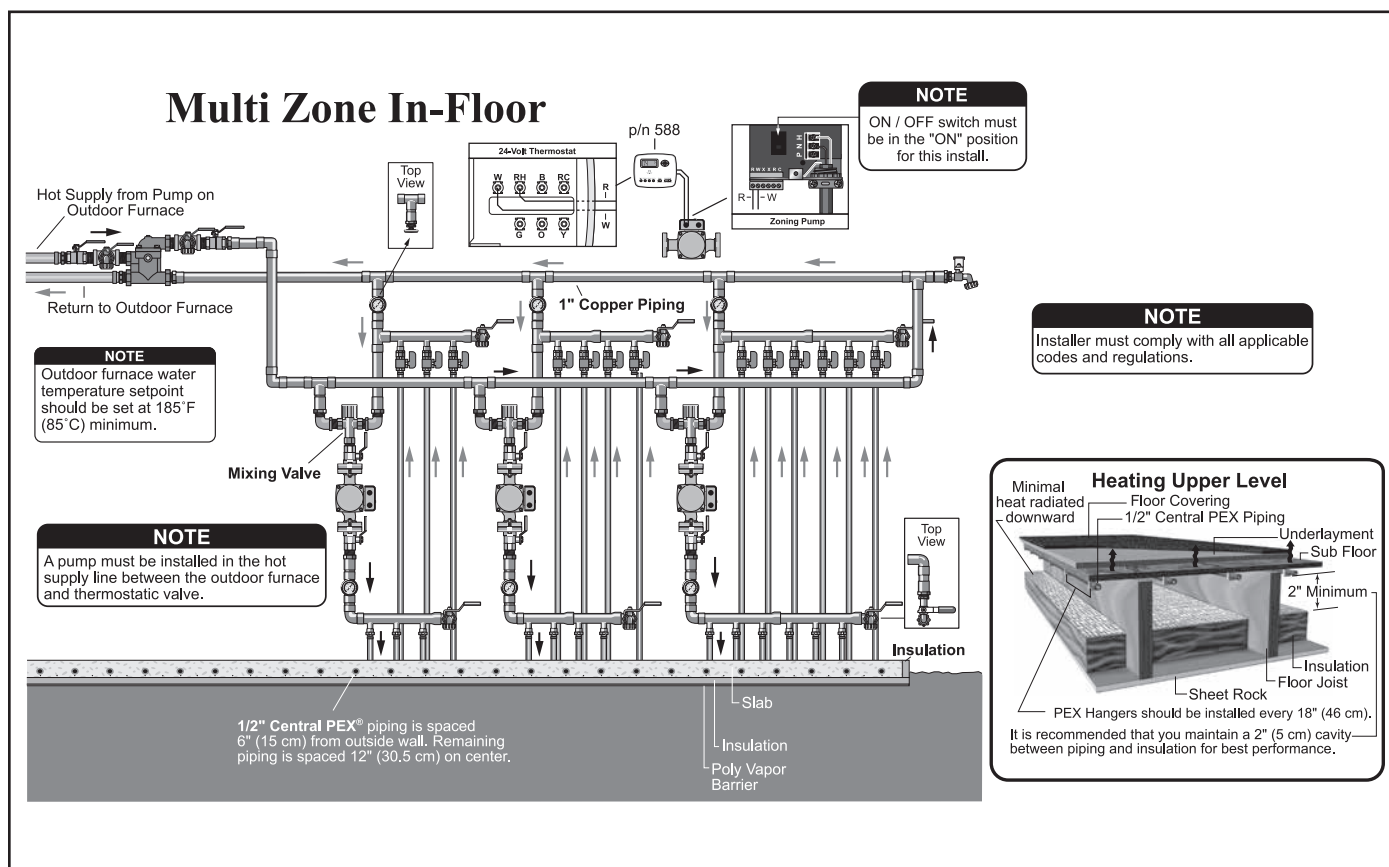


Fig. 43

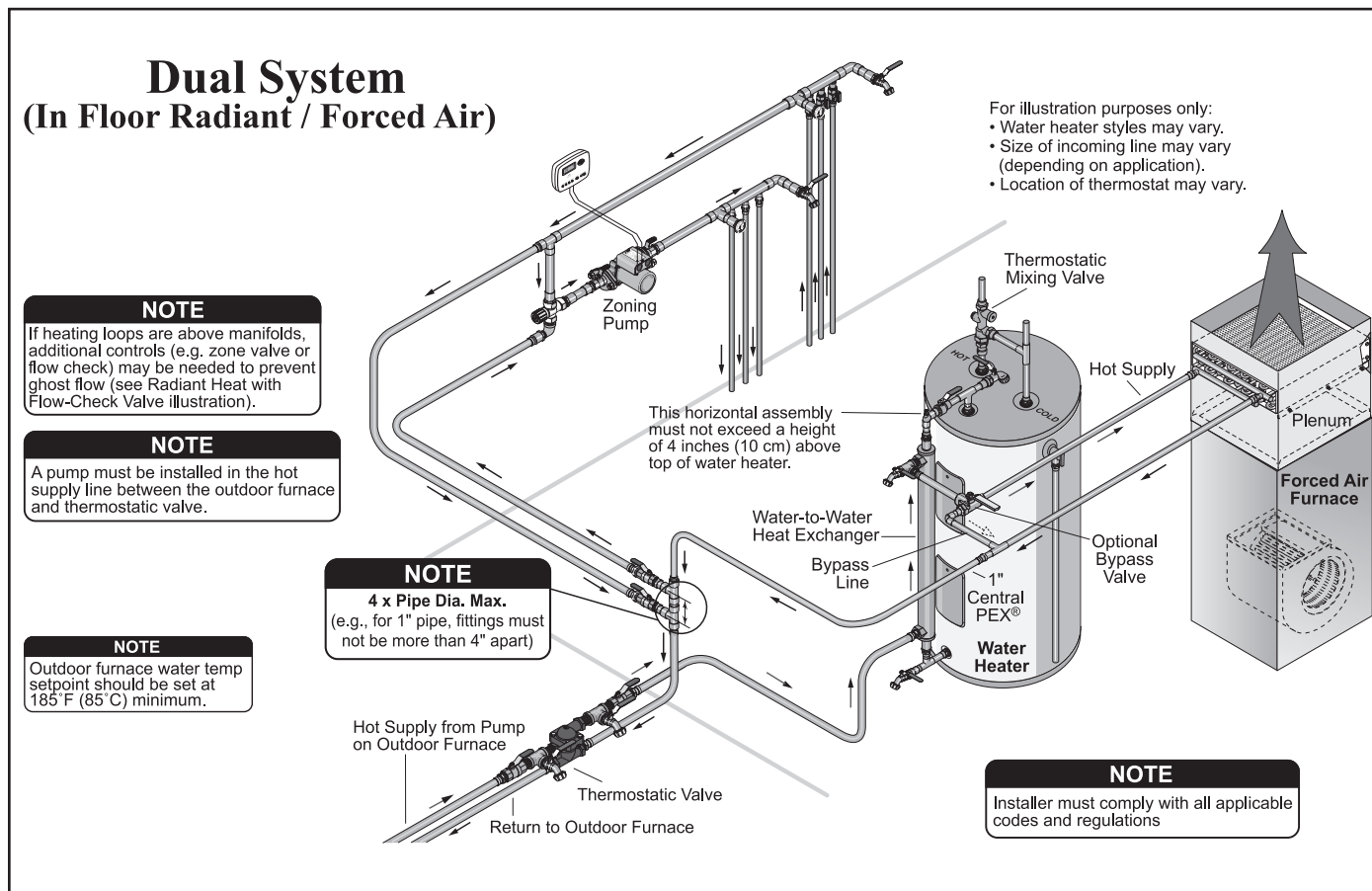


Fig. 44

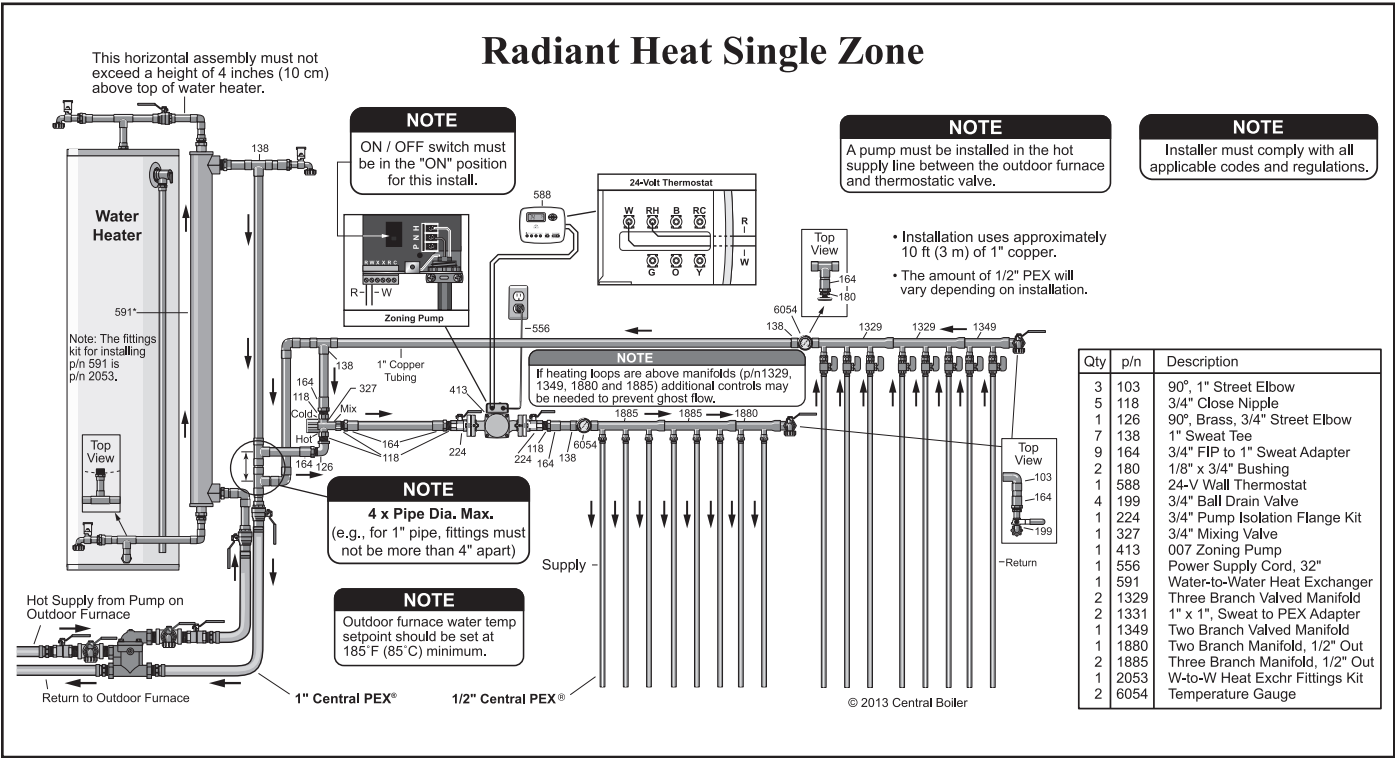
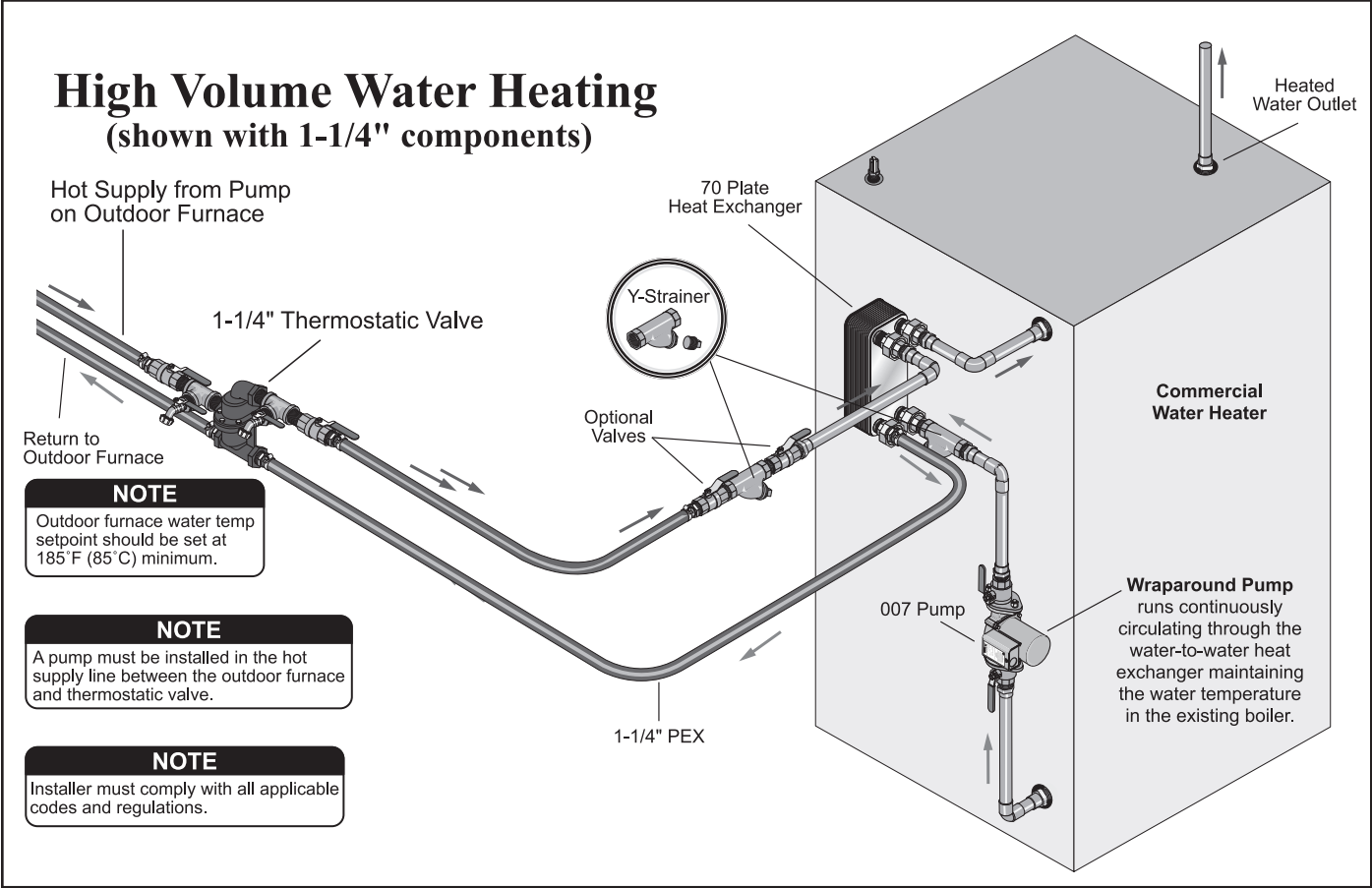


Fig. 45



Pool and/or Hot Tub Heating

Valves should be installed so the heat exchanger can be isolated and bypassed when shock-treating or adding chemicals to a pool or hot tub (Fig. 46). Incorrect chemical concentrations can cause rapid corrosion to the heat exchanger. Bypassing the heat exchanger is recommended until the pH has stabilized between 7.2 and 7.8.

If the swimming pool or hot tub is salt water treated, the heat exchanger should be a shell and tube type (p/n 148, 151 or 177). See the Hydronic Component Selection Guide (p/n 2482) for more detailed information.

CAUTION

Do not install a swimming pool heat exchanger inside a home or building below the level of the pool as a damaged heat exchanger may result in extensive flooding and draining of the pool.

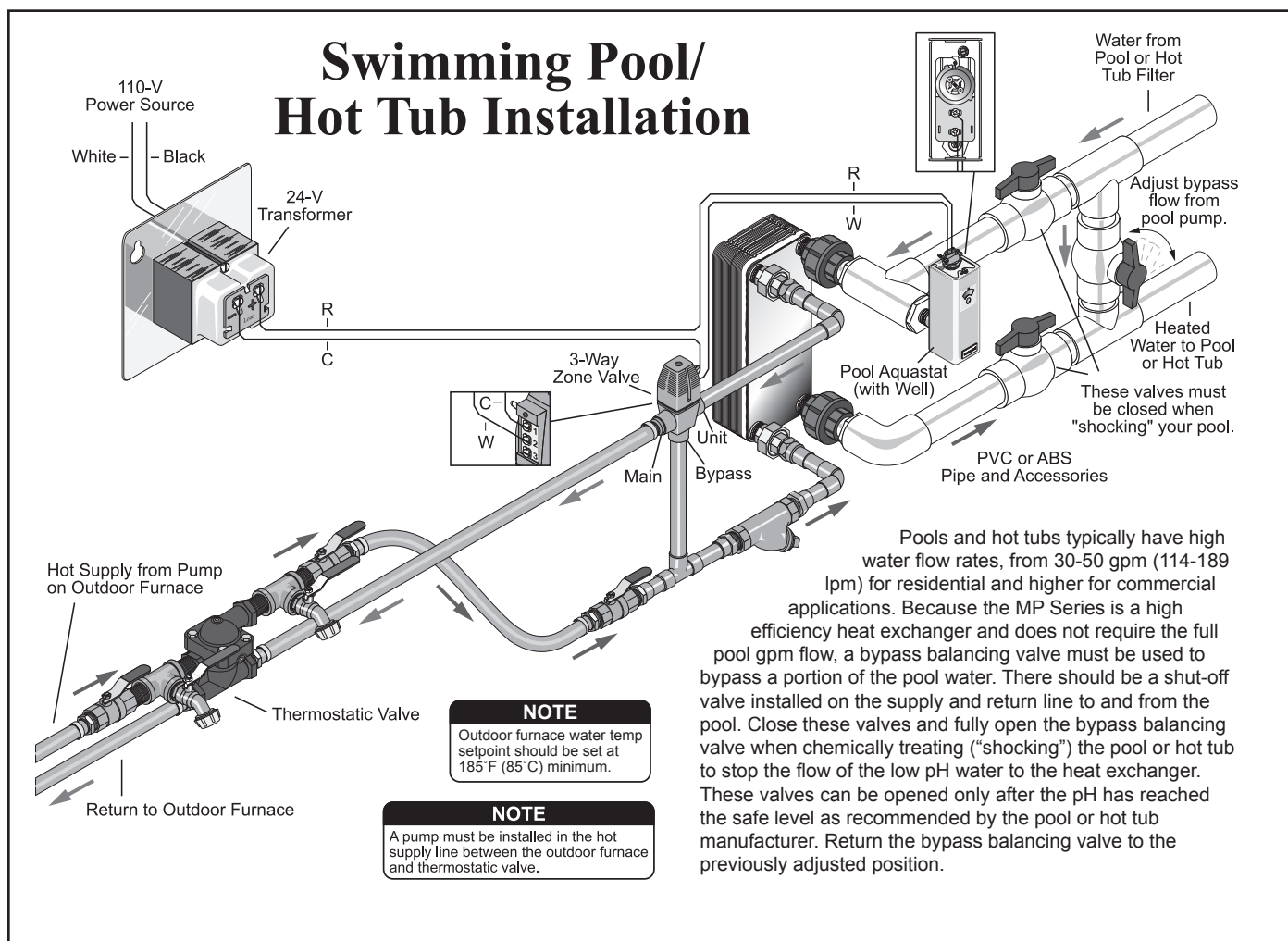
WARNING

Do not use automotive or ethylene glycol antifreeze in an outdoor furnace connected to a swimming pool heat exchanger as a damaged heat exchanger may cause severe personal injury, death, or substantial property damage.

CAUTION

Do not operate the outdoor furnace frequently or for extended periods of time with the water temperature below 150°F (65°C) as this will result in more condensation in the firebox that can lead to corrosion.

Fig. 46



SECTION 7 – FILLING SYSTEM WITH WATER AND PURGING AIR

Before firing the outdoor furnace for the first time, perform the following important steps:


1. **Check for leaks.** Close the valves on the outdoor furnace before checking for leaks. Do not pressurize the outdoor furnace. Pressure-test the entire plumbing system. Apply 50 psi (3.5 kg/cm²) of air pressure for thirty minutes and closely monitor for any pressure loss. Inspect all fittings and hose ends for any signs of leakage using leak detection solution (leak soap); repair as necessary.
2. **Cover Supply and Return Lines.** Backfill the trench for the supply and return lines. Enclose the area where the supply and return lines enter the outdoor furnace. Do not leave the PEX hot supply and return lines exposed to sunlight as exposure to UV rays will damage them.
3. **Add Corrosion Inhibitor Plus™.** Add Corrosion Inhibitor Plus™ (p/n 1650) through the vent pipe on the outdoor furnace before filling with water to immediately begin to protect the steel. Refer to Water Quality and Maintenance.
4. **Turn the FireStar controller on** by pressing the **Power**  button. The LED display should flash **LD** to indicate that the water level is below the sensor.
5. **Fill with water, purge air from system and verify flow direction of the water.** See Filling Outdoor Furnace with Water and Purging Air for details.
6. Install the vent cap. The vent cap must fit loosely over the outdoor furnace vent.

Fig. 47

FILLING OUTDOOR FURNACE WITH WATER AND PURGING AIR

NOTE: The items referred to in this procedure correspond to the items in Fig. 47. Refer to Fig. 47 when performing these steps.

All air must be purged from the water lines when filling the system. Also, the circulation pump(s) must be installed in the hot supply line(s).

NOTE: If using the valve on the water heater to fill the outdoor furnace, flush the water heater to remove all sediment before filling the outdoor furnace.

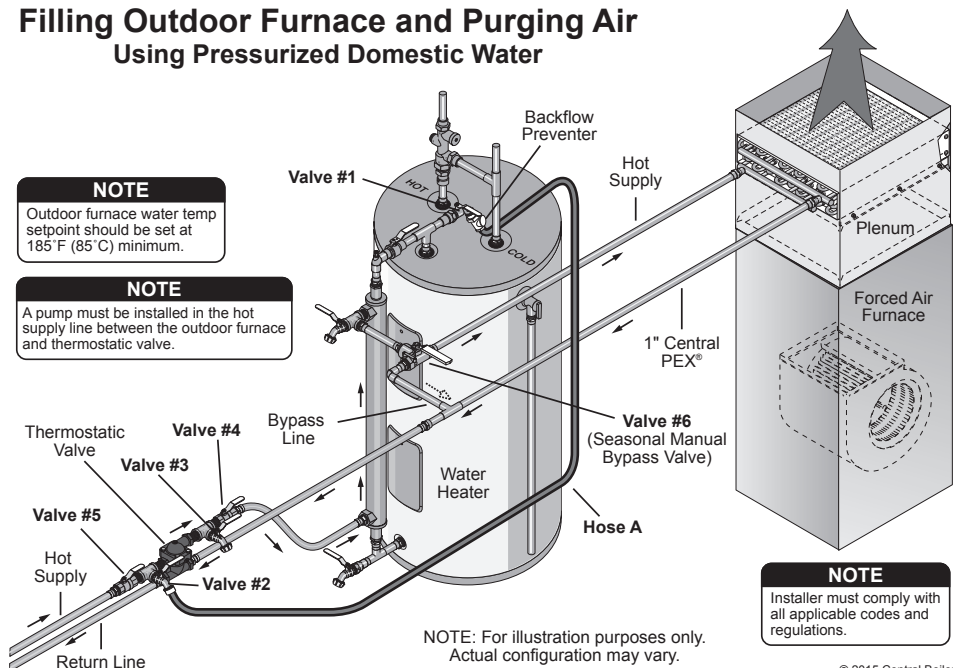
NOTE: If the outdoor furnace is being filled with water when the temperature is below freezing, circulate the water immediately after filling to prevent freezing the water lines.

NOTE: Be sure to fill the outdoor furnace with water of good quality (softened water, if possible). See Water Quality and Maintenance section.

Use the procedure in this section to fill the outdoor furnace with water and purge the air from the system. All valves in the outdoor furnace system that allow circulation through each circuit should be open before starting. Perform this procedure on each pump circuit from the outdoor furnace.

NOTE: Add Corrosion Inhibitor Plus™ (p/n 1650) through the 2-inch vent pipe on the outdoor furnace before filling with water to immediately begin to protect the steel.

Filling Outdoor Furnace and Purging Air Using Pressurized Domestic Water



1. Connect the male end of garden hose A to valve #1 using the backflow preventer and two 3/4" female hose x 3/4" male pipe adapters (p/n 4928). Connect the female end of the garden hose to valve #2.
2. Close the valves on the hot supply and return lines of the outdoor furnace.
3. Close valve #4 and valve #5.
4. Open valve #1 and valve #2. This step begins filling the system with domestic water and purging the hot supply line and thermostatic valve.
5. Remove cap from valve #3 and open valve #3 slightly to purge air from valve body. Close valve #3 when air is purged.
6. Open valve #5.
7. Open the valve on the hot supply line of the outdoor furnace for 5 minutes; then close the valve. Water will purge air from the hot supply line. The valve and attached fittings on the outdoor furnace will become cold as water starts filling into outdoor furnace.
8. Close valve #5, #1 and #2.
9. Move hose A from valve #2 to valve #3.
10. Open valves #1, #3 and #4.

NOTE: Skip to Step 12 if your system does not have a seasonal manual bypass valve (valve #6 shown in Fig. 35).

11. Valve #6 (seasonal manual bypass valve) should be positioned to direct water through the heat exchanger first.
12. Open the valve on the return line of the outdoor furnace.

NOTE: Skip to Step 14 if your system does not have a seasonal manual bypass valve (valve #6 shown in Fig. 35).

13. As soon as the valve on the return line of the outdoor furnace is opened, turn valve #6 to the bypass direction for 30 seconds; then turn valve #6 back to previous position.

NOTE: The heat exchanger manifold (lower manifold first) and fittings will become cold as water flows through the heat exchanger to the outdoor furnace.

14. Allow outdoor furnace to fill until the controller no longer indicates **LD**.
15. Close valves #1 and #3. Disconnect hose A and replace caps on valves #1, #2 and #3.
16. Open the valve on the hot supply line of the outdoor furnace and valve #5.

NOTE: The valves on the hot supply and return lines of the outdoor furnace, and valves #4 and #5 should all be open, allowing the pump to circulate heated water in the system. Start pump.

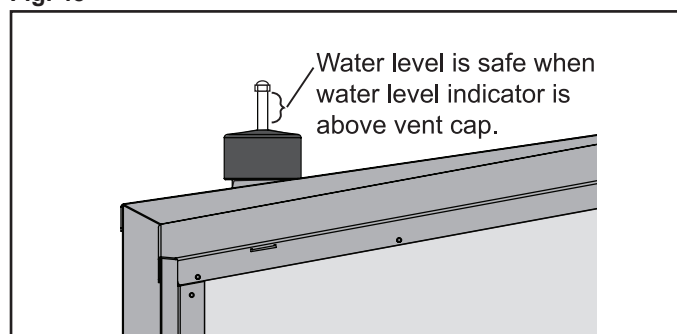
NOTE: If there are multiple circuits connected to the outdoor furnace, repeat the process for each circuit.

17. Refer to Firing the Outdoor Furnace to fire up the outdoor furnace.

CAUTION

Be sure the outdoor furnace is filled with water before firing. Water level is safe when the water level indicator rod is above the vent cap (Fig. 48). Corrosion Inhibitor Plus™ must be added before the initial fill (see Water Quality and Maintenance).

Fig. 48



18. Check the system for leaks again. Inspect all fittings and hose ends for any signs of leakage; repair as necessary. It may be possible to stop a very slow leak at a hose clamp by tightening the clamp after the system has warmed up and the poly becomes more pliable. It might also be necessary to install a second hose clamp with the screw positioned on the opposite side. Release the pressure upon completion of the test.

NOTE: It should not be necessary to add water to the outdoor furnace more frequently than once every twelve months. If it is more frequent, either there is a leak in the system or the outdoor furnace is boiling because of improper operation or maintenance (see Troubleshooting Section). Be sure to locate and repair the problem immediately. Frequently adding water can cause deterioration in the water jacket. Each time water is added, refer to Water Quality and Maintenance for water testing procedures. If indicated by test results, add Corrosion Inhibitor Plus™ as required. Deterioration due to improper operation and/or maintenance is not covered by warranty.

SECTION 8 – OPERATING INSTRUCTIONS

Fuel Quality and Storage

Wood pellets must be stored in a container or building that prevents rain or other moisture from contact with the fuel.

WARNING

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

- Use only premium quality wood pellets.
- If fans are used in the fuel storage area, they should be installed so as not to create negative pressures in the non-habitable building where the outdoor furnace is located.

CAUTION

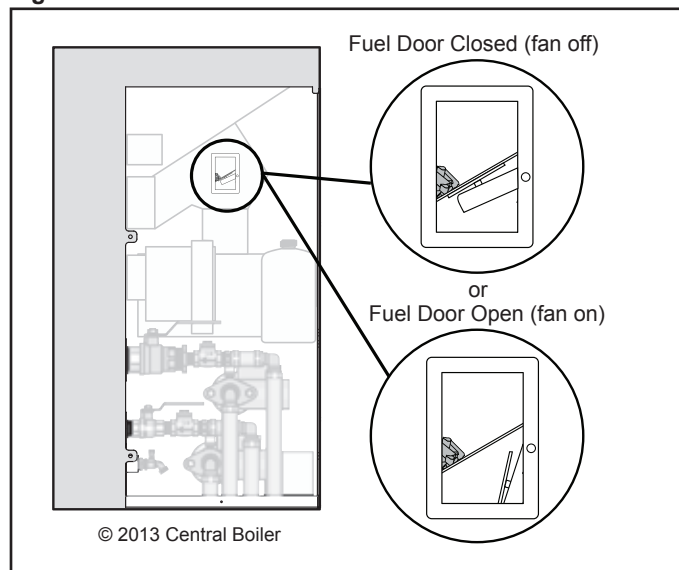
Do not burn plastic, garbage, treated wood or fuels not listed for this outdoor furnace.

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

NOTE: Wood pellets with a high sawdust content may cause a feed rate interruption. An interruption in fuel flow may result in an empty burn chamber, or if the blockage frees itself after the fire has gone out, a burn chamber full of unburned fuel.

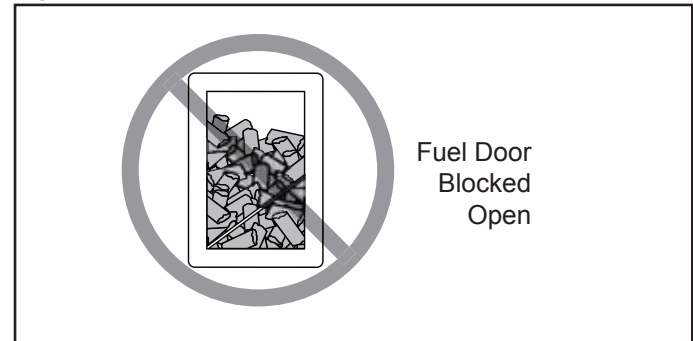
NOTE: Fuel must be flowing from the transfer auger to the burner auger when the burner auger is turning (see Fig. 49).

Fig. 49



NOTE: Fuel must not build up so that it prevents the fuel door from closing as shown in Fig. 50. This is an indication the burner auger is obstructed or has quit turning. If this condition exists, inspect the burner auger and clean or replace as necessary. If condition persists contact your Central Boiler dealer for more information.

Fig. 50



FireStar Controller

Refer to the FireStar Operation Manual for instructions on how to use the FireStar controller.

Operating Precautions

NOTE: If the controller is flashing **LD** the system senses a low water condition. This outdoor furnace is equipped with an automatic shut down system if the water level falls to an unsafe level. The water level in the outdoor furnace is safe when the water level indicator rod is above the vent cap (see Fig. 55).

1. Do not burn garbage, gasoline, rubber, engine oil, naphtha, plastics, treated wood, cord wood or combustibles other than the fuel specified.
2. Do not store combustibles within the installation clearances listed on the Important Precautionary Information page. Be sure to leave a safe amount of room for cleaning out ash without causing a fire hazard. **Keep the area around the outdoor furnace clear of combustible materials. Combustible debris may be easily ignited if embers spill out of the firebox.**
3. The outdoor furnace water jacket must not be allowed to pressurize. Inspect the vent cap periodically for any obstructions or restrictions. The vent cap must fit loosely over the vent (Fig. 51). Do not extend or connect anything to the vent pipe.

Fig. 51

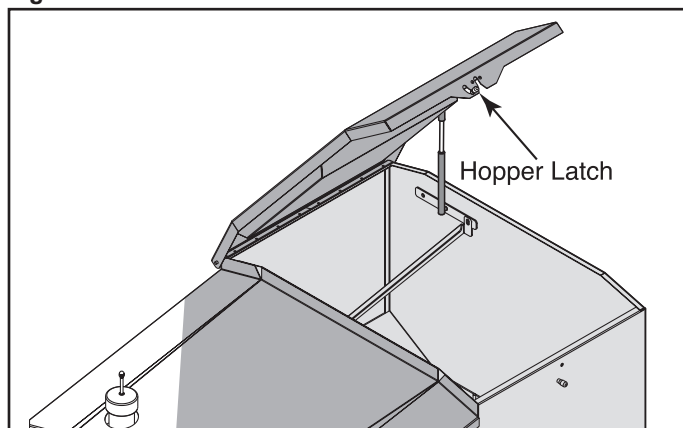


4. All cover plates, enclosures and guards must be secured at all times except during maintenance, inspection, and servicing.
5. In case of a power outage, a small generator can provide enough electricity to operate the system.
6. If any questions should arise that cannot be answered by the information in this manual, be sure to contact either your dealer or qualified installer.

Filling the Hopper

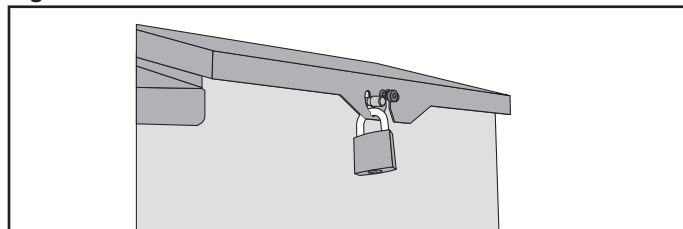
Open the hopper lid (Fig. 52) and add wood pellets. After filling, make sure the hopper lid is securely closed to prevent moisture from entering the hopper. Do not over-fill the hopper.

Fig. 52



NOTE: The hopper lid may be locked to prevent unauthorized access (Fig. 53).

Fig. 53



Smoke in Hopper

How air flows through the furnace is an important part of optimal operation. Smoke in the hopper is an indication that the air flow through the furnace is restricted, obstructed or different than it should be.

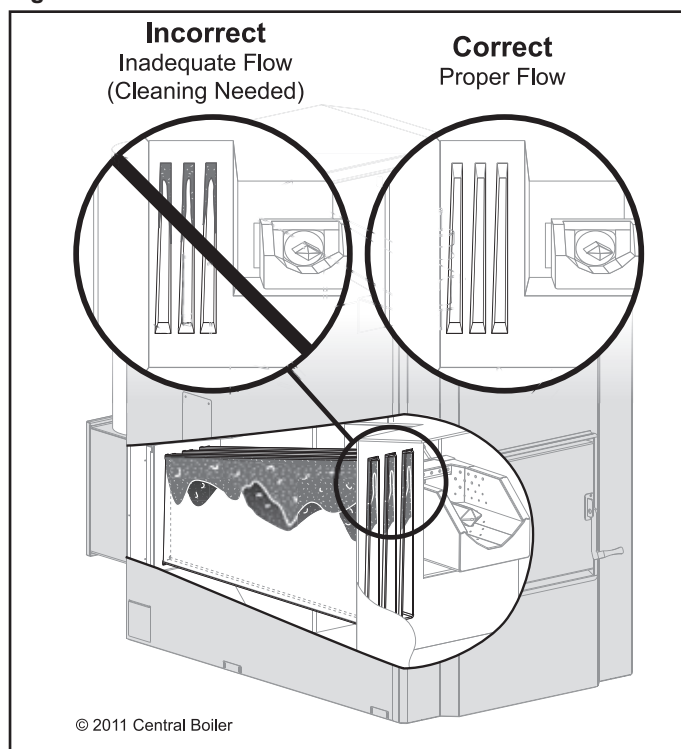
CAUTION

Operating for extended periods of time with air flow through the furnace restricted (i.e., smoke in the hopper) can damage components in the furnace.

If smoke in the hopper occurs, check the following:

- **Heat exchanger obstructed** - clean the heat exchanger (see Fig. 54).
- **Aerator covered by ash** - do not allow ash in the burn chamber to accumulate over the aerator. Use the cleaning rod to pull ash forward to ash collection area.
- **Carbon buildup** - inspect the burner auger where it enters the firebox for carbon buildup and clean if necessary.
- **Chimney is obstructed** - inspect the chimney and chimney connector and clean if dirty or obstructed. If a spark arrestor is installed, ensure it is not dirty or obstructed.
- **Chimney too short** - may need to increase the height of the chimney.

Fig. 54



SECTION 9 – ROUTINE MAINTENANCE

PREVENTIVE MAINTENANCE SCHEDULE

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

OPERATION	SERVICE INTERVAL						SEE SECTION
	Before first operation of season	Daily	Weekly	Monthly	Semi-Annually	Post Season	
Check water level.	●	●					9.1
Remove ash.			C			●	9.2
Inspect firebox and firebox ash area.	●			B		●	9.3
Inspect gaskets.	●				●		9.4
Inspect and clean heat exchanger, chimney transition.			C			●	9.5
Inspect and clean aerator and burn chamber.		A					9.6
Lubricate door and hopper lid hinge points.						●	9.7
Check thermal valve.				B			9.9
Test thermal valve.	●					●	9.10
Check gas pressure, electrode.	●						9.11
Check pH and nitrite levels of water.	●				D	●	E
Check that the outdoor furnace is level.					●		F
Check fuel door operation.			●				9.8

- A When the outdoor furnace is new, daily for the first week.
- B When new, after one month, then midway through the heating season, and in the spring.
- C Weekly until interval for your application can be determined.
- D When new, after three months, then every six months thereafter.
- E Refer to **Testing Treated Water in the Outdoor Furnace**.
- F Refer to **Leveling the Outdoor Furnace**.

CAUTION

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

ROUTINE MAINTENANCE

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

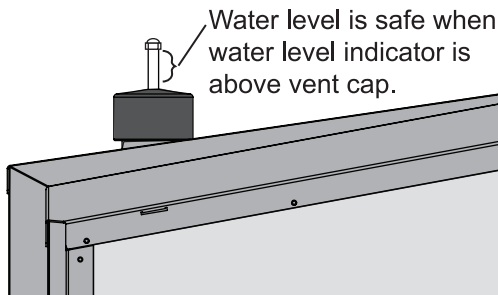
CAUTION

Turn off the FireStar controller before performing any maintenance.

9.1 Water Level

The water level in the outdoor furnace is safe when the water level indicator rod is above the vent cap (see Fig. 55). If adding water is necessary, refer to the Water Quality and Maintenance section.

Fig. 55



9.2 Ash Removal

An ash scoop is included with your outdoor furnace. For your protection, always wear the appropriate personal protective gear when cleaning ash from the firebox.

CAUTION

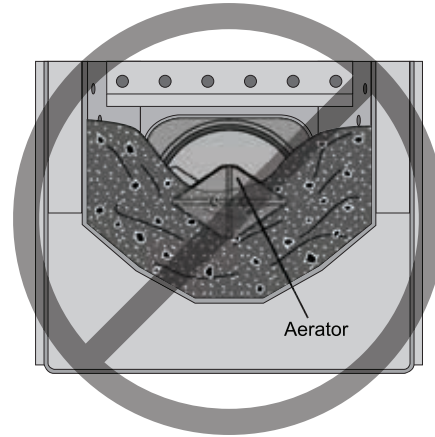
Always wear the appropriate personal protective gear when cleaning ash from the firebox.

CAUTION

When cleaning the outdoor furnace, be careful not to spill any hot ash outside of the noncombustible container.

1. Do not allow ash in the burn chamber to accumulate over the aerator as shown in Fig. 56. Use the cleaning rod provided to pull the ash forward to the ash collection area.

Fig. 56



2. It is important to remove the ash in the firebox before it solidifies to prevent sealing in moisture on the bottom and along the edges. It is especially important to scrape all of the firebox where build up and ash are collected. Any heavy or solidified ash should be removed.

NOTE: If these maintenance operations are not performed as directed, deterioration can result from the moisture trapped between the ash and the steel.

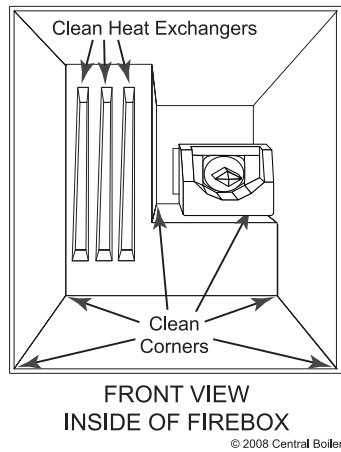
3. If burning wood pellets with a high ash content, a hard deposit may form in the burn chamber. Remove the deposit by scraping the burn chamber with the cleaning rod provided.
4. **Disposal of ash** - Place ash in a metal container with a tight-fitting lid. Store the closed container of ash on a noncombustible surface, well away from all combustible materials until ready for final disposal. Do not dispose (either by burying or other means) until all cinders have thoroughly cooled.
5. Each time the ash are cleaned out, inspect the outdoor furnace door rope gasket to make sure it is sealing properly (see Fig. 58).

9.3 Firebox

NOTE: Proper firebox maintenance is essential to the longevity of the outdoor furnace.

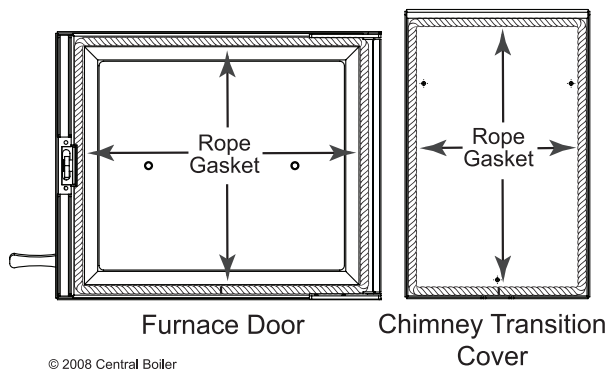
Remove ash as described in Ash Removal section. Scrape all surfaces in the firebox, paying close attention to the corners (see Fig. 57). If needed, the aerator and burn chamber can be removed for a more thorough cleaning (see Aerator and Burn Chamber).

Fig. 57



9.4 Gaskets

Fig. 58

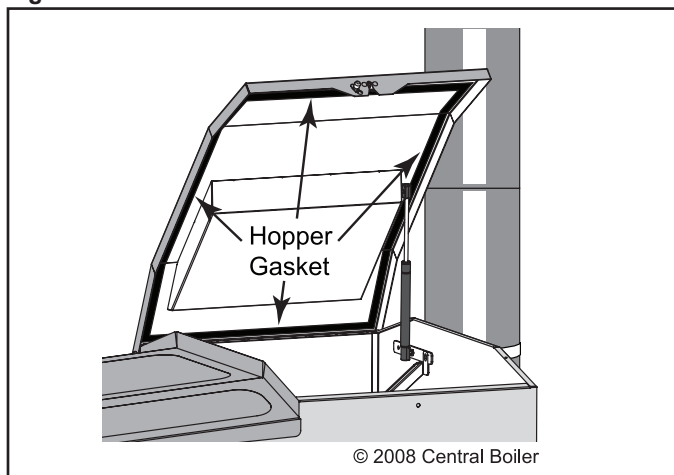


Inspect the rope gasket on the furnace door and on the chimney transition cover at the back of the furnace. A uniform indentation in the rope indicates the rope gasket is sealing properly. If it is not sealing properly, or if the rope gasket is damaged, replace the rope gasket.

Using Fig. 59 as a reference, inspect the hopper lid gasket and replace if necessary.

NOTE: Replacement gaskets for the furnace door, chimney transition cover and hopper are available from authorized Central Boiler dealers.

Fig. 59

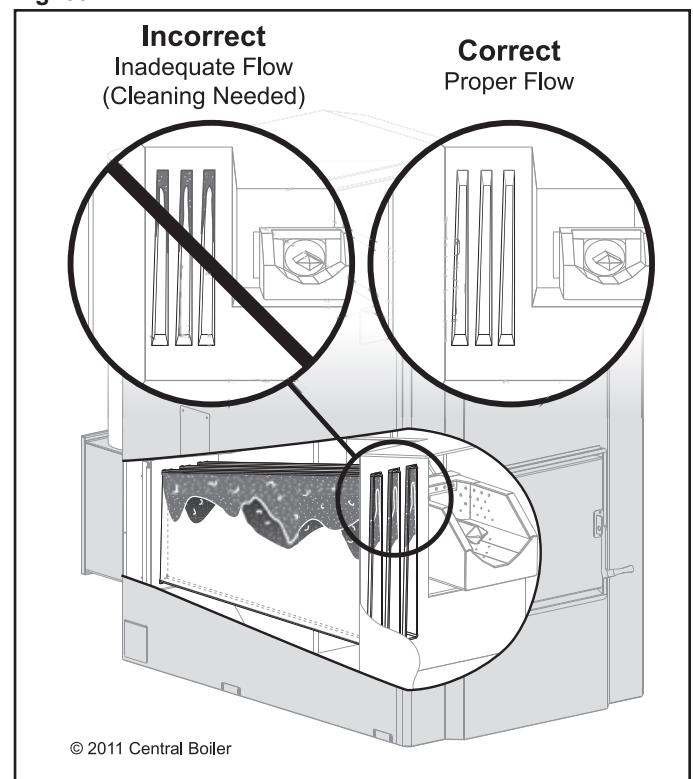


9.5 Heat Exchangers and Chimney Transition

The heat exchangers should be cleaned every time ash is removed, or if air flow through the heat exchangers becomes restricted (see Fig. 60).

To inspect the heat exchangers, remove the chimney transition cover on the back of the furnace and open the firebox door. It will probably be necessary to kneel down at the back of the furnace to look through each heat exchanger passageway. The heat exchangers taper up from the back of the furnace to the front. Pay particular attention to the top of each passageway as this is where ash tends to accumulate. The top of each heat exchanger passageway is where most air flow and heat transfer occur, so it is especially important to keep the top free of any buildup.

Fig. 60



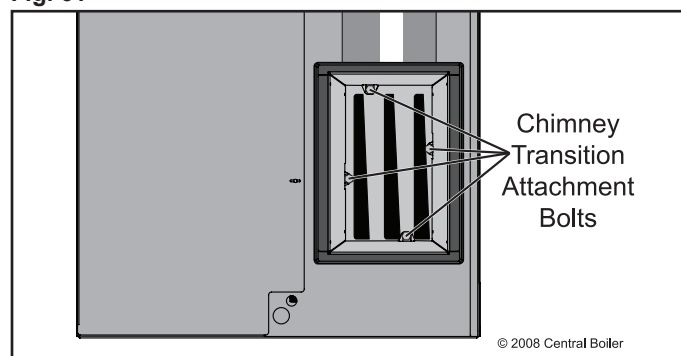
Remove deposits by scraping with the cleaning rod provided with your outdoor furnace. Use the cleaning rod from both the front and the back of the furnace, working from top to bottom of each passageway in the heat exchanger.

Inspect the chimney transition and clean if an excessive amount of buildup is present.

NOTE: Twice a month during the heating season, inspect the chimney transition for excessive buildup. If present, the buildup should be removed for proper operation and fire safety. In case of a chimney fire, close the firebox door.

Check the integrity of the chimney transition attachment bolts (Fig. 61) as they support the weight of the chimney.

Fig. 61

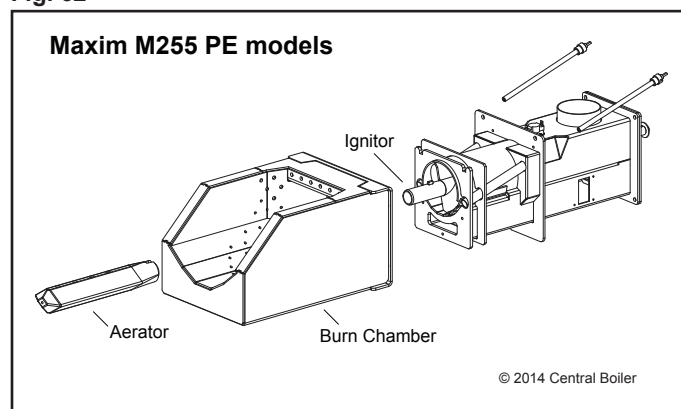


9.6 Aerator and Burn Chamber

As the quality of wood pellets varies from region to region, so will the requirements for component maintenance. The aerator and burn chamber should be inspected on a regular basis to ensure mineral deposits do not hinder burner performance. Regular inspection and removal of any deposits will ensure best furnace operation.

NOTE: Make it a habit to visually inspect the burner on a weekly basis during the heating season.

Fig. 62



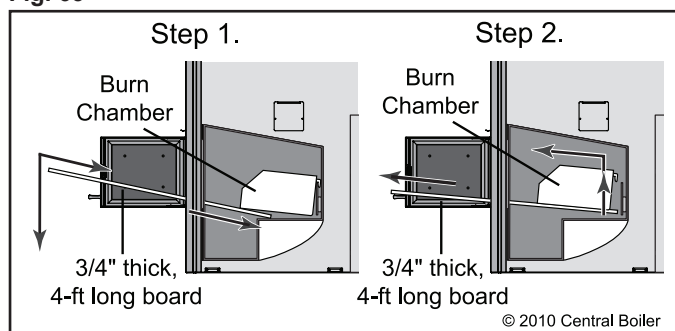
CAUTION

Before performing any maintenance on the burn chamber or aerator, shut off the burner, allow the outdoor furnace to cool and clean the firebox.

Disassembly

1. Turn the aerator 1/4 turn counterclockwise and pull straight forward to remove.
2. Remove the side access panel from the furnace. Roll back the insulating tape securing the thermocouple and remove the thermocouple.
3. Open the firebox door. Using Fig. 63 as a reference, place a 3/4" thick, 4-ft long board under the front of the burn chamber. Use the board to pry up the front of the burn chamber; then push the board in until it reaches the back of the firebox. Pry up the entire burn chamber to disengage the hooks on the back of the burn chamber. Remove the board with burn chamber through the door.

Fig. 63



NOTE: It will be necessary to angle the burn chamber when removing it through the firebox opening.

Inspecting and Cleaning

1. Inspect the aerator and burn chamber for any build-up of mineral deposits, especially in and around the combustion air holes.
2. To clean combustion air holes, use a suitably sized drill bit, round wire brush or other suitable tool to remove any deposits. Be careful not to damage, deform or increase the size of the combustion air holes. Clean ash from inside the burn chamber.
3. Scrape carbon deposits from the auger, the surfaces of the aerator and the burn chamber.

CAUTION

Do not strike the aerator or burn chamber with a hammer or other hard item to remove deposits. Doing so could damage the parts and prevent proper operation of the burner.

CAUTION

Before placing the aerator in water, allow it to cool thoroughly. Do not put the aerator in snow to cool faster as the aerator can be damaged.

4. Inspect gas ignitor.

Assembly

1. Inspect the burn chamber gasket for damage and replace if necessary. Place the 3/4" thick, 4-ft long board used to remove the burn chamber in the firebox opening; then place the burn chamber on top of the board.

NOTE: It will be necessary to angle the burn chamber to install it through the firebox opening.

2. Push the board and burn chamber to the back of the firebox; then use the board to lift the burn chamber up so the hooks on the back of the burn chamber can engage. Remove the board.
3. Place the aerator on the end of the auger tube; then rotate it 1/4 turn clockwise to lock it in position.

4. Install the thermocouple and replace the insulating tape. Install the side access panel on the back of the outdoor furnace.

9.7 Door and Hopper

Lubricate the door pivot points and hopper lid latch with a light petroleum distillate (WD-40 or equivalent).

9.8 Check Fuel Door Operation

Make sure the fuel door is open when the combustion fan is running and closed when the fan is stopped. It is important to check the fuel door monthly to make sure it is operating properly. When operating properly, the fuel door will be closed when the combustion fan is not operating.

9.9 Thermal Valve

The thermal valve does not require electricity to operate. If during a power outage, a high temperature condition is detected in the burner auger area, the thermal valve is designed to release a small amount of water into the burner auger area to cool the area.

Twice each heating season, check to see if the thermal valve has activated:

1. Disconnect the electrical power at the main power source.
2. Remove the access panels from the back corner of the furnace and set aside.

3. Remove the 1/2" silicone tubing from the thermal valve, leaving it attached to the discharge tube. Blow air through the tubing to clean. Connect the silicone tubing to the thermal valve making sure not to kink the silicone tubing.

NOTE: Fig. 64 shows one possible configuration for a thermal valve. Installations may vary slightly.

4. Install the access panels.
5. Connect the electrical power at the main power source.

CAUTION

Do NOT operate this appliance with any panels removed.

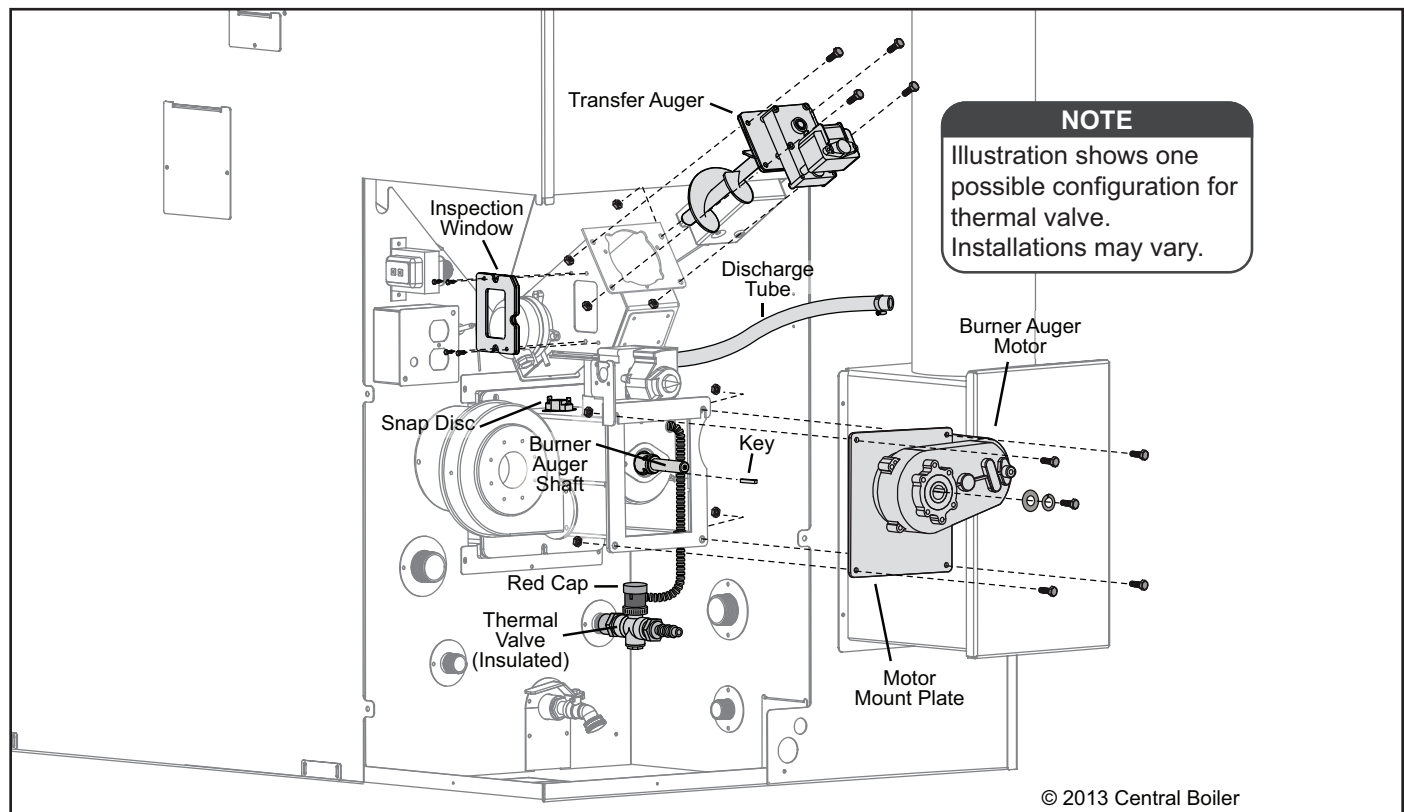
IF THE THERMAL VALVE ACTIVATES

If the thermal valve activates, it will be necessary to clean out the areas in which water from the thermal valve may have come in contact with the wood pellets. Do not use the furnace until these areas have been thoroughly cleaned. Read and understand these instructions before beginning the procedure.

NOTE: Fig. 64 illustrates the disassembly required to clean the furnace if the thermal valve activates.

1. Disconnect the electrical power at the main power source.

Fig. 64



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2. Remove the access panels from the back corner of the furnace and set aside.
3. If a one-pound propane cylinder is threaded onto the regulator on the gas valve, remove it. Otherwise turn off the gas supply at the appliance service valve.
4. Open the hopper lid and empty the hopper. One option for emptying the hopper is to use a wet-dry shop vacuum to remove the unused wood pellets. Wood pellets at the bottom of the hopper may have been saturated with water causing them to expand and fill the opening. If it is necessary to use a tool to break up the expanded wood pellets, use extreme caution not to damage any components of the furnace.

Remove Transfer Auger

1. Disconnect the wires from the transfer auger motor.
2. Remove the bolts securing the transfer auger motor mount plate to transfer auger housing; then remove the transfer auger assembly.

NOTE: Do not pull straight out or force the transfer auger assembly while removing. Turn the assembly counterclockwise.

3. Remove the screws securing the inspection window to the side of the hopper; then remove the inspection window.
4. Remove the 1/2" silicone tubing from the thermal valve, leaving it attached to the discharge tube. Blow air through the tubing to clean.

Remove Aerator, Burner Auger and Burner Auger Motor

1. Inside the firebox, turn the aerator 1/4 turn counterclockwise and pull straight forward to remove.
2. Disconnect the burner auger motor wiring connector.
3. Remove the bolt and washer securing the burner auger to the burner motor. Set the bolt and washer aside for assembly.
4. Remove the four bolts securing the motor mount plate to the transition box; then remove the burner auger motor and motor mount plate.

NOTE: On M255 P models, the motor mount plate is installed behind the gas valve mounting bracket.

5. Remove the key from the keyway slot on the auger shaft and set aside for assembly.
6. Using a wooden block, tap the burner auger into the firebox. Do not hit the bushing.
7. Remove the burner auger from inside the firebox.

Clean the Affected Areas

1. Inspect the bottom of the hopper and remove any wet fuel from the opening at the bottom.
2. Using a wet-dry shop vacuum, clean the transfer auger tube and the drop tube of any unused fuel or wet fuel; then clean the transition box that houses the burner assembly.

NOTE: Make sure that no fuel gets pushed back toward the combustion fan area or the combustion fan could be damaged.

3. Make sure the flightings on the augers are clean and dry.

Replace Snap Disc

1. Disconnect the two wires from the snap disc located on top of the transition box.
2. Remove the two screws securing the snap disc to the transition box; then remove the snap disc.
3. Place a new snap disc into place and secure with screws; then connect the two wires.

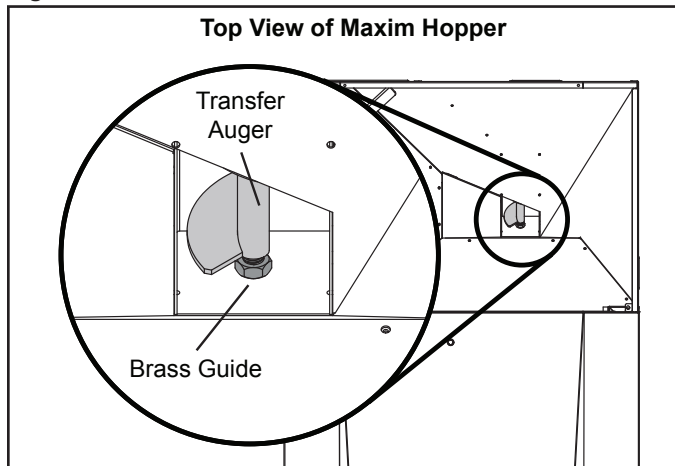
Install Burner Auger, Burner Auger Motor and Aerator

1. Apply grease to the portion of the burner auger shaft that will be seated in the bushing; then, from inside the firebox, install the burner auger into the burner assembly making sure it is properly aligned and seated in the bushing.
2. Install the motor mount plate with burner motor behind the gas valve mounting bracket on the transition box. Tighten the screws hand-tight only.
3. Align the keyway slot on the auger shaft with the keyway slot in the burner motor; then tap the key into the slot. Secure the burner auger with the bolt and washer removed earlier. Tighten securely.
4. Using a flashlight inside the firebox, check that the auger flightings are centered in the burner tube. If necessary, loosen the motor mount plate bolts and move the motor mount plate to center the auger flightings in the burner tube. Tighten the motor mount plate bolts securely.

Install Transfer Auger

1. Install the transfer auger assembly in the transfer auger housing (see Fig. 64). Make sure the end of the transfer auger tube fits over the brass guide in the transfer auger housing. Verify by visually checking from the top of the hopper (see Fig. 65). Secure with the bolts.

Fig. 65



2. Connect the wires to the transfer auger motor.

Finish Installation

1. Install the inspection window and secure with the screws.
2. Attach the 1/2" silicone tubing to the thermal valve and secure with hose clamp.
3. Install the access panels.
4. Connect the electrical power at the main power source.
5. If a one-pound propane cylinder was installed, thread it onto the regulator on the gas valve. Otherwise turn on the gas supply at the appliance service valve.
6. Before adding fuel to the hopper, start the furnace and verify that both augers are turning freely without binding. The transfer auger can be viewed from the hopper and the burner auger can be viewed using a flashlight from inside the firebox.
7. Once it has been determined the augers are turning freely, add fuel to the hopper and start the furnace following the procedure in Initial Start-up.

9.10 Test Thermal Valve

Twice each heating season (at the beginning and the end), check to make sure the thermal valve operates properly.

WARNING

Allow the outdoor furnace to thoroughly cool down before performing maintenance.

1. Disconnect the electrical power at the main power source.
2. Remove the access panels from the back corner of the furnace and set aside.
3. Remove the 1/2" silicone tubing from the thermal valve; then place a small cup under the outlet on the valve.

4. Push down on the red cap of the thermal valve and run a small amount of water through the valve to make sure it is operating properly.
5. Connect the silicone tubing to the thermal valve making sure not to kink the silicone tubing.
6. Install the access panels.
7. Connect the electrical power to the main power source.

9.11 Gas Ignitor - M255 P Models

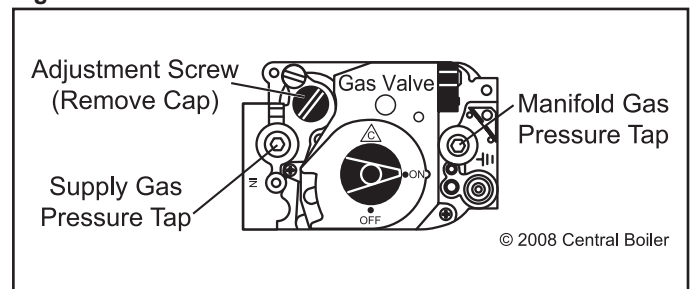
NOTE: Any maintenance on the gas ignitor should be done by a qualified installer in accordance with applicable codes.

Gas Pressure

Pressures should be checked while burner is operating. Gas pressure can be tested using the gas pressure taps on the gas valve. Ensure that the inlet side (supply) gas pressure is no less than 10 inches of water column. Outlet side (manifold) gas pressure must be no less than 9 inches of water column.

If the supply gas pressure is correct and the manifold gas pressure is not, the manifold gas pressure can be adjusted by removing the cap on the gas valve and turning the adjustment screw with a flat screwdriver (Fig. 66). Turning the adjustment screw clockwise increases manifold gas pressure; turning it counterclockwise decreases manifold gas pressure.

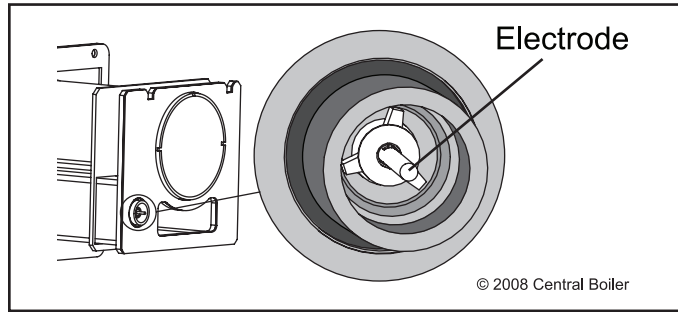
Fig. 66



Electrode

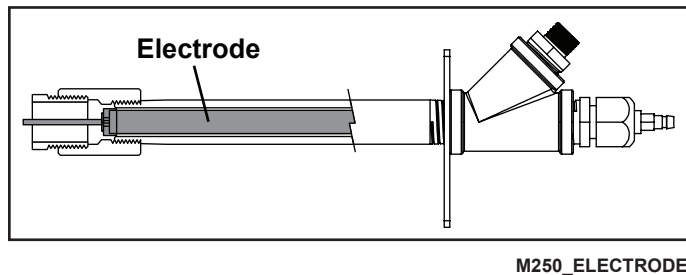
1. Disconnect the gas line and spark plug wire; then remove the two 5/16" screws securing the burner tube assembly and remove the burner tube assembly.
2. The electrode must be adjusted properly to provide the proper spark and sense the flame when lit. The electrode rod must be centered in the end of the burner tube (Fig. 67).

Fig. 67



3. Whenever the burn chamber is removed for maintenance, or if there is a problem with the gas ignition, clean the electrode using a coarse (i.e., denim) cloth rag. If there is excessive creosote or deposits on the electrode that are difficult to remove, oven cleaner may be used to soften the deposits. Inspect for cracked insulation, damage or for any loose components.
4. Make sure the connector on the end of the ignitor is threaded on tightly.
5. When properly adjusted, the electrode will appear in the end of the burner tube as it does in Fig. 68.

Fig. 68



WATER QUALITY AND MAINTENANCE

An important part of outdoor furnace maintenance is controlling the quality of the water in the furnace. Central Boiler supplies a pH test strip and a nitrite test kit with each new outdoor furnace.

Water Test Kits and Test Results

It is very important to keep record of water test results (include the date, pH and nitrite level). If subsequent water tests indicate a pH that is too low and/or a nitrite level that is too high, the results should be verified using a new test kit.

The pH test strips and Permanganate Reagent each have a varying shelf life that can affect their accuracy. Test kits should be stored in a dry area at room temperature to obtain maximum accuracy over a longer period of time.

NOTE: Do not store the test kit where it will be exposed to heat (e.g., on top of the water heater).

The pH of the water in the outdoor furnace will not decrease unless fresh water is added to the furnace. The nitrite level of the water in the furnace will not increase unless Corrosion Inhibitor Plus™ is added.

For example, if a water test in the fall of the year indicates a pH of 8.5 and a nitrite level of 20 drops by nitrite test (2000 ppm) and no water or Corrosion Inhibitor Plus™ is added, a water test the following spring must indicate a pH of at least 8.5 and a nitrite level of no more than 20 drops by nitrite test (or slightly less, due to evaporation). If the test indicates a significantly lower pH level or higher nitrite level, perform another test with a new test kit to verify the results. If the results are +10% different using a new test kit, either water or Corrosion Inhibitor Plus™ has been added to the system.

If a test is conducted and verified that indicates a high pH (above 9.5) and/or nitrite level (above 30 drops), **DO NOT ADD MORE CORROSION INHIBITOR PLUS™**. Adding Corrosion Inhibitor Plus™ **increases** nitrite and pH levels. The outdoor furnace should be drained until the LED display flashes **LD** to indicate that the water level is below the sensor; then add fresh water until the water level indicator rod is above the vent cap (Fig. 55). Circulate the water for 24 hours and test the water again.

Testing Supply Water

Before filling the outdoor furnace with water, test a sample of the supply water that will be used to fill the outdoor furnace (softened water is recommended).

1. Collect a small sample of the water to be used to fill the outdoor furnace in a clean container.
2. Dip the pH test strip from the test kit in the water sample. Shake excess water off the test strip. Compare the color of the test strip to the chart provided to determine pH level.

3. If the pH level is between 6.5 and 8 and there are no other known water quality problems, then the outdoor furnace may be filled with this water.
4. If the water to be used to fill the outdoor furnace has a pH level of less than 6.5 or greater than 8, a sample of the water should be sent to a water quality test lab for recommended treatment, the water should be conditioned, or water should be supplied from a different source.

Corrosion Inhibitor Plus™ and Initial Treatment

Central Boiler Corrosion Inhibitor Plus™ (p/n 1650) gives optimum protection when it is used to initially treat the water and is then maintained at proper levels. The initial nitrite level target is 20 drops by nitrite test, but 20 to 30 drops is acceptable. Do not exceed treatment of higher than 30 drops by nitrite test.

The recommended initial treatment rate for the outdoor furnace is specified by units. One unit of the Corrosion Inhibitor Plus™ is a 1-gallon (3.78-liter) container. The normal rate for the initial treatment is 1/2 of a unit.

NOTE: If the system has a larger than normal water capacity, more Corrosion Inhibitor Plus™ should be added at a recommended amount of one unit per 180 gallons (680 liters) of water.

Refer to Section 7 - Filling System with Water and Purging Air for the recommended initial treatment of Corrosion Inhibitor Plus™.

Obtaining Treated Water Sample

A treated water sample from the outdoor furnace can be obtained either from the valve on the hot water heater (Fig. 69) or from the furnace drain valve (Fig. 70).

Fig. 69

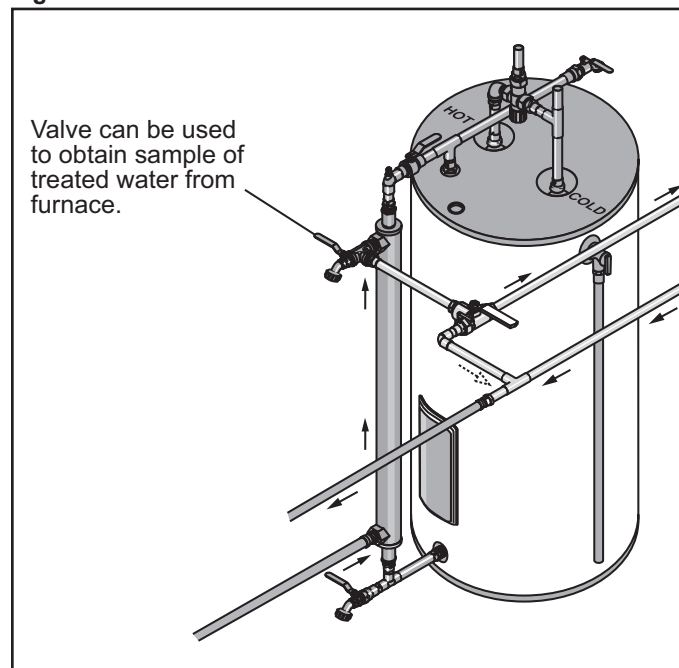
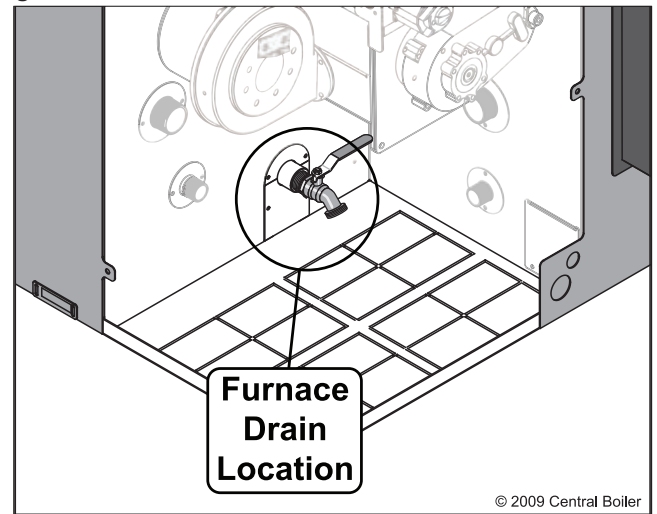


Fig. 70



Before collecting the sample, drain about a quart (liter) of water; then carefully fill the sample container without contaminating the sample. **Be sure to properly close the valve when finished.**

Testing Treated Water in the Outdoor Furnace

1. If no antifreeze is present in the water, use Test Kit (p/n 405). If antifreeze has been added to the water, use Test Kit (p/n 597).
2. Dip the pH test strip from the test kit in the water sample. Shake excess water off the test strip. Compare the color of the test strip to the chart provided to determine pH level. The pH of the water should now be between 8.0 and 9.5.
3. Rinse and fill the sample tube to the 25 mL mark with treated water from the outdoor furnace.
4. Add 25 drops of Sulfuric Acid (p/n 404) to the water sample and swirl to mix.

WARNING

Sulfuric Acid is a corrosive acid. Handle carefully. Carefully read and follow precautions on test chemical labels. Keep test chemicals away from children. Safely dispose of tested samples.

5. Using the dropper, add Permanganate Reagent (p/n 403) one drop at a time, swirling the water and counting each drop, until the color changes from colorless to pink that persists for at least one minute.

NOTE: Always hold the dropper in a vertical position to ensure proper droplet size.

6. If the nitrite level is not at least 20 drops by nitrite test, add 1/4 unit of Corrosion Inhibitor Plus™ (p/n 1650); then circulate water for 24 hours and repeat procedure, as needed, to achieve a nitrite level of at least 20 drops by nitrite test.

7. Do not exceed treatment of higher than 30 drops by the nitrite test. If the test requires more than 30 drops, dilute the water by draining water from the system until the LED display flashes **LD**. Then add fresh water until the water level indicator rod is above the vent cap (Fig. 55). Start the pump(s) and circulate water for 24 hours. Recheck nitrite levels.
8. After the proper nitrite level has been obtained, check pH to make sure it is between 8 and 9.5.
2. Remove the aerator and burn chamber; inspect and clean as explained in section 9.7 Aerator and Burn Chamber.
3. Clean all the ash out of the outdoor furnace. Scrape the walls and floor of the firebox.
4. Check the chimney box and flues. Clean out any excessive buildup. Any large or dry crusty deposits on the walls or heat exchanger area should be removed. When cleaning the firebox, be sure to wear the appropriate personal protective gear.

After initial treatment, the maintenance nitrite level target is 15 drops by nitrite test, but 15 to 30 drops is acceptable. One drop of permanganate reagent equals approximately 100 ppm.

System Maintenance

The pH and nitrite levels of the water, once treated, should remain stable as long as water is not added to the outdoor furnace. If water is added to the outdoor furnace and/or system, the system water should be tested and Corrosion Inhibitor Plus™ should be added (if necessary) to maintain the recommended level of protection.

NOTE: If there is a leak in the system or if the outdoor furnace loses water from boiling frequently, the problem should be identified and repaired immediately. Under normal operation, little or no water needs to be added. Adding water to the outdoor furnace may cause corrosion if not immediately treated with Corrosion Inhibitor Plus™ to the proper pH and nitrite levels. In addition, the amount of dissolved solids in the system (due to adding additional water) can cause problems.

After the initial three months of operation and every six months thereafter, the pH and nitrite levels of the system water should be tested. These levels should be maintained as previously stated.

POST HEATING SEASON MAINTENANCE

The water should be left in the outdoor furnace during the non-heating season. Check pH and nitrite levels as described in the Water Quality and Maintenance section; add Corrosion Inhibitor Plus™ (p/n 1650) as needed. If Corrosion Inhibitor Plus™ is added, run the circulation pump for two days to thoroughly mix in the new corrosion inhibitor. If water is added, bring the water up to operating temperature as soon as possible. If water is added more frequently than once during the heating season, a complete inspection of the outdoor furnace and plumbing should be performed.

1. At the end of the heating season, clean all of the fuel from the hopper. Clean the fuel from the augers by pressing the Auger button until no fuel enters the burn chamber.

CAUTION

To minimize corrosion caused by accumulated ash, it is especially important to clean the chimney, chimney box and flues at the end of the heating season.

5. When the outdoor furnace is clean, carefully inspect the firebox for any signs of excessive corrosion or deterioration. If any corrosion or deterioration is found, call your dealer. It is always better to do maintenance during the non-heating season.
6. After the inspection is completed, apply a thin coat of new motor oil to the firebox and heat exchanger being sure to work oil into all corners.
7. Inspect the thermal valve as explained in section 9.9 Thermal Valve.
8. Place a cover over the chimney to keep rain from entering the outdoor furnace.
9. If the water is left in the outdoor furnace during the non-heating season, condensation can occur in the firebox. Periodically during the non-heating season, check for condensation in the firebox. To prevent condensation in the firebox, one option is to keep a 60W light bulb on in the firebox during the non-heating season. Another option is to keep a circulating pump running.

SECTION 10 – TROUBLESHOOTING

A. FURNACE DOES NOT HEAT (BUILDING IS LOSING TEMPERATURE)

1. **Out of fuel** - Check firebox to see if fire is out. Add wood pellets as necessary.
2. **Fire out** - If the controller is flashing **FD** refer to FireStar Controller for Maxim Operating Instructions.
3. **Thermal valve opened** - If during a power outage, a high temperature situation is detected in the burner auger area, the thermal valve will open to release a small amount of water into the burner auger area to cool the area. To determine if this has happened, first look in the firebox for the presence of water. Also check the glass inspection port just above the burner auger. If the pellets appear to have expanded from absorbing water, the thermal valve has opened. Contact your Central Boiler dealer for assistance.
4. **Circulation valve(s) closed** - Be sure all valves in the system are open.
5. **Circuit breaker off** - Reset the circuit breaker that supplies power to the outdoor furnace.
6. **Circulation pump(s) not operating** - Disconnect power to the pump. Close valves at the pump. Disassemble the pump and try to turn the pump shaft. If the shaft is stuck, replace the pump cartridge. Replace only the cartridge whenever possible. If necessary, replace the pump. Follow instructions supplied with the pump.
7. **Air in system** - Check for air in the supply and return lines or heat exchangers. If you hear a gurgling sound in a heat exchanger, air is present in the system. Shut off the pump, wait 15 seconds and start the pump. If it is necessary to force air from lines, refer to Section 7.
8. **Outdoor furnace exhaust obstructed** - Check outdoor furnace exhaust for obstructions by removing the chimney transition cover to expose the heat exchanger. The heat exchanger can also be observed from the front of the furnace through the front door opening.
9. **Combustion fan blocked or obstructed** - Check the combustion fan for obstructions.
10. **Building(s) poorly insulated or uninsulated** - Poorly insulated or uninsulated buildings and/or buildings with uninsulated or poorly insulated ceilings can cause excessive fuel consumption and or heating problems.

11. **Supply and return lines installed incorrectly** - Make sure the hot supply water line is connected to the correct fitting on the outdoor furnace and heat exchanger.
12. **Circulation pump(s) installed incorrectly** - Circulation pump(s) must be installed in the supply line(s) with the arrow on each pump pointed away from the outdoor furnace. Remove the pump and install correctly. Refer to the System Installation section for installation guidelines.
13. **Underground supply and return lines insulated poorly** - Heat loss from poorly insulated underground supply and return lines is often indicated by an unusually high amount of snow melting above the lines when the ground temperature is 10°F (-12°C) or colder.
14. **Supply and return lines uninsulated** - Uninsulated supply and return lines in areas that are not intended to be heated (unheated crawl spaces, under mobile homes, etc.) may cause excessive heat loss. Insulate the supply and return lines.
15. **Low water** - If the controller is flashing **LD** the system senses a low water condition. Check water level and if necessary add water according to the Water Quality and Maintenance section. If adding water does not correct the problem, contact your Central Boiler dealer.
16. **Poor water quality** - Water with high amounts of solids, sand or dirt can create deposits inside the wall of heat exchanger components, reducing the amount of heat output. If this condition is suspected, contact your Central Boiler dealer.
17. **Propane tank too cold** - Extremely cold temperatures (-40°F/-40°C) can prevent propane from vaporizing properly. A one-pound propane tank will stay warmer if installed on the regulator inside the rear access area. The propane burner is not a backup heat source.

B. FURNACE IS OVERHEATING (FIRESTAR LED DISPLAYS **HI**)

1. **FireStar controller set incorrectly** - Lower the water temperature setpoint and/or adjust the heat output settings in one or all of the three modes (see Setting the FireStar Controller for Heat Load and Efficiency).
2. **High limit switch tripped** - Lower the water temperature setpoint and/or adjust the heat output settings in one or all of the three modes (see Setting the FireStar Controller for Heat Load and Efficiency).

3. **Water is not circulating** - The pump should run and water should circulate continuously through the supply and return lines to keep water temperature uniform in the outdoor furnace.
4. **Circulation valve(s) closed** - Be sure the proper valves in the system are open to allow circulation.

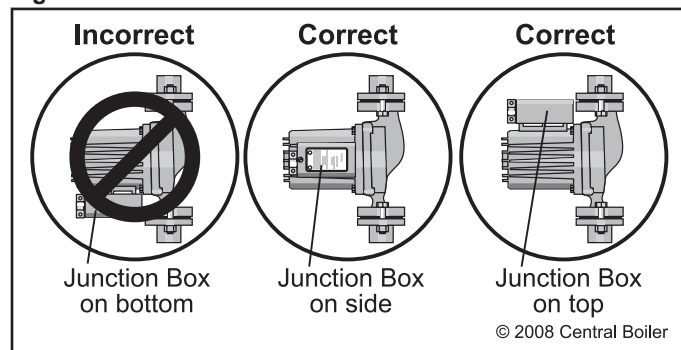
C. BACK BURN (FIRESTAR DISPLAYS **b b**)

1. **High temperature in burner auger area** - Everything but the burner auger will be disabled. The burner auger will run for two minutes, pause for 10 minutes, and continue as required. The Back Burn alarm will not stop until the controller detects that the temperature in the burner auger area has dropped.

D. FREQUENT PUMP TROUBLE OR POOR WATER CIRCULATION

1. **Pump mounted incorrectly** - The pump must be mounted with the pump motor horizontal and the junction box either on the side or on top (see Fig. 71).

Fig. 71



2. **Deposits in water lines/heat exchanger walls** - If water high in silica or other mineral content has been used to fill the outdoor furnace, material deposits may build up on the insides of the supply and return lines and on the heat exchanger walls. If this occurs, the system will need to be drained and then cleaned using Sludge Conditioner (p/n 166). The system must then be refilled with the proper amount of Corrosion Inhibitor Plus™ (p/n 1650) and good quality water (softened water, if possible).
3. **Water will not circulate** - If the system has been drained and refilled, or if the system has been opened for any reason (e.g., replacement of pump, adding heat exchangers, repairing a leak), air must be purged from the system (see Filling System with Water and Purging Air section).
4. **Poor water quality** - Water with high amounts of solids, sand or dirt can cause frequent pump failure. Use softened and/or filtered water.

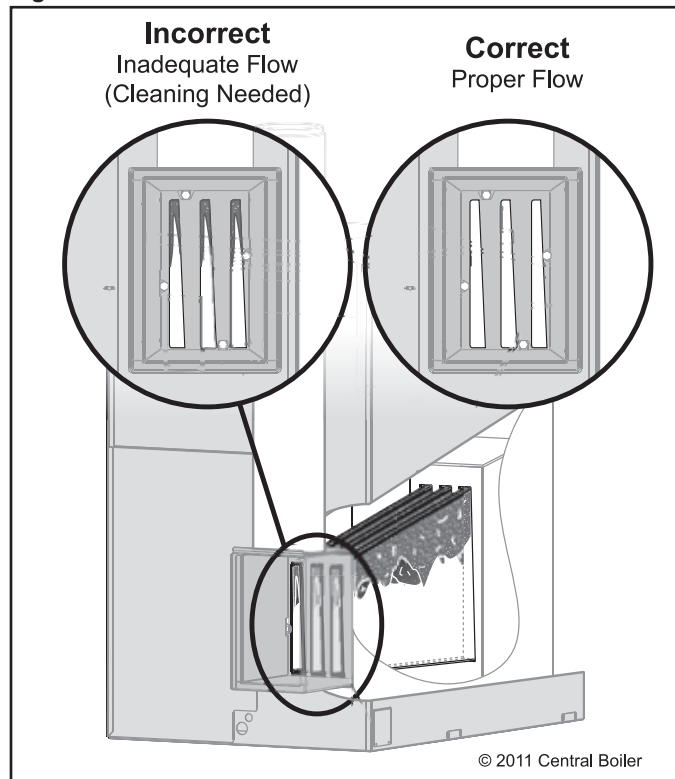
E. BURNING AN EXCESSIVE AMOUNT OF FUEL.

1. **High volume water heating** - High volume water heating (e.g., car wash, swimming pool, etc.) will require high fuel consumption.
2. **Excessive heat loss** - See items 8-12 of Furnace Does Not Heat.
3. **Supply and return line heat loss** - If not using ThermoPEX, supply and return lines buried in a wet, low-lying area may cause a large heat loss that will greatly increase the fuel consumption.
4. **High heat demand** - Concrete slabs (with radiant heat) that are poorly insulated or are exposed to water or cold outside temperatures will require increased fuel consumption. Bringing a concrete slab up to temperature the first time will take a considerable amount of time and fuel; once warm, fuel consumption will be reduced if the concrete slab and building are insulated properly. The following items will cause a high heat demand: poor insulation, large amounts of glass windows/doors (e.g., greenhouses), overhead doors, uninsulated crawl spaces, outdoor air infiltration and air leaking through foundation.

F. FUEL NOT BURNING PROPERLY

1. **Poor fuel or out of fuel** - See Fuel Quality and Storage section for recommendations about fuel types. Check firebox to see if fire is out. Add wood pellets as necessary.
2. **Combustion fan blocked or obstructed** - Check the combustion fan and air flow path for obstructions.
3. **Outdoor furnace exhaust obstructed** - Check outdoor furnace exhaust for obstructions. To inspect the heat exchangers, remove the chimney transition cover on the back of the furnace and open the firebox door. It will probably be necessary to kneel down at the back of the furnace to look through each heat exchanger passageway.

Fig. 72



4. **Heat output set too high or too low** - For best results, determine the lowest water temperature setpoint the outdoor furnace can be set to that will supply enough heat to the heat emitters. See FireStar Controller Manual for more information.
5. **Air setting too high or too low** - See Setting the FireStar Controller for Heat Load and Efficiency.

G. BURNER AUGER MOTOR NOT TURNING

1. **Wood pellets wet or swollen** - Check to see if the wood pellets have absorbed moisture and may be swollen in the burner auger area. If the thermal valve has activated, it will be necessary to remove all of the pellets from the hopper; then remove the transfer auger, aerator, burner auger and burner auger motor and clean the entire area.
2. **Burn chamber obstructed** - Clean the burn chamber especially at the end of the auger.
3. **Motor overheated** - Clean the burner auger and allow the burner auger motor to cool.

H. IF CORROSION IS PRESENT

Corrosion in the firebox can occur when the outdoor furnace is being operated improperly. To maximize the life of your investment, it is important to identify signs of corrosion early (you can do this by performing the items in the Preventive Maintenance Schedule) and take measures to correct it as soon as possible. Some, but not all, causes of corrosion are listed below with possible solutions. If you are unsure how to proceed, contact your Central Boiler dealer.

1. **Water temperature is too low** - If the heat load in the system is too large, the water in the system will not reach high enough temperatures and corrosion can occur. Re-evaluate the system and match heat load to the outdoor furnace.

NOTE: To reduce condensation in the firebox, set the temperature to 185°F or higher.

2. **Heat load is too high** - Reduce heat load.
3. **Thermostatic valve is not installed** - A thermostatic valve must be installed on each set of supply and return lines in the system to maintain the outdoor furnace water temperature above 150°F (65°C).
4. **Firebox wasn't cleaned out at the end of the heating season** - Be sure to follow the post-heating season maintenance schedule which includes scraping out firebox and removing all ash.

J. WATER TEMPERATURE AT SUPPLY PORT LOWER THAN THE FIRESTAR INDICATES

1. **Water flow too low** - Add wraparound pump if using one set of lines. Install higher pressure-volume pumps if using two sets of lines.

K. LOW WATER (FIRESTAR LED DISPLAYS **LD**)

System leak - Try to identify the leak by inspecting all lines, fittings, heat exchangers, etc. in the system and repair as needed. If the leak cannot be found and **if there is no chance of the system or furnace freezing**, the following procedures can help determine whether the leak is in the furnace or somewhere else in the system:

- a. Turn off the FireStar controller; then completely empty the firebox of all coals, embers and ash.
- b. Allow the furnace to cool below 100°F (38°C).
- c. Refill the outdoor furnace with water until the water level indicator rod is above the vent cap. Add Corrosion Inhibitor Plus™ if needed.
- d. Record the water level by measuring how far the water level indicator rod is above the vent cap.
- e. Close all shut-off valves on the hot supply and return lines at the outdoor furnace.

- f. Check the water level periodically during the next 48 hours (the water level may drop slightly as the water cools).
- g. Inspect the firebox and under and around the outside of the outdoor furnace for evidence of a leak each time the water level is checked.

During the 48-hour inspection period, the water lines should also be checked for leaks using a pressure gauge and the following procedure:

- a. Isolate the furnace by closing all shut-off valves on the hot supply and return lines at the furnace.

WARNING

Be sure to close all shut-off valves on the hot supply and return lines at the furnace. DO NOT ALLOW THE FURNACE TO PRESSURIZE.

- b. Isolate each zone in the system using shut-off valves.
- c. Pressurize each zone with domestic water or air; then check the pressure gauge after 12 hours. A drop in pressure indicates that a leak is present in the zone. Before resuming furnace operation, it will be necessary to repair the leak.

L. SMOKE IN THE HOPPER

How air flows through the furnace is an important part of optimal operation. Smoke in the hopper is an indication that the air flow through the furnace is restricted, obstructed or different than it should be.

CAUTION

Operating for extended periods of time with air flow through the furnace restricted (i.e., smoke in the hopper) can damage components in the furnace.

1. **Heat exchanger dirty or obstructed** - Because the gases moving through the heat exchanger are hot, most of the heat transfer occurs at the top of the heat exchangers. It is therefore important to ensure that the top of each heat exchanger passageway is clean and not obstructed or blocked from ash. Use the procedure from 9.5 Heat Exchanger in the Routine Maintenance section to inspect the heat exchanger for obstructions or restrictions and clean if necessary.
2. **Aerator covered by ash** - do not allow ash in the burn chamber to accumulate over the aerator. Use the cleaning rod to pull ash forward to ash collection area.
3. **Carbon buildup** - inspect the burner auger where it enters the firebox for carbon buildup and clean if necessary.
4. **Fan setting for HIGH mode set too high** - Decrease the fan setting for HIGH mode (see Setting the FireStar Controller for Heat Load and Efficiency).

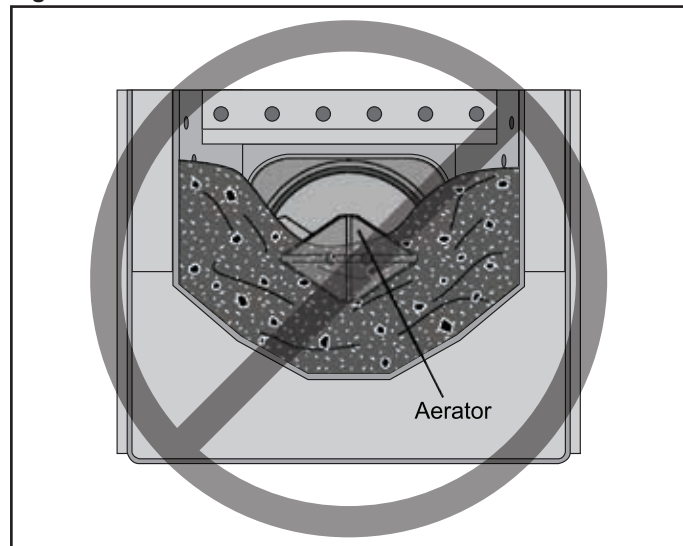
5. **Chimney dirty or obstructed** - Inspect the chimney transition and chimney for obstructions or restrictions and clean if necessary.
6. **Spark arrestor (if present) dirty or obstructed** - Inspect the spark arrestor screen for obstructions and remove. Clean the spark arrestor if it is restricting air flow.
7. **Chimney not drafting properly** - Proper draft is necessary for the Maxim to operate optimally. Draft occurs when the temperature in the chimney is high enough to cause a negative pressure that "pulls" the exhaust up through the heat exchanger and out the chimney.

If poor draft is suspected, check that the chimney transition cover is properly sealing. Adding chimney sections may be required. However, due to a number of variables (e.g., objects like buildings and trees in close proximity, nearby terrain such as hills, valleys, etc.), poor draft can be an intermittent problem.

M. CREOSOTE ON COMBUSTION FAN

1. **Outdoor furnace not level** - The furnace should be leveled so that the back of the transition box (i.e., the burner auger motor end) is slightly higher than the front. If the burner auger is not sloped down toward the front of the furnace, condensation can form in the burner auger tube and drip into the transition box. See Leveling the Outdoor Furnace section.
2. **Ash covering aerator** - Do not allow ash in the burn chamber to accumulate over the aerator.

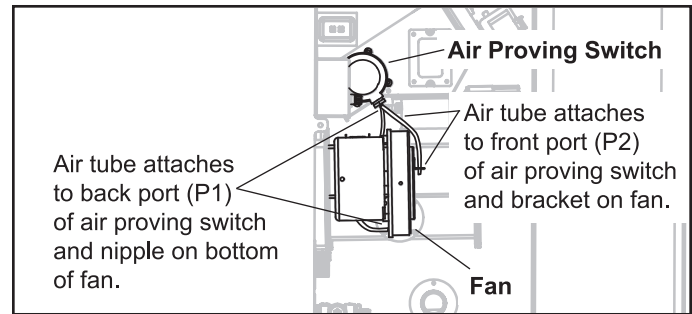
Fig. 73




N. GAS IGNITOR NOT WORKING

1. **Gas pressure too low** - The pressure inside a propane tank decreases as the temperature drops, even to the point of having zero pressure. Larger and/or fuller tanks can withstand longer periods of colder temperatures before losing all pressure. Therefore, smaller, less full tanks will be more susceptible to cold temperatures. In cold weather, tanks should be kept full and the tank and hose should be sheltered.
2. **Burn chamber obstructed** - Clean the burn chamber, especially at the end of the auger. Make sure there is no ash or material inside the burn chamber and that all of the combustion air holes are open and unobstructed.
3. **Aerator combustion air holes obstructed** - Remove aerator and clear deposits from combustion air holes.
4. **Ignitor wire loose** - Make sure the connector on the end of the ignitor is threaded on tightly and that the ignitor wire has a good connection.
5. **Electrode dirty or damaged** - Clean the electrode using a coarse cloth rag. If there is excessive creosote or deposits on the electrode that are difficult to remove, oven cleaner may be used to soften the deposits. Inspect for cracked insulation, damage or for any loose components.
6. **Combustion fan obstructed** - Inspect the combustion fan and remove any obstructions.
7. **Air proving switch tubes obstructed or disconnected** - Make sure the fan is operating. The air tube from the back port (P1) of the air proving switch connects to the nipple on the bottom of the fan; the air tube from the front port (P2) of the air proving switch is installed in the bracket on the fan. Make sure both tubes are securely connected to the correct port and are not kinked, cracked or obstructed.

Fig. 74



8. **Burn chamber temperature is 300°F or higher** - If the FireStar controller detects the temperature of the burn chamber is at or above 300°F (149°C), the gas ignitor will not light. Allow the burn chamber to cool. To display the temperature of the burn chamber, press the Water Temp  button. The LED display will indicate the actual temperature of the burner up to 999°F or, if it is higher, as a decimal representation (e.g., 1500°F will display as 1.5).

NOTE: If the thermocouple in the burn chamber becomes damaged or is faulty, the FireStar will indicate a temperature of 300°F (149°C). If the burn chamber is relatively cool and the FireStar indicates 300°F (149°C), the thermocouple will need to be replaced. Contact your Central Boiler dealer.

SECTION 11 – DECALS

⚠ DANGER

- Risk of fire or explosion - DO NOT burn garbage, gasoline, drain oil or other flammable liquids.
- If you smell gas: DO NOT light this appliance. Extinguish any open flames. DO NOT touch any electrical switch; DO NOT use a phone located in the building where the appliance is installed. Call your fuel supplier and follow their instructions.
- Risk of electrical shock - disconnect power before servicing unit.

MAINTENANCE SCHEDULE

DAILY

Check water level, inspect firebox and remove ash as needed.

WEEKLY

Inspect flues, aerator and burn chamber and clean as needed.

SEMI-MONTHLY

Twice a month during the heating season, inspect chimney and chimney transition and clean as needed.

MONTHLY

Inspect rope gaskets on the furnace door and chimney transition cover. Inspect chimney transition and clean as needed.

SEMI-ANNUALLY

Shut down and completely clean and inspect firebox, flues, chimney and burner assembly. Remove the tubing from the thermal valve; then clean the tubing and discharge tube by blowing air through it. Check the pH and nitrite levels of the water semiannually or if water is added, and add water treatment as necessary. READ OWNER'S MANUAL FOR COMPLETE INSTRUCTIONS.

⚠ WARNING

- Risk of fire - DO NOT store fuel or other combustible material within marked installation clearances.
- DO NOT install or operate this appliance before first reading and understanding the Owner's Manual.
- DO NOT allow others to install or operate this appliance without first reading and understanding the Owner's Manual.
- DO NOT leave this appliance unattended with firebox door unlatched.
- Avoid breathing smoke. Wear appropriate personal protective gear when servicing firebox or flues.
- DO NOT operate with flue draft exceeding -0.05 inches of water column.

⚠ CAUTION

- Hot surfaces.
- Keep face away from door area.
- DO NOT start fire until water level is full.
- Comply with all applicable state or local codes and regulations.
- Store ash in a covered non-combustible container.
- Take care when opening the door to prevent hot ash from spilling out.
- Keep children away from this appliance.
- Maximum draft marked on nameplate.

APPLIANCE LOCATION:

- When installing this appliance, consider the direction that smoke will travel with prevailing winds and chimney height.

CAUTION

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

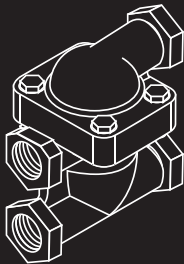
1. Add water treatment before filling with water.
2. Do not burn anything other than the recommended fuels.
3. Clean and inspect the furnace regularly.
4. Do not operate with the water temperature below 150°F (66°C).
5. Maintain the recommended water treatment levels at all times.
6. Clean the firebox thoroughly and keep it dry when not in use.
7. See Owner's Manual for more information about regularly scheduled maintenance.

p/n 9419

ATTENTION!

One Thermostatic Valve per set of supply and return lines must be installed in the system for the furnace's corrosion warranty to be valid.

READ OWNER'S MANUAL FOR COMPLETE INSTRUCTIONS.



p/n 10296

NOTICE

Furnace must be leveled properly.

If the lower auger is not sloped down toward the front of the furnace, condensation can form in the lower auger tube and drip into the transition box.

M250

p/n 9433

⚠ CAUTION

CLEAN OUT THE LOWER AUGER BEFORE DISCONNECTING POWER.

To prevent the thermal valve from activating, turn off the Auto Relight function and clean out the lower (burner) auger using the Clean Out Mode before disconnecting power.

To start Clean Out Mode, press the Auger button two times within one second. The Clean Out Mode light will turn on and only the lower (burner) auger will operate to empty all of the fuel from the lower (burner) auger. To empty the fuel faster, press and hold the Auger button while in Clean Out Mode until the lower (burner) auger is empty. After the lower (burner) auger is empty, clean the burn chamber.

p/n 9431

THERMAL VALVE MAINTENANCE SCHEDULE

SEMI-ANNUALLY

Remove the 1/2" silicone tubing from the thermal valve, leaving it attached to the discharge tube. Blow air through the tubing to clean.

p/n 10416

NOTICE



To lock and unlock the FireStar controller, press the 'Water Temp' button, located on the controller, four times rapidly. When locked, the display on the controller will indicate 'LOC' for five seconds and any time a button on the controller is pressed.

p/n 9631

⚠ WARNING

If this appliance is installed inside a building and the LP tank capacity exceeds one pound, the tank and regulator must be mounted outdoors.

p/n 9401

NOTICE

After appliance has been installed, seal these holes with silicone to prevent rodents from entering.

p/n 4122

NOTICE

DO NOT operate this appliance with this panel removed.

p/n 4125

⚠ CAUTION

HOT GASES - Keep face away when viewing fire and from door area.

p/n 4120

⚠ WARNING

Vent cap must fit loosely over pipe.

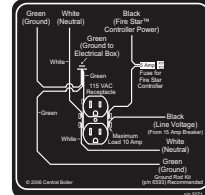
p/n 625

ATTENTION!

Immediate Action Required

Central Boiler 1650XL Inhibitor Plus (p/n 1650) should be added to the appliance before it is filled with water. The normal rate for the initial treatment is 1/2 unit for the Maxim.

Read Owner's Manual and test water to be certain that proper Corrosion Inhibitor and pH levels are achieved.



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NOTICE

DO NOT alter this equipment in any way.

p/n 5073

⚠ CAUTION

HOT Surfaces

DO NOT Touch During Operation

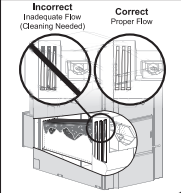
p/n 5078

CAUTION

Smoke in the hopper is an indication that air flow through the furnace is restricted and may prevent proper furnace operation. If restricted air flow is suspected, inspect the following for obstructions or restrictions and clean if necessary:

1. Heat exchanger passageways.
2. Aerator - do not allow ashes in the burn chamber to accumulate over the aerator.
3. Chimney transition box/chimney.
4. Spark arrestor (if present).

Refer to the Owner's Manual for more information.

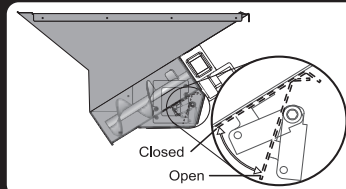


p/n 9763

NOTICE

Fuel door must operate properly.

It is important to check the fuel door regularly to make sure it is operating properly. When operating properly, the fuel door will be closed when the combustion fan is not operating.

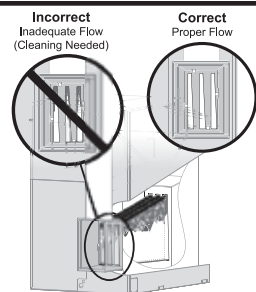


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p/n 7000113

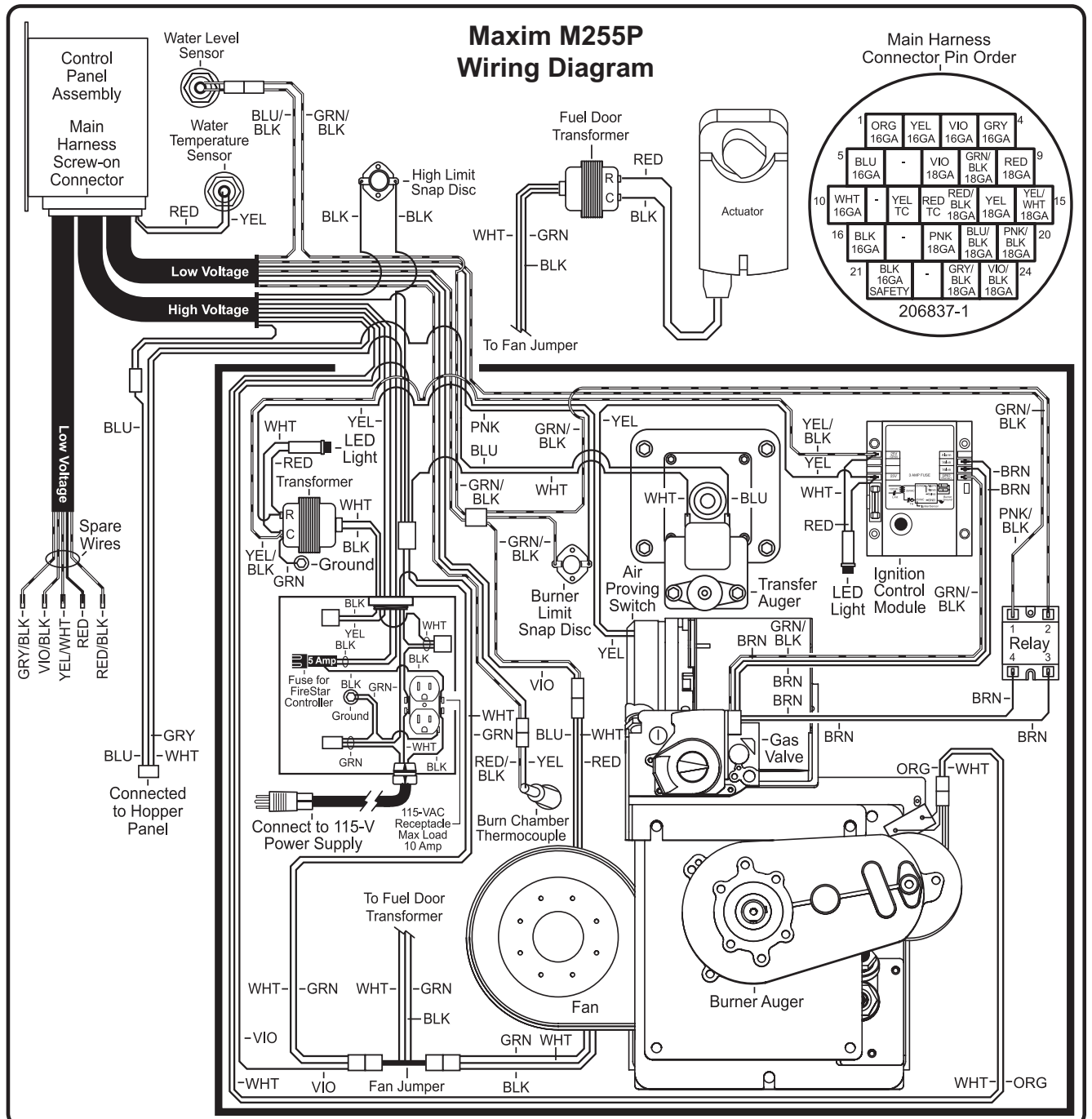
CAUTION

For the furnace to operate optimally, air flow through the heat exchanger must be unrestricted. Failure to regularly care for and maintain the heat exchanger will reduce the life and performance of your furnace. Refer to the Owner's Manual for maintenance procedures and frequency.



p/n 9762

SECTION 12 – WIRING DIAGRAMS

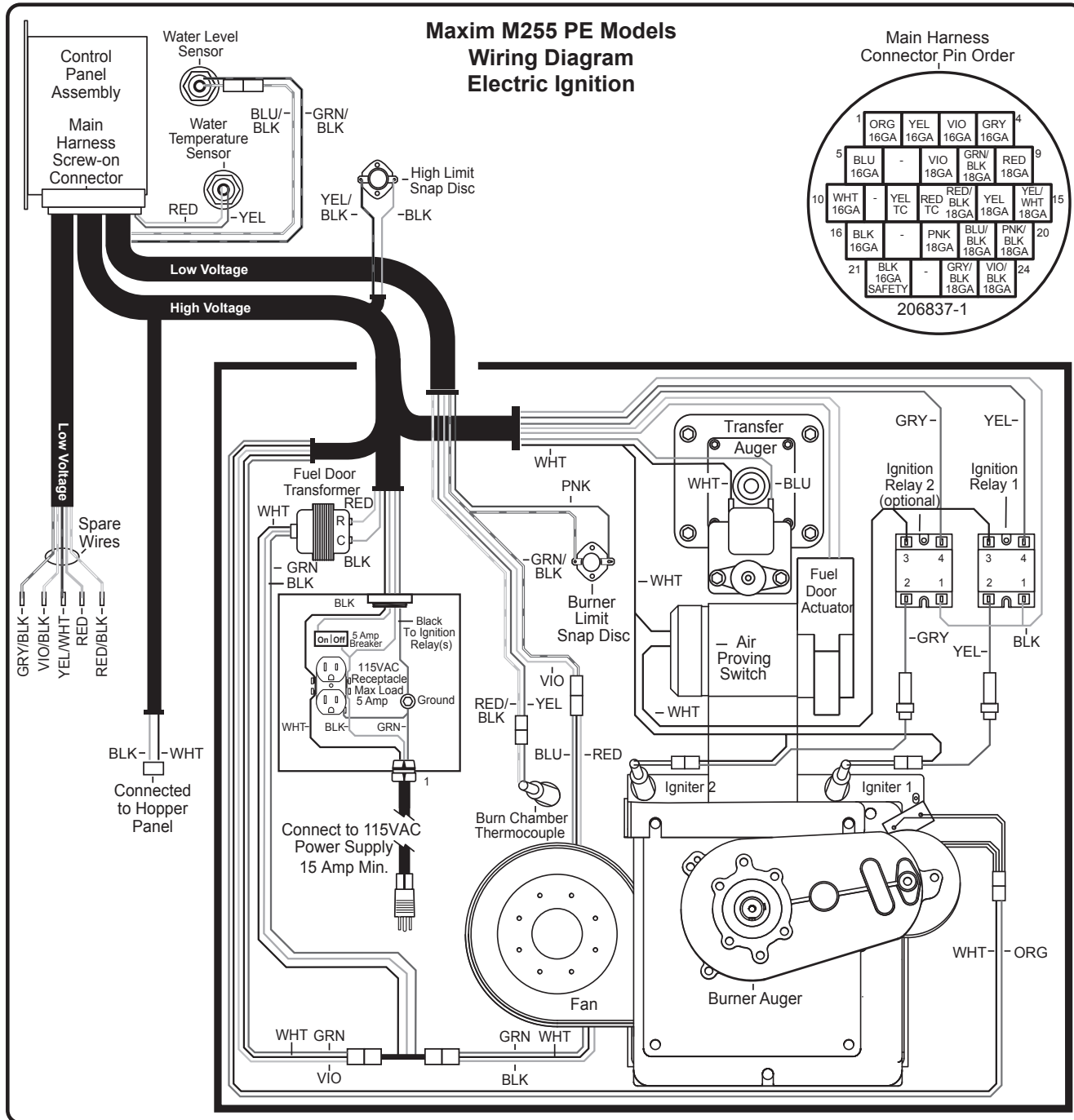


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ref. p/n 7000117

Pin	Color	Description	Voltage	Pin	Color	Description	Voltage	Pin	Color	Description	Voltage
1	Orange	Burner auger	120V	7	Violet	Fan control	5 VDC	12	Yellow/Black	Spare thermocouple	N/A
2	Yellow	Gas burner transformer	120V	8	Green/Black	Low voltage ground	5 VDC	13	Red/Black	Thermocouple ground	N/A
3	Violet	Fan	120V	9	Red	Spare 5 VDC	5 VDC	14	Yellow	Water level	N/A
4	Grey	Auxiliary auger (hopper)	120V	18	Pink	Burn-back snap disc	5 VDC	15	Yellow/White	Burn chamber	N/A
5	Blue	Transfer auger (and hopper)	120V	19	Blue/Black	Water level sensor	5 VDC				
10	White	Neutral	120V	20	Pink/Black	Relay/ignition confirmation	5 VDC				
16	Black	Power to the board	120V	23	Grey/Black	Spare I/O	5 VDC				
21	Black	Safety power/snap disc	120V	24	Violet/Black	Spare I/O	5 VDC				

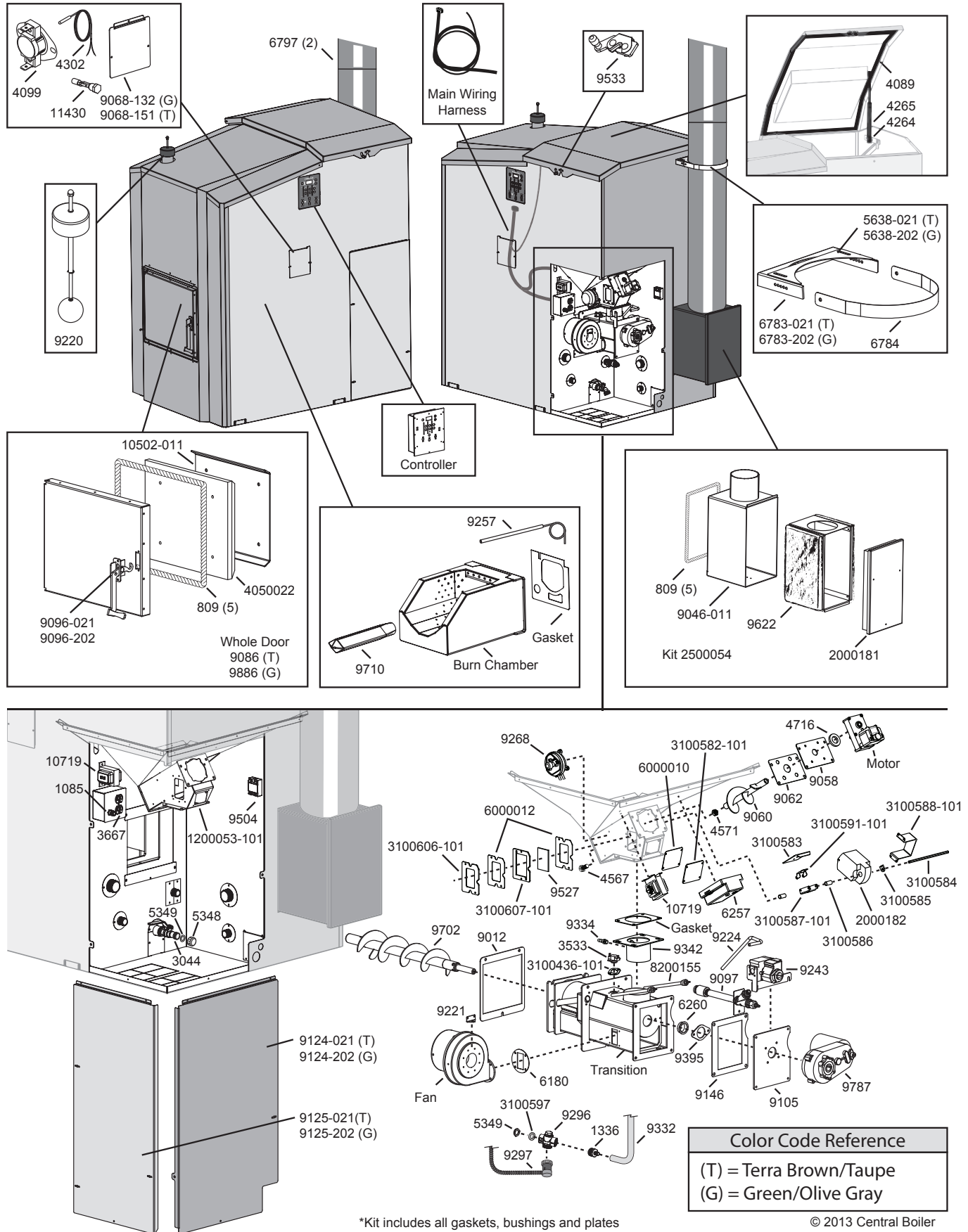
SECTION 12 – WIRING DIAGRAMS



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Pin	Color	Description	Voltage	Pin	Color	Description	Voltage	Pin	Color	Description	Voltage
1	Orange	Burner auger	120V	7	Violet	Fan control	5 VDC	12	Yellow/Black	Spare thermocouple	N/A
2	Yellow	Gas burner transformer	120V	8	Green/Black	Low voltage ground	5 VDC	13	Red/Black	Thermocouple ground	N/A
3	Violet	Fan	120V	9	Red	Spare 5 VDC	5 VDC	14	Yellow	Water level	N/A
4	Grey	Auxiliary auger (hopper)	120V	18	Pink	Burn-back snap disc	5 VDC	15	Yellow/White	Burn chamber	N/A
5	Blue	Transfer auger (and hopper)	120V	19	Blue/Black	Water level sensor	5 VDC				
10	White	Neutral	120V	20	Pink/Black	Relay/Ignition confirmation	5 VDC				
16	Black	Power to the board	120V	23	Grey/Black	Spare I/O	5 VDC				
21	Black	Safety power/snap disc	120V	24	Violet/Black	Spare I/O	5 VDC				

SECTION 13 – PARTS LISTING



1-YEAR LIMITED WARRANTY

Central Boiler, Inc. ("Central Boiler") warrants to the original owner, except (a) parts manufactured by others and excluded from warranty coverage below; and (b) parts or items specified below, Central Boiler Maxim furnaces against defects in workmanship for a period of ONE (1) YEAR from the date of original retail purchase.

An optional 5-Year Warranty is available if a Limited Warranty Registration Form is completed and sent to Central Boiler within ten (10) days of the original owner taking possession of the furnace AND provided that one thermostatic valve per set of supply and return lines is installed in the system.

If a defect exists, at its option Central Boiler will (1) repair the defective part at no charge, using new or refurbished replacement parts, (2) exchange the furnace with a comparable model furnace that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original furnace, or (3) refund the purchase price of the furnace based on the pro-rata scale. A replacement furnace/part assumes the remaining warranty of the original furnace/part or ninety (90) days from the date of replacement or repair, whichever provides longer coverage for you. If a furnace or part is qualified for replacement under the provisions of this limited warranty, at Central Boiler's discretion, the furnace or part may be required to be returned to Central Boiler for inspection and recycling or disposal.

Parts Manufactured By Others. Parts that are factory-installed by Central Boiler, but are manufactured by others, may be covered by their own manufacturer's warranty and are not covered by this limited warranty, except the FireStar™ controller is warranted against defects in workmanship for a period of two (2) years from the date of original retail purchase, provided that the Limited Warranty Registration Form is completed and sent to the Central Boiler within ten (10) days of the original owner taking possession of the furnace; otherwise this limited warranty shall be good for a period of ONE (1) YEAR from the date of original retail purchase. This limited warranty covers the controller part only; service calls, mileage, and labor to diagnose the problem and install a new part are not covered.

Parts Covered by a Limited One Year Warranty. The following parts are covered by a limited warranty for workmanship defects for one year: aerator, burn chamber, thermocouple, hopper lid shock, chimney transition, firebox door parts, chimney box parts, paint, burner assembly, auger, auger motor and fan.

This Limited Warranty applies only to Central Boiler Maxim outdoor furnaces. This limited warranty covers only those defects that arise as a result of normal use of the outdoor furnace and does not cover any other defects or problems, including those that arise as a result of: (a) improper maintenance (b) operation outside the furnace's specifications, accident, abuse, misuse, misapplication, or parts that are not factory-installed; (c) service performed by anyone other than Central Boiler unless authorized by Central Boiler in writing; (d) modifications undertaken without the written permission of Central Boiler; or (e) if any Central Boiler serial number has been removed or defaced. This warranty excludes the cost of shipping, labor to remove or reinstall the furnace, plumbing labor and/or parts and the cost of alternative heat if the furnace is out of service for repairs. Warranty excludes replacement of water, inhibitors or other additives, and parts used in the system whether or not mounted on the furnace, such as pumps, valves, and piping.

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

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To obtain warranty service, contact the Central Boiler dealer from whom you purchased your furnace or contact Central Boiler by telephone (800-248-4681) or mail (20502 160th Street, Greenbush, MN 56726). Please provide the dealer's name, original date of sale, model number and serial number in all communications. Central Boiler reserves the right to require the warranty service to be performed at Central Boiler facility when deemed necessary by Central Boiler.