Pallet Burner Dual Fuel

OUTDOOR WOOD FURNACE
OWNER'S MANUAL

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		

Tested & Listed By O-T L Portland Oregon USA c US

OMNI-Test Laboratories, Inc.

117-S-02b-2

IN THE U.S., THIS APPLIANCE IS FOR NON-RESIDENTIAL APPLICATIONS ONLY

Save This Manual For Future Reference

(p/n 9000345 REV. A) - 26-AUG-15

Pallet Burner Dual Fuel

by
Central Boiler, Inc.
20502 160th Street
Greenbush, MN 56726
www.CentralBoiler.com

The Central Boiler Pallet Burner Dual Fuel is OMNI tested and listed.

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 9000201 Décalcomanies : p/n 9408

OUTDOOR WOOD FURNACE BEST BURN PRACTICES

1. Read and follow all operating instructions supplied by the manufacturer.

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

3. LOADING FUEL: For a more efficient burn, pay careful attention to loading times and amounts. Follow the manufacturer's written instructions for recommended loading times and amounts.

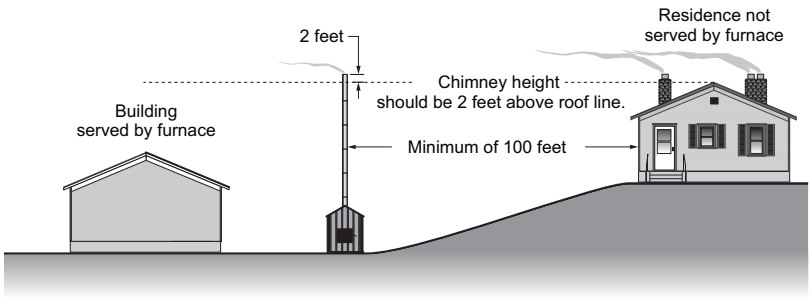
4. STARTERS: Do not use lighter fluids, gasoline, or chemicals.

5. LOCATION: It is recommended that the unit be located with due consideration to the prevailing wind direction.

   - Furnace should be located no less than 100 feet from any residence not served by the furnace.

   - If located within 100 feet to 300 feet to any residence not served by the furnace, it is recommended that the stack be at least 2 feet higher than the peak of that residence.

Chimney Height Installation Scenario



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

HPBA Hearth, Patio & Barbecue Association

OUTDOOR FURNACE MANUFACTURERS CAUCUS

Operating an outdoor furnace may not be suitable to some individuals' abilities or lifestyles. Be sure to review the Owner's Manual for the appliance with your dealer.

Table of Contents

INTRODUCTION . . . 4
Labeling and Terminology . . . 4
Foreword . . . 4
IMPORTANT PRECAUTIONARY INFORMATION . . . 5-6
SECTION 1 – OUTDOOR FURNACE INSTALLATION . . . 7
PLANNING THE LOCATION . . . 7
INSTALLATION PRECAUTIONS . . . 7
CHIMNEY HEIGHT AND REINFORCEMENT RECOMMENDATIONS . . . 7
GENERAL INSTALLATION INFORMATION . . . 8
Foundation . . . 8
Potable Water . . . 9
Antifreeze . . . 9
Corrosion Inhibitor Plus™ . . . 9
Shut-Off Valves . . . 9
Ground Rod Kit . . . 9
SUPPLY AND RETURN LINES . . . 10
Temporary Above Ground of Winter Installations . . . 10
Digging the Trench . . . 10
Underground Electric Wire . . . 11
Connecting to Existing Heating System . . . 11
AUXILIARY BURNER . . . 12
INSTALLING FUEL TANK & GAS PIPING . . . 12
CIRCULATION PUMPS . . . 12
Water Flow . . . 12
Access to Ports on Outdoor Furnace . . . 12
Installing Circulation Pumps . . . 12
Shut-Off Valves . . . 14
Filters . . . 14
Thermostatic Valves . . . 14
Purging Air from the System - Manual Air Bleeders . . . 16
WATER HEATER INSTALLATION . . . 16
EXISTING FORCED AIR INSTALLATION . . . 17
Thermostatic Controls . . . 20
HEATING MULTIPLE ZONES OR BUILDINGS . . . 21
HYDRONIC INSTALLATIONS . . . 22
Pressurized Water System Installations . . . 23
Water-to-Water Heat Transfer System . . . 23
Vented System Installation . . . 24
Direct Circulation Baseboard Installation . . . 25
Radiant Floor System Installations . . . 26
Pool and/or Hot Tub Heating . . . 29
FINALIZING THE INSTALLATION . . . 30
FILLING OUTDOOR FURNACE WITH WATER AND PURGING AIR . . . 30
SECTION 2 – OPERATING INSTRUCTIONS . . . 32
Wood Selection and Preparation . . . 32
FIRING THE FURNACE . . . 33
FILLING THE FIREBOX . . . 33
CLEANING AND INSPECTING . . . 34
CONTROL LOCATIONS . . . 34
ADJUSTING WATER TEMPERATURE . . . 34
MODES OF OPERATION . . . 35
OPERATING OPTIONAL BURNER . . . 35
SECTION 3 – MAINTENANCE INSTRUCTIONS . . . 36
ROUTINE MAINTENANCE . . . 37
WATER QUALITY AND MAINTENANCE . . . 39
Water Test Kits and Test Results . . . 39
Testing Supply Water . . . 39
Corrosion Inhibitor Plus™ and Initial Treatment . . . 39
Testing Treated Water in the Outdoor Furnace . . . 39
System Maintenance . . . 40
POST HEATING SEASON MAINTENANCE . . . 40
Flushing the System . . . 40
SECTION 4 – OWNER SERVICEABLE ITEMS . . . 42
FIREBOX DOOR CAM LOC ADJUSTMENT . . . 42
FIREBOX DOOR SEAL ROPE . . . 42
SOLENOID . . . 42
TEMPERATURE CONTROLLER . . . 43
WATER TEMPERATURE SENSOR . . . 44
SECTION 5 – TROUBLESHOOTING . . . 45
SECTION 6 – GENERAL INFORMATION . . . 48
PARTS LISTING . . . 49
FURNACE MEASUREMENTS . . . 50
WIRING DIAGRAMS . . . 51
1-YEAR LIMITED WARRANTY . . . Back Cover

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 outdoor 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 can cause minor personal injury or property damage if ignored.

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

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

Foreword

This manual and the accompanying gas or fuel oil burner Operator's Manual (if the furnace is supplied with a burner) are to be used as a guideline for installation, operation, and maintenance of the Pallet Burner Dual Fuel outdoor wood furnace. This manual is organized into six sections for easy reference.

- Section 1 – Outdoor Furnace Installation;
- Section 2 – Operating Instructions;
- Section 3 – Maintenance Instructions;
- Section 4 – Owner Serviceable Items;
- Section 5 – Troubleshooting;
- Section 6 – General Information.

Anyone owning or operating this outdoor furnace must read, fully understand, and follow all of the information in this manual and the accompanying gas or fuel oil burner Operator's Manual.

NOTE: In higher populated areas, extend the chimney to a height above the roofs of surrounding buildings (see Outdoor Wood Furnace Best Burn Practices illustration, inside front cover).

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.

EPA RESOURCES

EPA's Burnwise Program - http://www.epa.gov/burnwise

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

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

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

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

Wet Wood is a Waste brochure - http://www.epa.gov/burnwise/pdfs/wetwoodwastebrochure.pdf

This tri-fold brochure provides colorful illustrations of the four easy steps to dry firewood.

NOTE: The warranty can be voided by operating a hydronic heater in a manner inconsistent with the owner's manual.

IMPORTANT PRECAUTIONARY INFORMATION

The information contained on pages 5-6 appears throughout this manual. Be sure to read carefully and understand these precautions before, during and after the installation, operation and maintenance of the outdoor furnace.

CAUTION

This outdoor furnace is not intended to be the only source of heat. Should the outdoor furnace be left unattended, run out of fuel or require service, an alternate heating source in the building being heated should be in place to prevent damage caused by freezing.

WARNING

Outdoor furnace vent cap must fit loosely on the vent opening (Fig. 1). 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.

Fig. 1

© 2008 Central Boiler

WARNING

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

WARNING

This outdoor wood furnace is not intended or certified to be installed inside a building.

WARNING

This outdoor wood 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

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

WARNING

Allow the outdoor furnace to thoroughly cool and completely clean out the firebox before draining water from the outdoor furnace. If the water in the outdoor furnace ever boils, be sure to check the water level and restore to full. If water is added, the proper level of Corrosion Inhibitor Plus™ (p/n 1650) must be maintained.

WARNING

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

WARNING

ALWAYS store ashes in a covered non-combustible container.

WARNING

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

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

WARNING

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

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

WARNING

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

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

WARNING

Maintain the following clearances from combustibles for the furnace installation:

- **18" from the back**
- **6" from the sides**
- **48" from the front**
- **18" from the chimney inspection cover**
- **The foundation must be noncombustible**

IMPORTANT PRECAUTIONARY INFORMATION

The information contained on pages 5-6 appears throughout this manual. Be sure to read carefully and understand these precautions before, during and after the installation, operation and maintenance of the outdoor furnace.

WARNING

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

WARNING

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

WARNING

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

WARNING

Use only untreated wood in the firebox. Do not burn garbage, gasoline, rubber, engine oil, naptha, plastics, treated wood or combustibles other than wood.

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

NOTE: Do not use chemicals or fluids to start the fire. Use kindling and a small amount of paper to start an initial fire.

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

WARNING

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

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

WARNING

Sulfuric acid in the nitrite 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: A 40-watt appliance light bulb is recommended if replacement is necessary. Do not install a bulb in excess of 60 watts.

NOTE: In case of a power outage, either a generator or 12V battery with a power inverter can be used to provide electricity to operate the outdoor furnace.

SECTION 1 – OUTDOOR FURNACE INSTALLATION

To ensure the outdoor furnace functions as designed, careful planning and proper installation are imperative. This section outlines much of the information needed to install the outdoor furnace, select water lines, install circulation pumps and connect to your existing heating system.

Be sure to read carefully and observe all of the information, not only in this section, but 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.

PLANNING THE LOCATION

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

- ❑ Must be installed in accordance to all applicable codes and regulations.
- ❑ Check with your insurance company to see if they have any location requirements.
- ❑ Consider prevailing winds and the direction smoke 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 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 beneath the front portion of the slab and the area around the slab used for walking.

INSTALLATIONS IN MASSACHUSETTS:

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

INSTALLATION PRECAUTIONS

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.

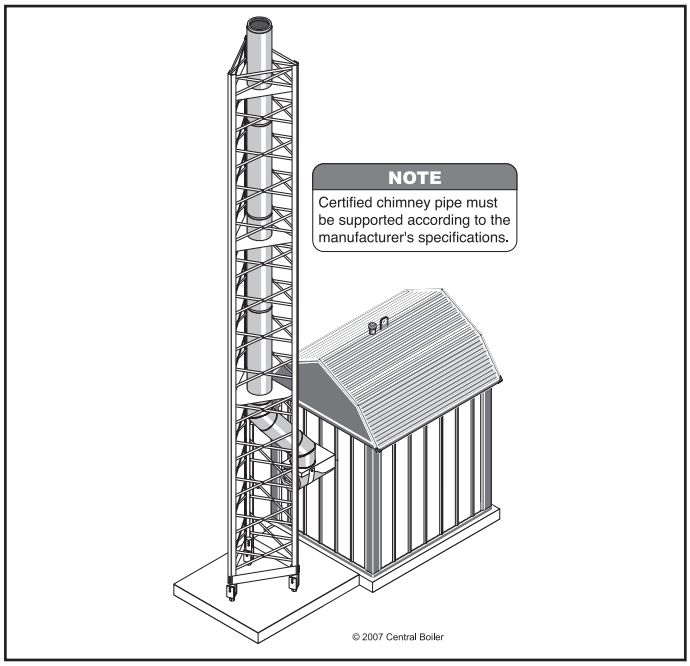
CHIMNEY HEIGHT AND REINFORCEMENT RECOMMENDATIONS

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. Each extension section must be secured at the connection joint with four (4) screws to stabilize the extension.

If extensions are added to the standard 12 feet of chimney, the chimney should be reinforced appropriately. 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. 2 and 3 for chimney reinforcement recommendations.

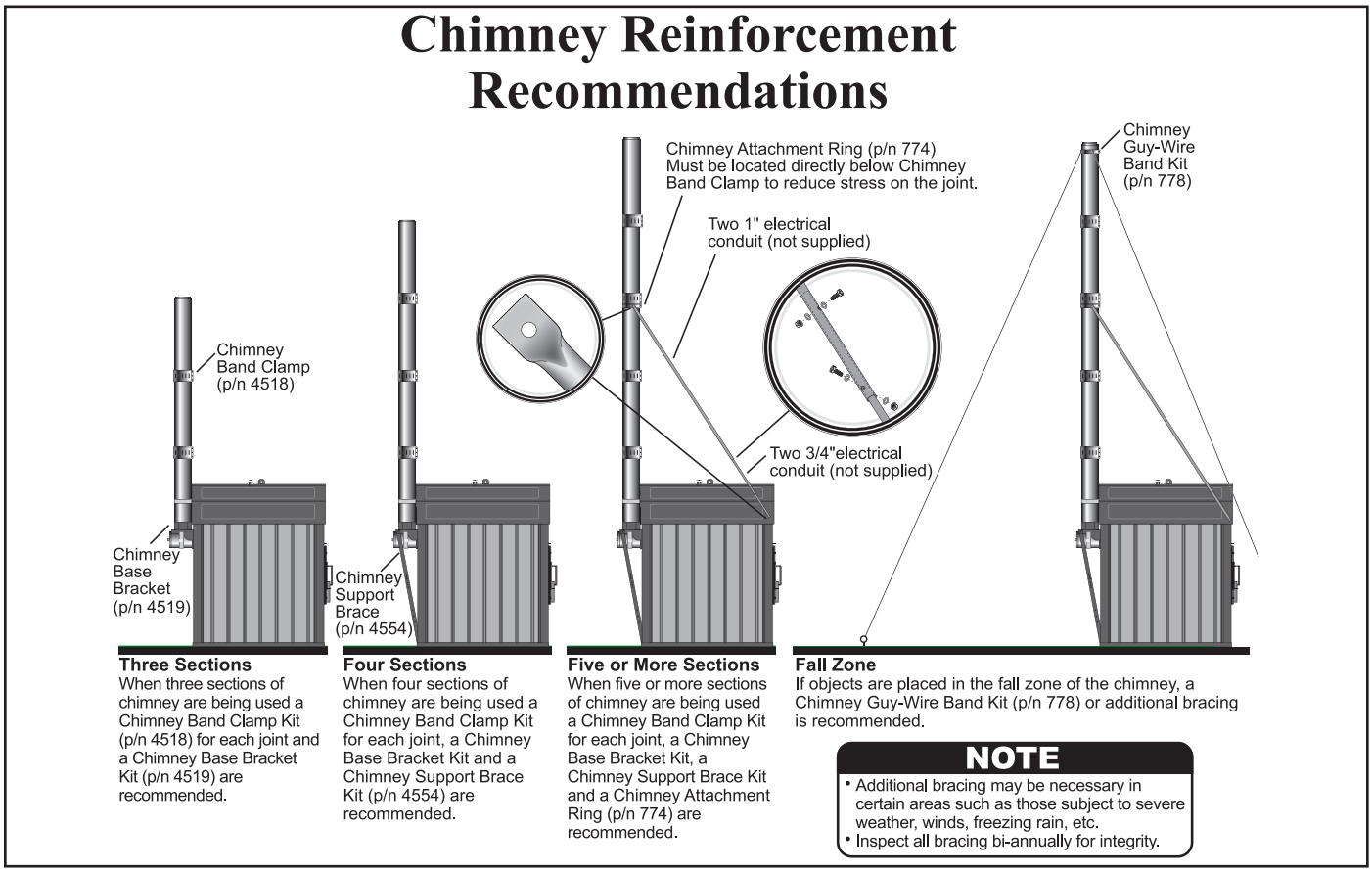
NOTE: If more than three 4-foot sections of chimney are used, a support (e.g., a pole, pipe or other structural support) may be installed from the ground that can withstand wind. Other reinforcement recommendations are shown in Fig. 3.

Fig. 2



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

Fig. 3



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 ashes, cleaning and refueling. Keep all highly combustible materials (e.g., gasoline, propane, leaves, pine needles, etc.) away from an operating unit at all times. Take special precautions in windy conditions.

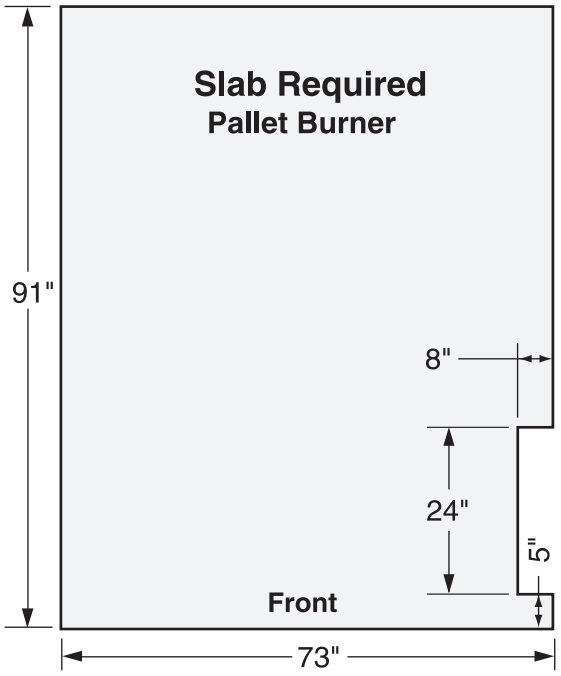
GENERAL INSTALLATION INFORMATION

Foundation

The Pallet Burner outdoor furnace must be installed on a concrete foundation. Refer to Fig. 4 for dimensions and for the location of the hollowed-out area. A 4" to 6" thick concrete slab works well; however, a thicker slab may be used to obtain the desired door opening height.

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

Fig. 4



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.

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). For recommended initial treatment rates, refer to Water Quality and Maintenance. 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 septic system. Central Boiler Corrosion Inhibitor Plus™ is biodegradable and can be properly treated in a septic system. If doing so, however, be careful not to overflow the tank.
- Do not drain the 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 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**.

Ground Rod Kit

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

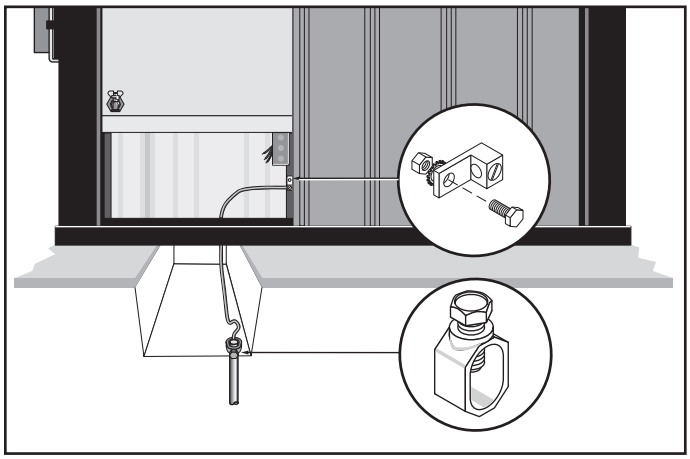
Install a Ground Rod Kit (p/n 6593) and connect it to the outdoor furnace.

1. In the water line trench near the outdoor furnace, drive the ground rod into the ground until the top of the ground rod is below the ground surface.
2. Route the ground wire from the ground rod under the outdoor furnace base and over to either a vertical brace or the frame of the outdoor furnace.

NOTE: On some models, a 1/4" hole for the ground terminal has been pre-drilled in the outdoor furnace base. Check to see if there is an existing 1/4" hole before drilling the hole in Step 3.

3. Drill a 1/4" hole in the brace; then secure the ground terminal with a cap screw (1/4" x 20" x 3/4"), star washer and nut. Secure the ground wire to the terminal; then secure the ground wire to the ground rod with the clamp. Tighten all hardware securely.

Fig. 5



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 building, 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 trench 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.

Temporary Above Ground or Winter Installations

For temporary 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.

NOTE: 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 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., stray, hay, leaves, etc.).

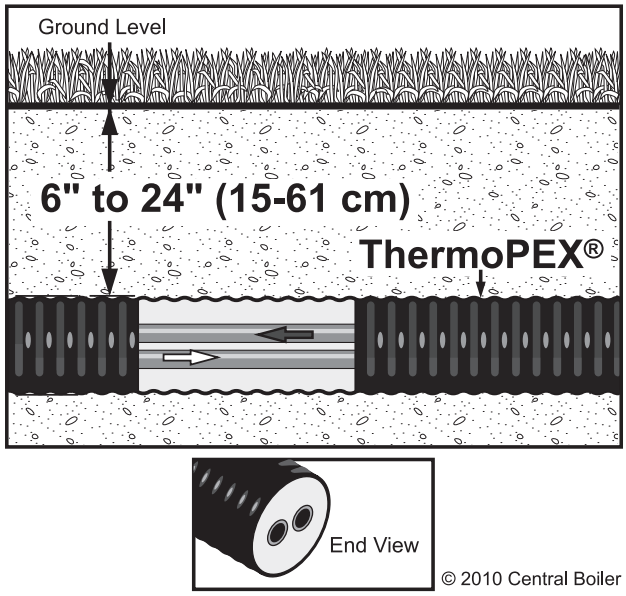
Digging the Trench

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. 6



© 2010 Central Boiler

Underground Electric Wire

A 14-2 (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. It is recommended that the incoming fuse or circuit breaker not exceed 15 amps.

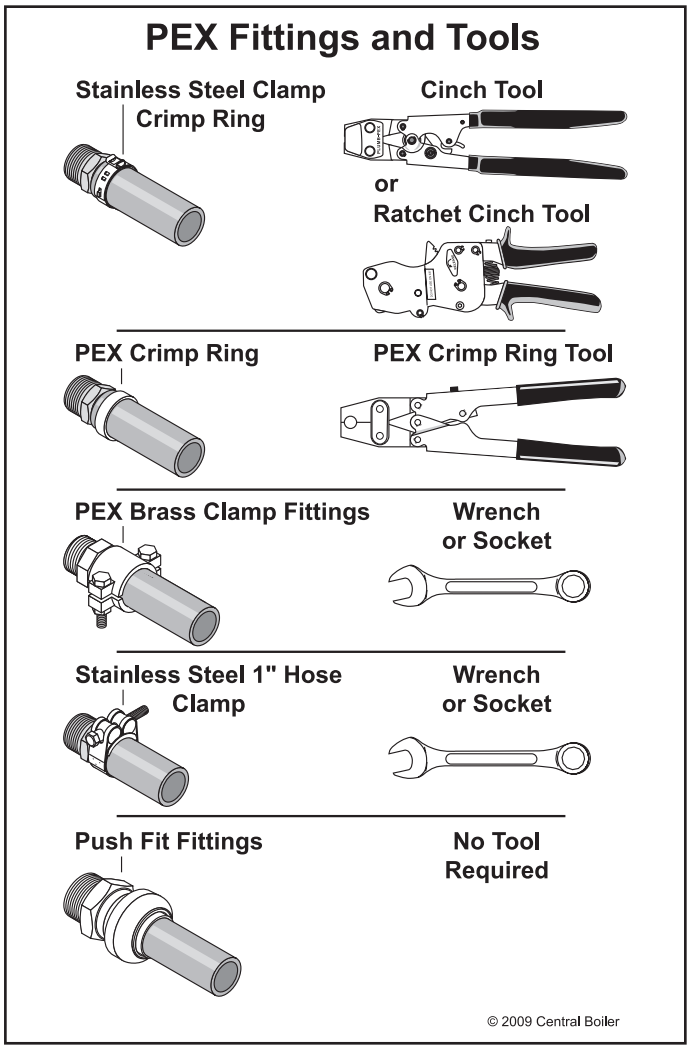
Connecting to Existing Heating System

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/cm^2) 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. 7 shows some of the PEX fittings and tools used in making connections.

Fig. 7



CAUTION

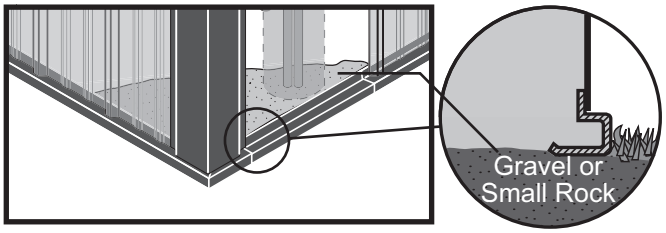
Allow for expansion and contraction of the supply and return lines at each end. Without an allowance for expansion and contraction, the lines may kink or the fittings may be pulled apart, causing an immediate water loss from the outdoor furnace. Central PEX water lines can have an expansion and contraction 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.

8. Install the base trim; then, using gravel or small rock, backfill the perimeter of the ThermoPEX line enclosure to the bottom, inner edge of the base (Fig. 8). Install the siding panel.

Fig. 8



AUXILIARY BURNER

The auxiliary burner must be installed by a qualified installer in accordance with local and state and applicable national codes. Where required by the authority having jurisdiction, the installation must conform to the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.

Each optional burner is accompanied by Central Boiler instructions and the manufacturer's instructions which provide the information for proper installation, setup, adjustment and service.

Upon completion of the installation, the entire installation must be inspected and all safety shutoff devices tested according to the manufacturer's instructions.

INSTALLING FUEL TANK & GAS PIPING

If installing a fuel tank, it must be installed by a qualified installer familiar with all regulations and must conform to the authorities having jurisdiction, or in the absence of such requirements, with the NFPA 31, the National Fuel Gas Code ANSI Z223. or CAN/CGA B149.

All gas piping must conform to the authorities having jurisdiction, or in the absence of such requirements, with the National Fuel Gas Code ANSI Z223.1 or CAN/CGA B149. The line should be dug in underground to the outdoor furnace and supported to the burner appropriately.

The pipings should be installed and tested for leaks by a qualified installer familiar with all regulations.

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 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 in the plenum of the existing furnace, and then to the return port of the outdoor furnace.

NOTE: Some systems may have different flow patterns.

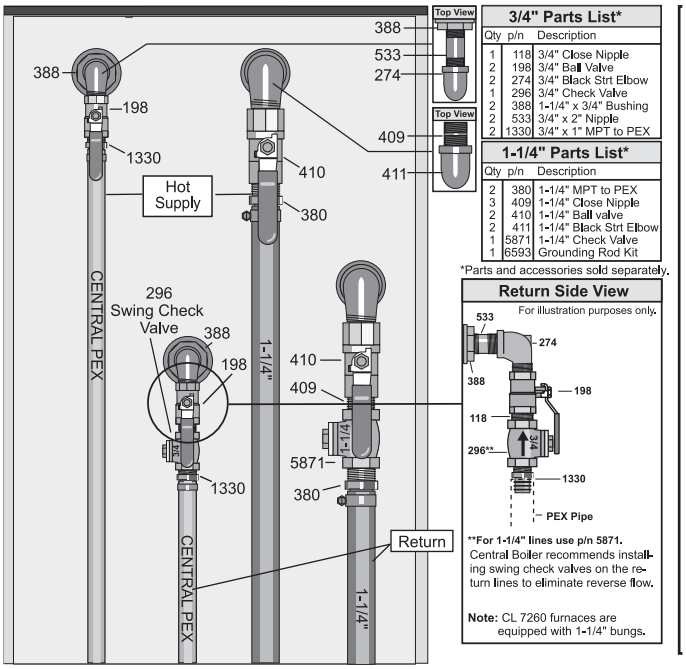
Access to Ports on Outdoor Furnace

Access to the hot and cold outlets is gained by opening the control panel on the right-hand side of the outdoor furnace.

The upper ports are the hot supply outlets and the lower ports are the return inlets. This configuration allows for mounting the circulation pumps on the outdoor furnace. Fig. 9 shows the configuration for proper supply and return line and pump installations.

NOTE: Pallet Burner outdoor furnaces are equipped with 1-1/4 inch bungs.

Fig. 9



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.

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 information.

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

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

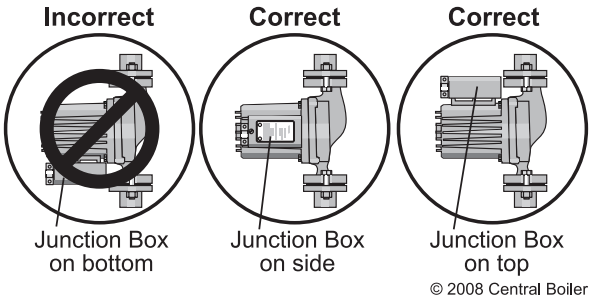
WARNING

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. 10). If necessary, remove the four screws and rotate the pump body.

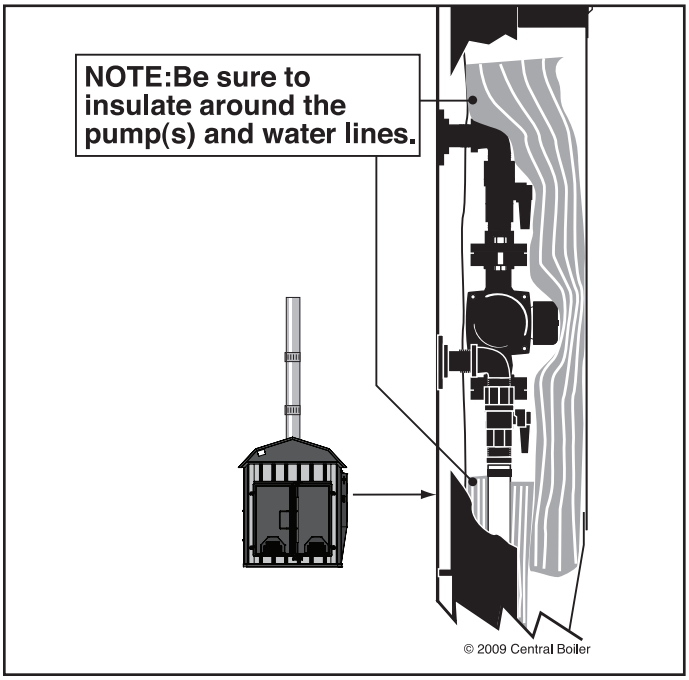
Fig. 10



C. Do not operate the circulation pump until the entire system has been filled with water and checked for leaks or the pump will be damaged.

D. Insulate the areas around the supply and return lines, pumps and drain valve (Fig. 11); then install and secure the back panel.

Fig. 11



NOTE: If installing three pumps on the outdoor furnace, use a UL approved adapter on the receptacle outlet.

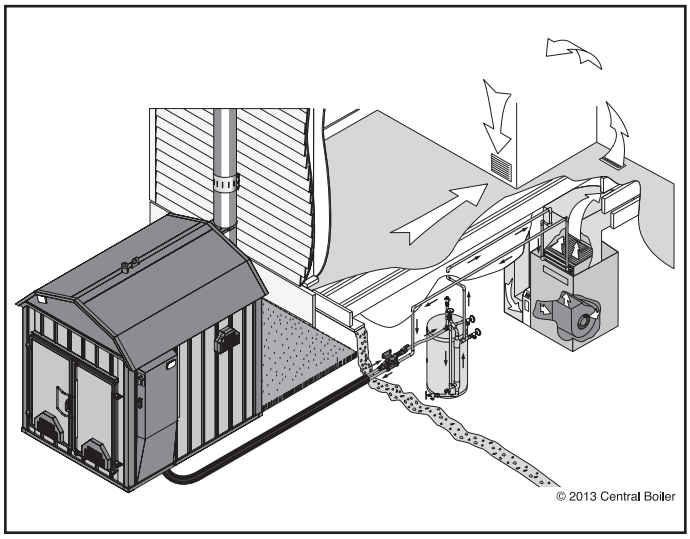
NOTE: At least one circulation pump must run continuously to ensure proper operation of the outdoor furnace.

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).

The pump(s)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 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 information.

Fig. 12



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. 13 and 14). 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. 13

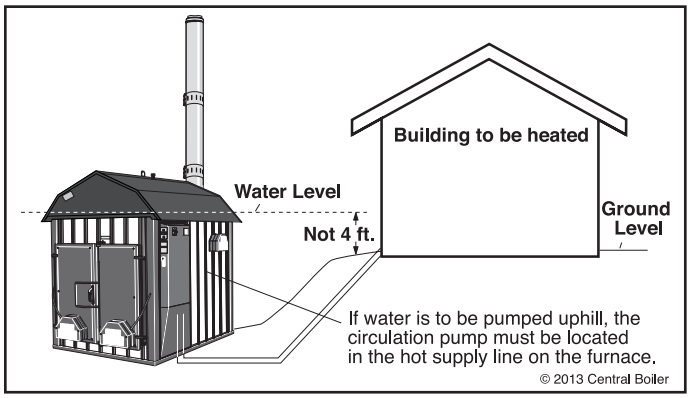
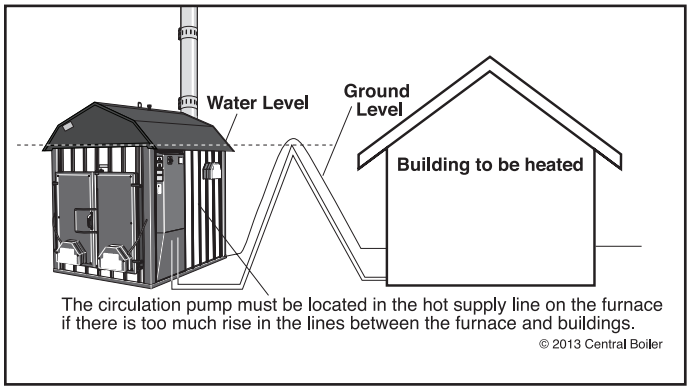
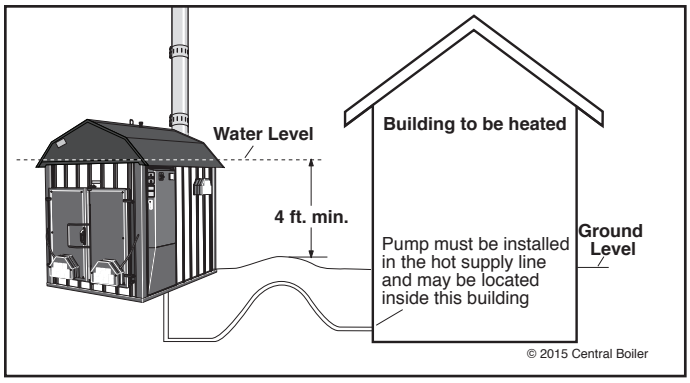


Fig. 14



If not mounted on the outdoor furnace, the circulation pump(s) must be mounted 4 to 5 feet lower than the top water level in the outdoor furnace (see Fig. 15).

Fig. 15



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 thermostatic valve with installation instructions is included with each new Pallet Burner and must be installed on each set of supply and return lines or warranty can be voided.

NOTE: For additional thermostatic valves (3/4" or 1-1/4" thermostatic valves are available), contact your authorized Central Boiler dealer.

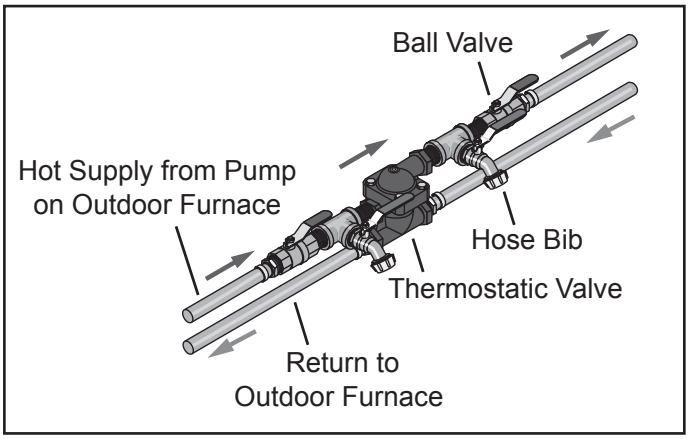
NOTE: The thermostatic valves illustrated throughout the manual may vary from your installation. See the installation instructions provided with the thermostatic valve.

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.

NOTE: The thermostatic valve must be installed in the building to be heated.

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 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. 16



Thermostatic Valve Exemption

If the system includes more than one building and one of the buildings is heated with an oil, gas or electric boiler that also serves as a backup for the other building(s) by keeping the system water temperature above 150˚F (65˚C) when the outdoor wood furnace is not fired, the thermostatic valve is not required.

Thermostatic Valve - How It Works

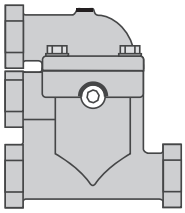
(arrow indicates water flow)

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

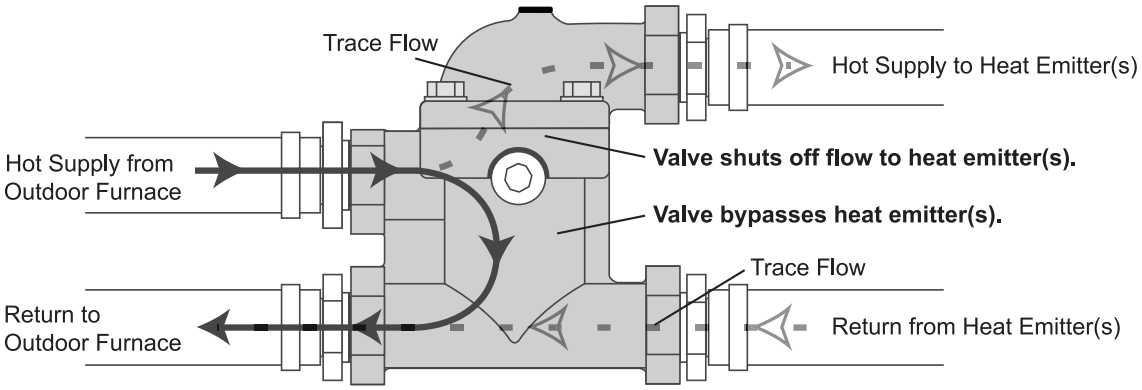
The proper level of Corrosion Inhibitor Plus™ (p/n 1650) must be maintained (see Owner's Manual for more information).



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

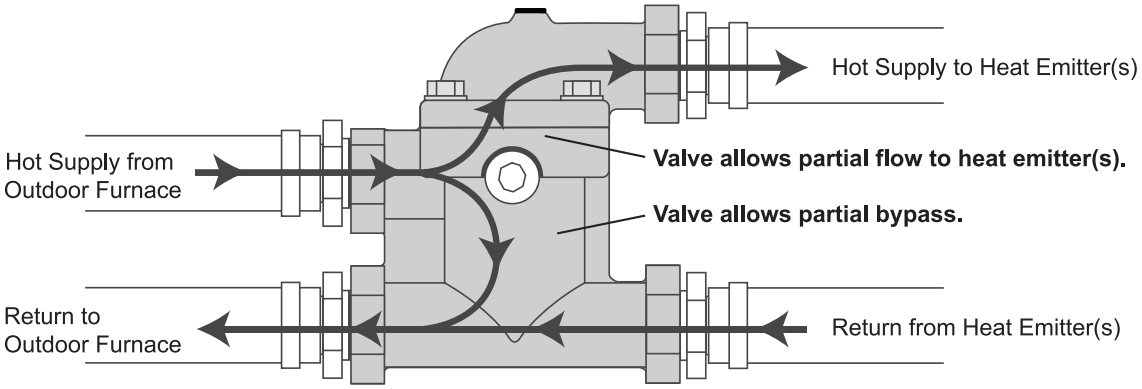
Water Below 150°F at Thermostatic Valve

(water returns to furnace to be reheated)



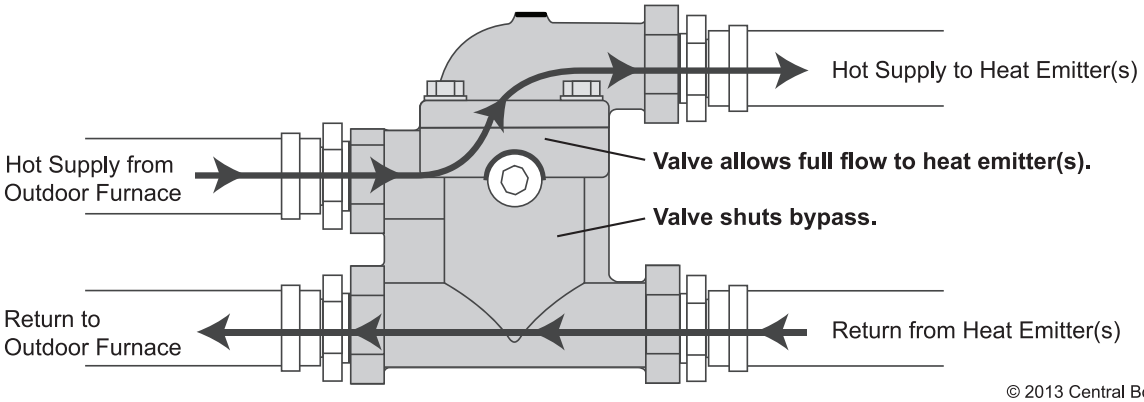
Water at 150°F up to 170°F at Thermostatic Valve

(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))



© 2013 Central Boiler

Purging Air from the System - Manual Air Bleeders

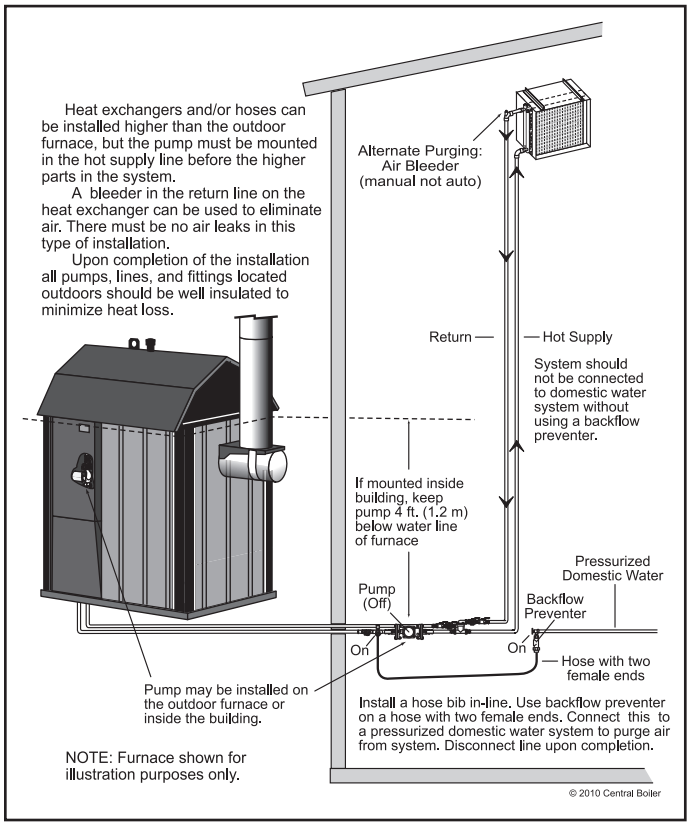
Manual air bleeders may be installed in the high points of the water lines where air may get trapped and cause circulation problems. Water can be pumped to levels higher than the outdoor furnace as long as the pump is **pushing** the water to the higher level and there are no air leaks in the system. Air should be purged from the system using pressurized domestic water and a hose with two female ends (see Fig. 17 and 35).

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. 17



NOTE: See the Hydronic Component Selection Guide (p/n 2482) for more 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. 18). 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 for the hot water heat exchanger.

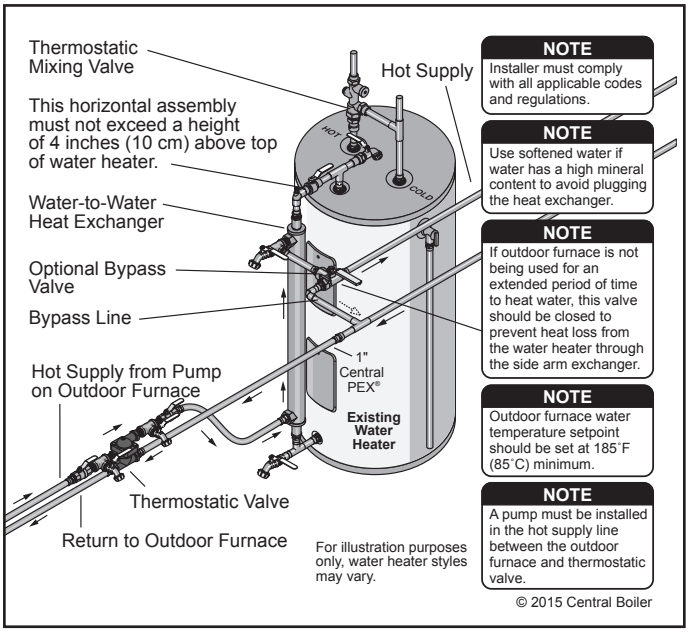
NOTE: If the water heater has been in service, flush the water heater prior to installing the hot water heat exchanger. Anode rod residue or other sediments in the water heater may plug the heat exchanger.

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. 18



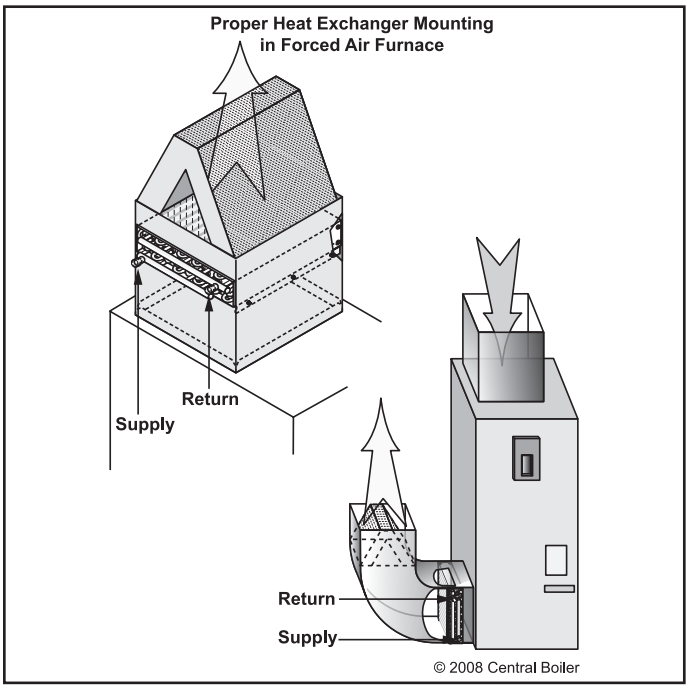
EXISTING FORCED AIR INSTALLATION

When the Pallet Burner Outdoor Wood Furnace 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 heating system 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. 19).

Fig. 19



- 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 heating (gas or electric) system should be operated before adding the heat exchanger.
- The air temperature rise should be measured with the system 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 heating system 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.

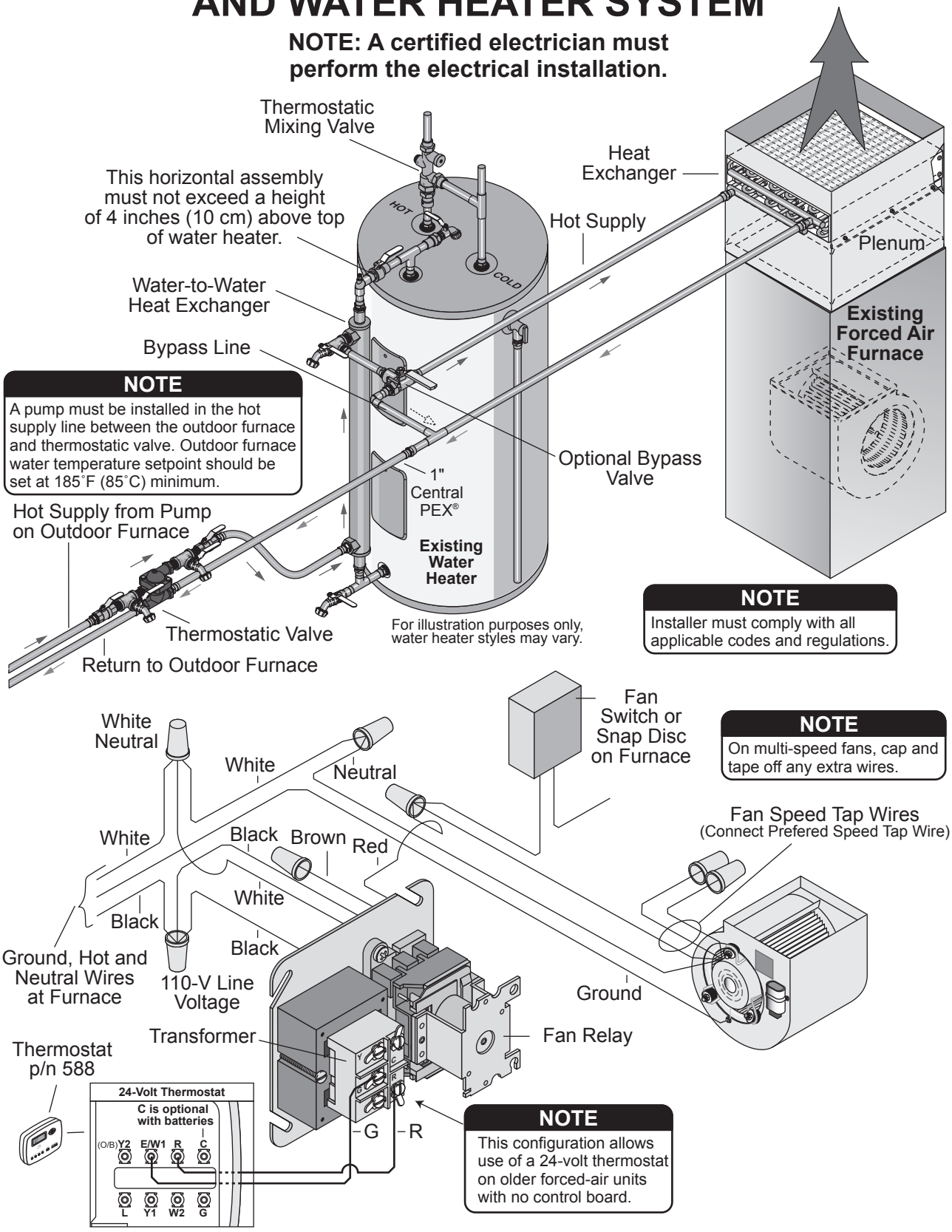
NOTE: Any electrical installation should be done by a certified electrician in accordance with all applicable codes.

- 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.

Fig. 20

WATER-TO-AIR HEAT EXCHANGER AND WATER HEATER SYSTEM

NOTE: A certified electrician must perform the electrical installation.



NOTE

A pump must be installed in the hot supply line between the outdoor furnace and thermostatic valve. Outdoor furnace water temperature setpoint should be set at 185˚F (85˚C) minimum.

NOTE

Installer must comply with all applicable codes and regulations.

NOTE

On multi-speed fans, cap and tape off any extra wires.

NOTE

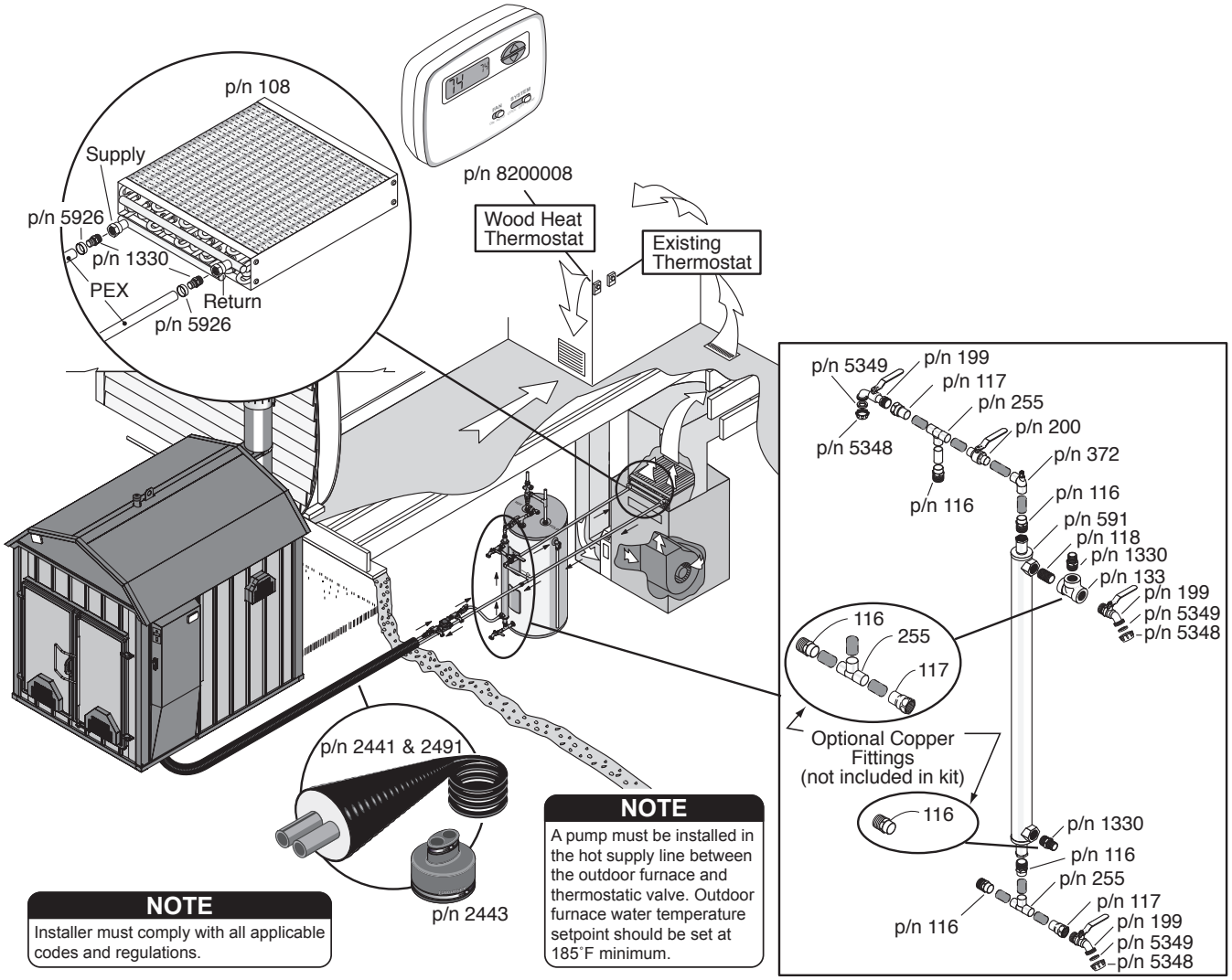
This configuration allows use of a 24-volt thermostat on older forced-air units with no control board.

For illustration purposes only.

© 2015 Central Boiler

Fig. 21

Forced Air Heating System



© 2015 Central Boiler

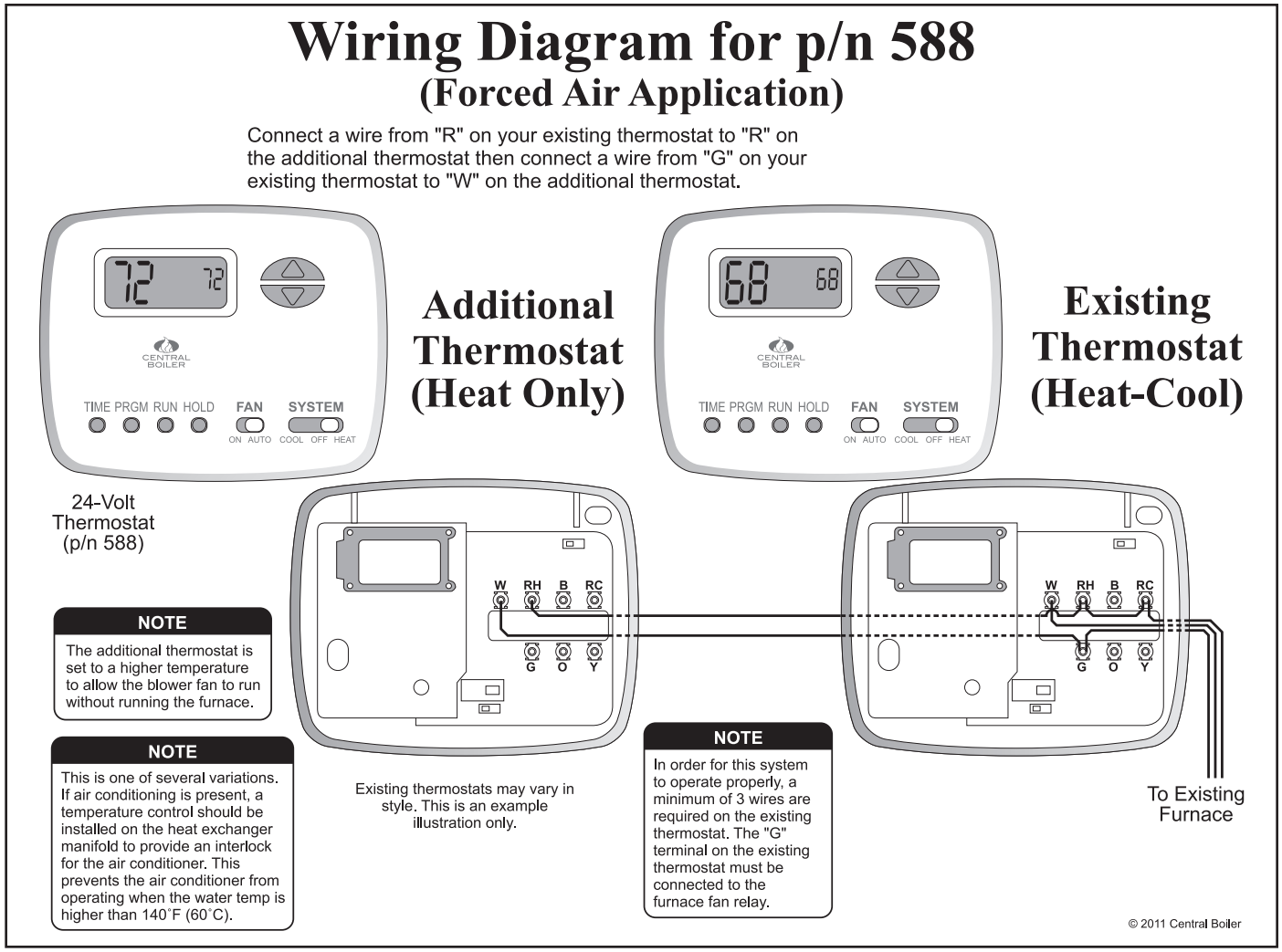
Thermostatic Controls

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. 22 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 line 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 building (to prevent the water in the outdoor furnace from freezing).

Fig. 22



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. If the return water temperature can not be maintained above 150°F, then a separate pump should be used for each zone. A thermostatic bypass valve should be installed to ensure that the water temperature in the outdoor furnace is maintained above 150˚F.

If a manifold is used (as illustrated in Fig. 23), 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 (as illustrated in Fig. 23) to allow for purging air from the zones.

Models with side panels offer three sets of supply and return ports (for up to three zones or buildings, without the need for manifolds) for mounting of up to three pumps on the outdoor furnace.

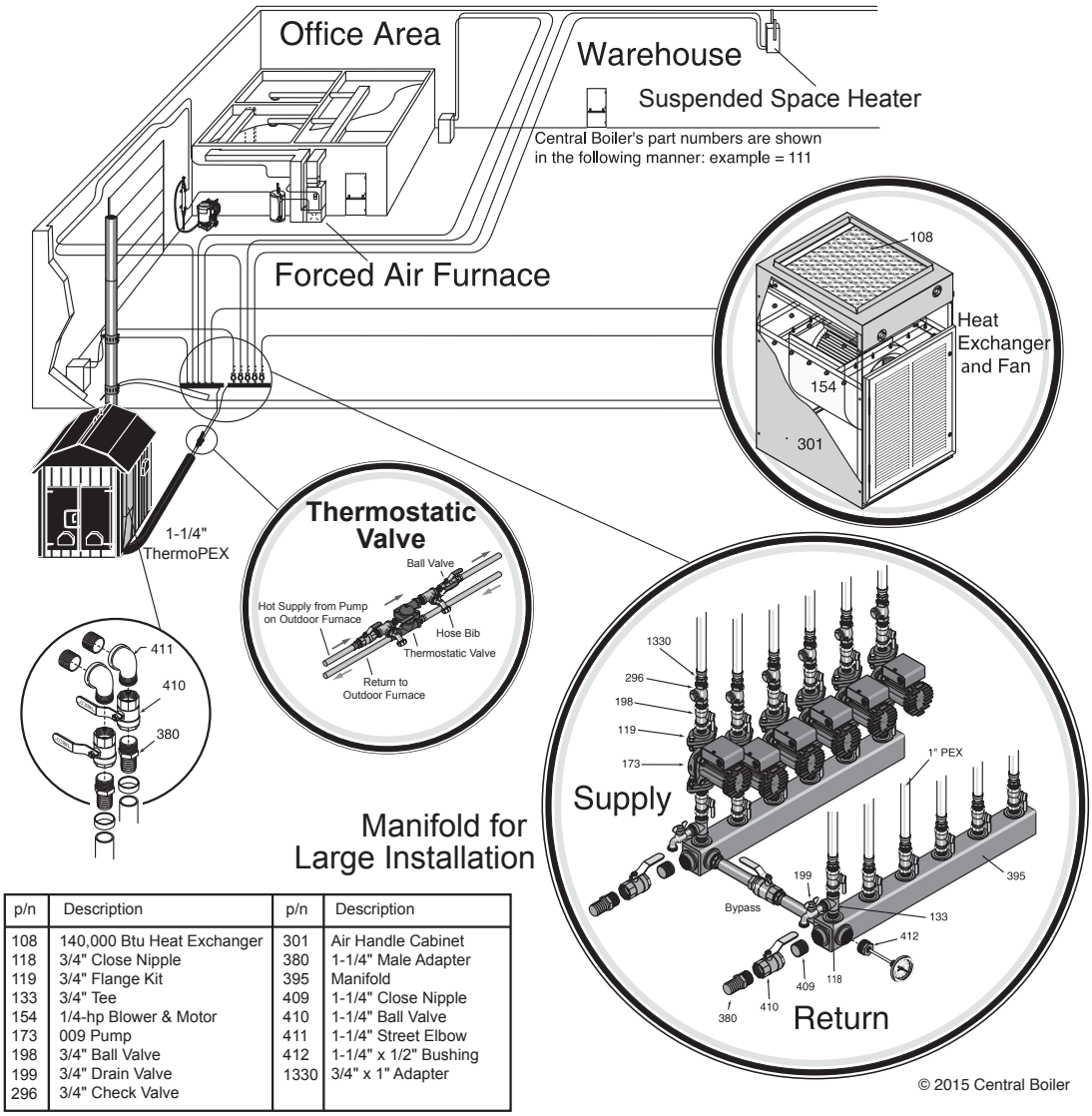
NOTE: If a Taco 014 pump is used, the pump should be mounted at the base of the outdoor furnace and a 1-1/4" supply line to the pump should be used to ensure adequate supply feed to the pump.

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 wood or the heat load exceeds the capacity of the outdoor furnace.

Fig. 23

Typical Large System Installation



p/n	Description	p/n	Description
108	140,000 Btu Heat Exchanger	301	Air Handle Cabinet
118	3/4" Close Nipple	380	1-1/4" Male Adapter
119	3/4" Flange Kit	395	Manifold
133	3/4" Tee	409	1-1/4" Close Nipple
154	1/4-hp Blower & Motor	410	1-1/4" Ball Valve
173	009 Pump	411	1-1/4" Street Elbow
198	3/4" Ball Valve	412	1-1/4" x 1/2" Bushing
199	3/4" Drain Valve	1330	3/4" x 1" Adapter
296	3/4" Check Valve		

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.

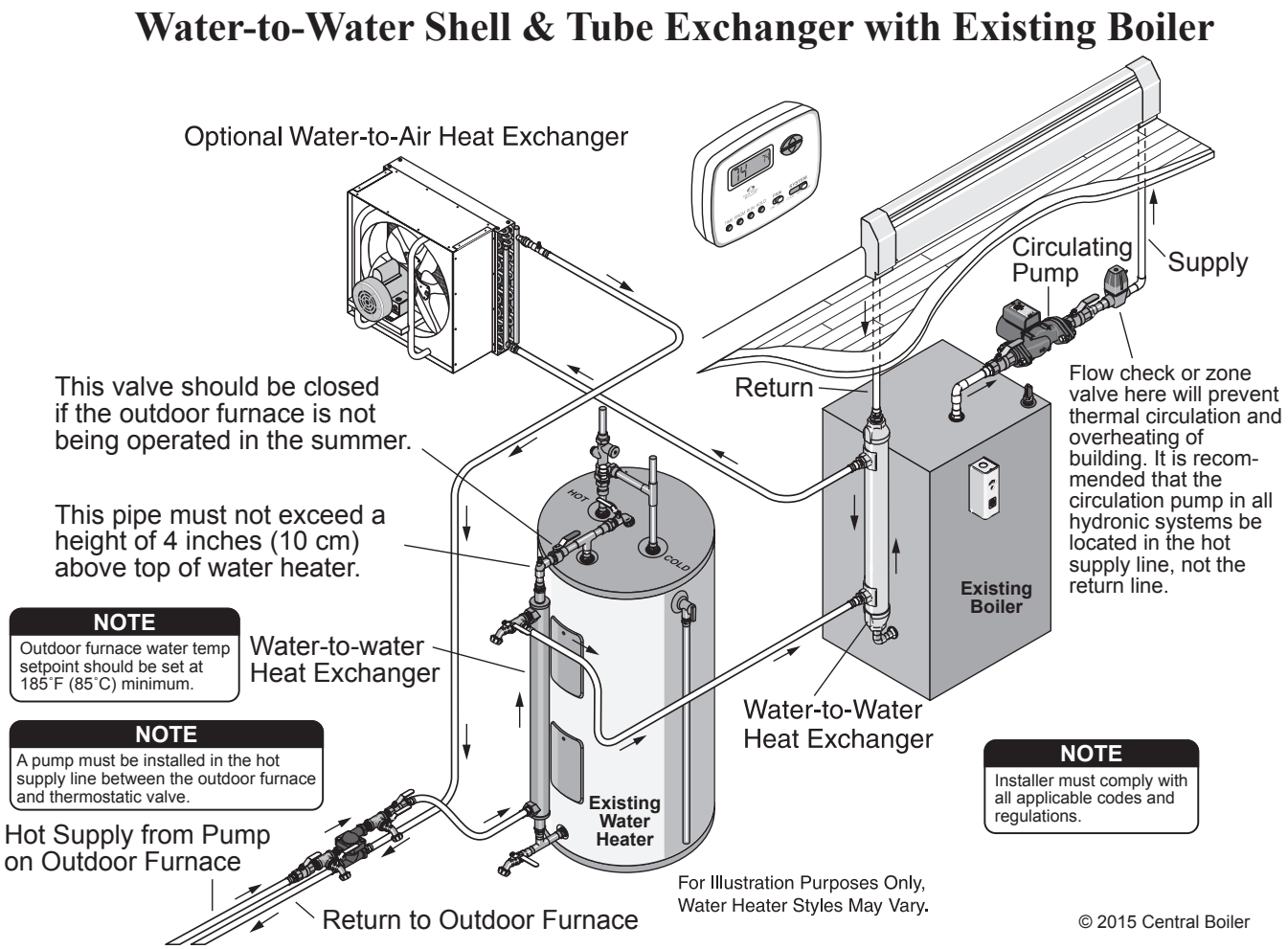
Evaluate the existing hot water heating system before starting the installation. If the existing hot water heating system has been unable to maintain the temperatures in the building at any time during cold weather before installing the outdoor furnace, then the hot water heating system is not adequate. 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. Some existing finned tube baseboard hot water heating systems are designed to operate with water temperatures up to 220°F or higher.

If the existing heating system is marginal or designed to operate with water temperatures above 165°F, 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. 24). 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. 24



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. 25). 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 building. 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.

Water-to-water heat exchangers will produce transfer temperatures approximately 20ºF less than the outdoor furnace water temperature; therefore if the outdoor furnace water temperature is 185°F, it will produce approximately 165°F 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 195ºF. Each system will vary in water temperature transfer depending upon the heat load of the existing heating system.

The addition of a wraparound pump with a water-to-water heat exchanger 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.

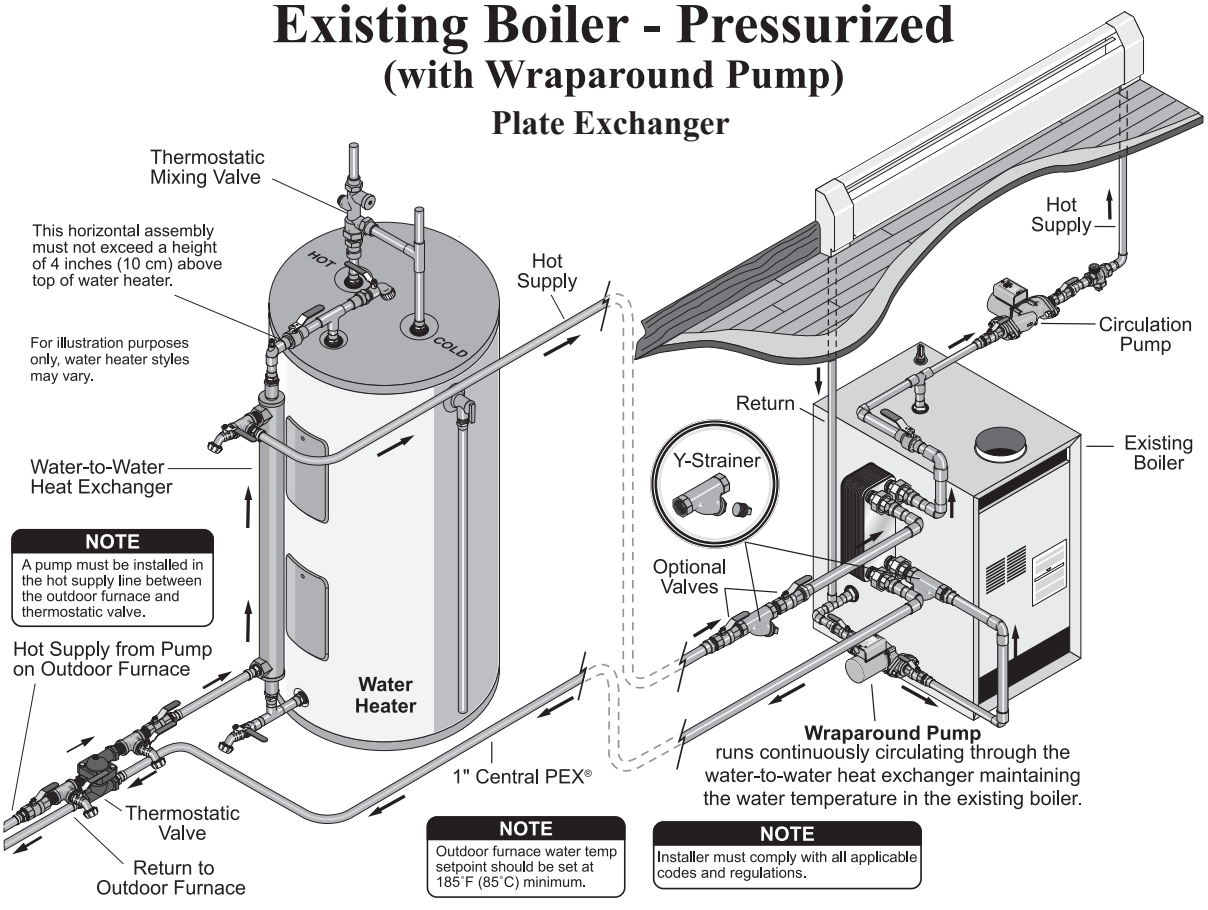
With this type of installation, the exchange temperature may be more than 165°F and may eliminate the need for additional baseboard heaters, panel radiators or heat exchangers.

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. 25. Also be sure to add Corrosion Inhibitor Plus™ (p/n 1650).

A Taco 007 pump can be used as a wraparound pump when a plate exchanger is installed. A Taco 009 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.

Fig. 25



Vented System Installation

The Pallet Burner Outdoor Wood Furnace 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. 26). 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. 26, 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.

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

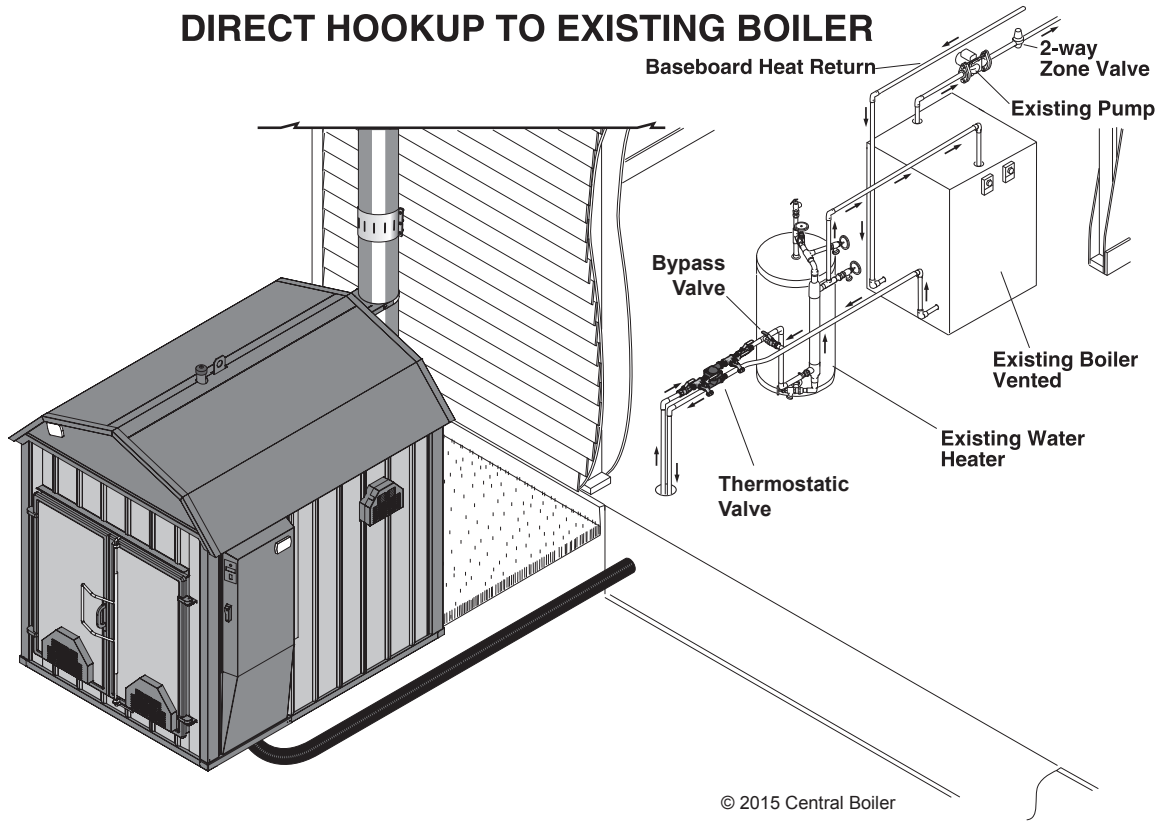
Do not apply more pressure to the indoor system than the pressure relief valve on the existing boiler is rated for.

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.

Fig. 26



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. Fig. 27 and 28 illustrate direct circulation baseboard installation examples.

CAUTION

This outdoor furnace is not intended to be the only source of heat.

Fig. 27

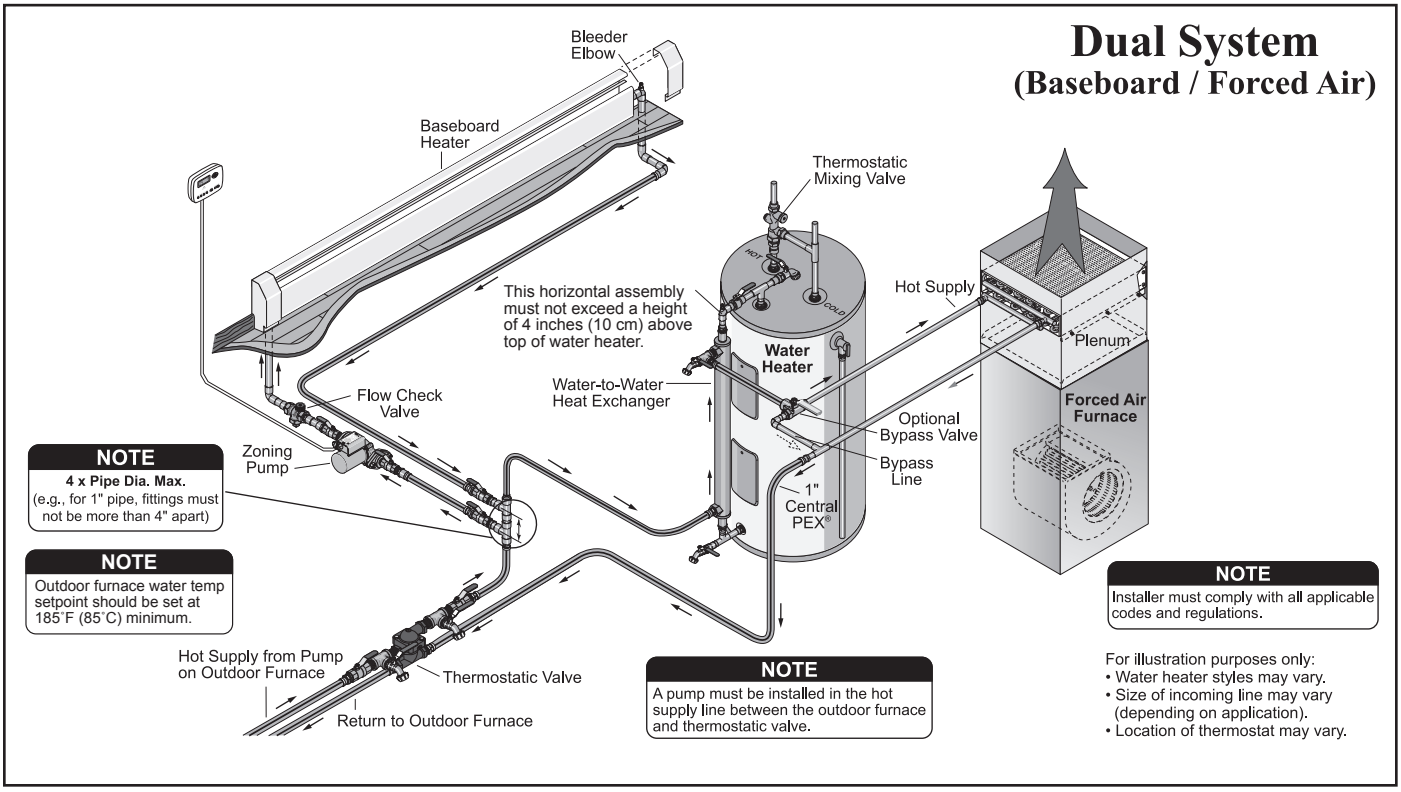
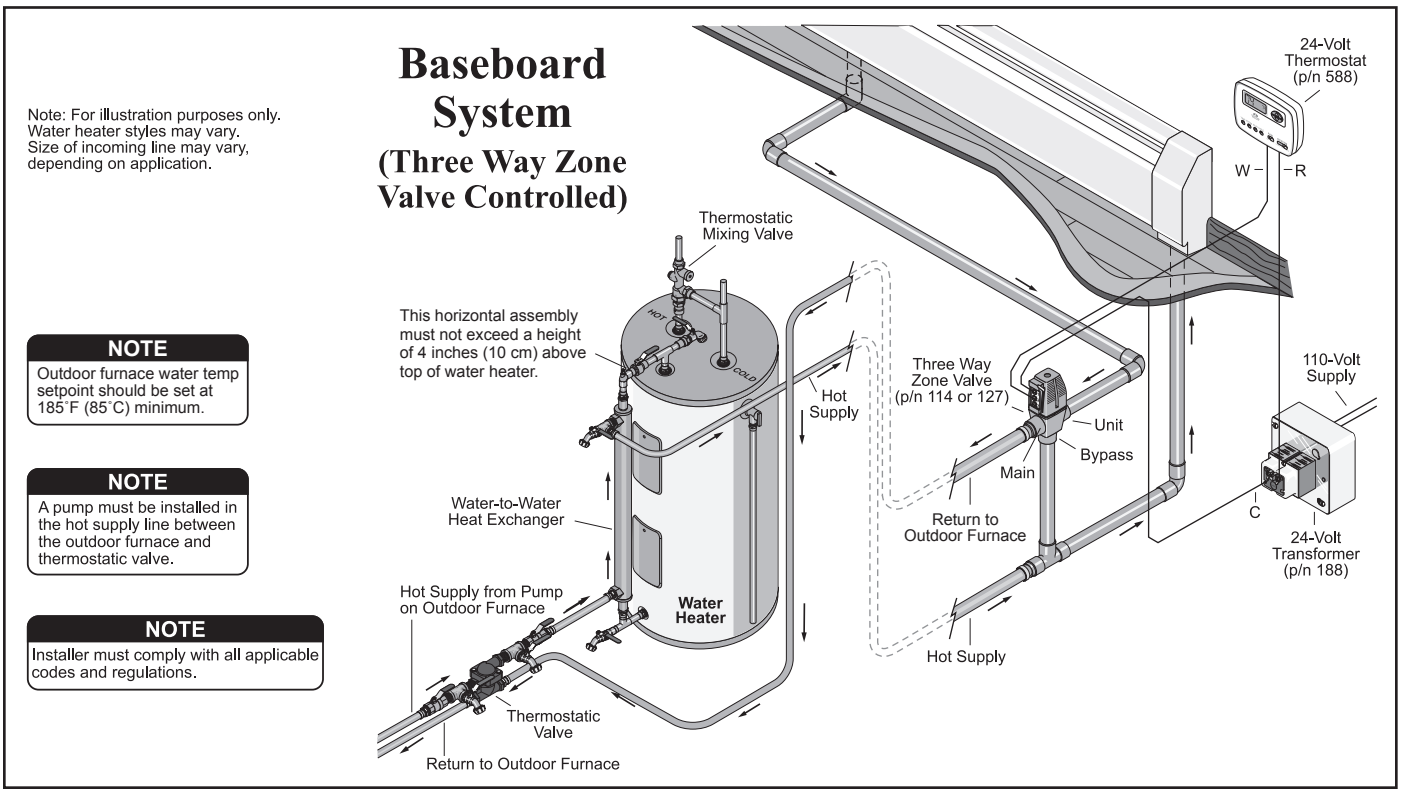


Fig. 28



Radiant Floor System Installations

Installing radiant floor (ceiling) heating is a very viable heating option when either remodeling or building new. Radiant floor heat can also be added easily if the floor joists are exposed (as in an unfinished basement). Tubing 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

When installing tubing between floor joists (16" on center) run two 1/2" tubes between each joist. Insulate below the tubing to prevent excessive heat in the lower level.

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 tubing 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 of blueboard insulation is recommended. Two 1" layers of blueboard can be used. This allows lapping of the joints in the 4' x 8' sheets.

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

NOTE: A minimum of one inch of insulation should be used. Two inches of insulation and vapor barrier below the insulation is recommended.

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

For examples of radiant heating systems using 1/2" tubing in the loops, refer to Fig. 29 through Fig. 32.

The spacing of each circuit should be 12" between tubes. 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" 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.

NOTE: 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 wood; however, once warm, wood consumption will be reduced if the concrete slab and building are insulated properly .

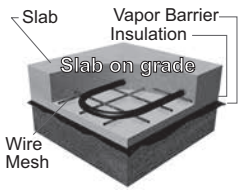
NOTE: For zone installations, refer to Fig. 30 (multi-zone) or Fig. 32 (single zone).

Fig. 29

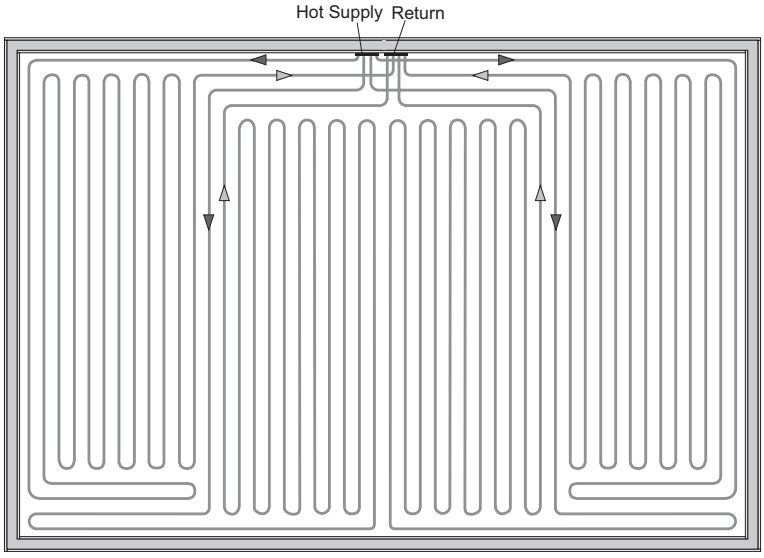
Radiant Floor Heat

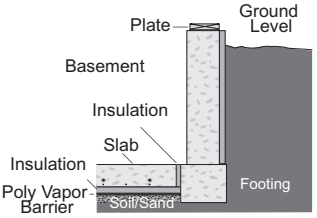
(For Slab on Grade or Basement)

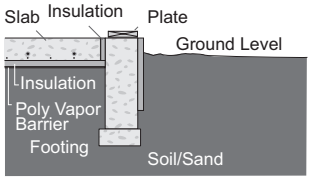
NOTE: If the temperature of the concrete slab is below freezing (32˚F), there must be adequate antifreeze in the system, or the slab must be pre-heated, before water is circulated through the radiant slab system.



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







© 2013 Central Boiler

Fig. 30

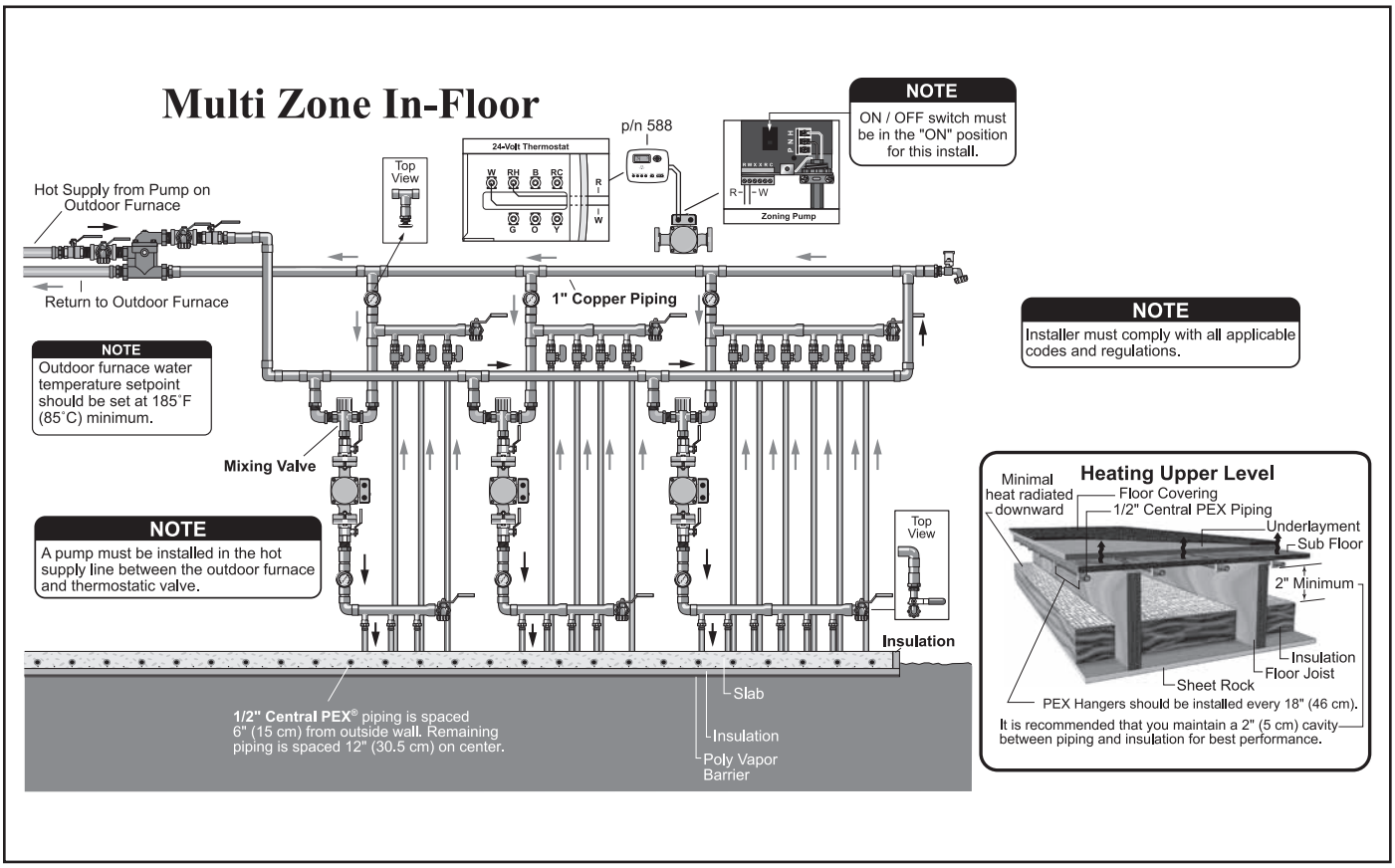

Multi Zone In-Floor
NOTE
ON / OFF switch must be in the "ON" position for this install.
p/n 588
24-Volt Thermostat
Top View
Zoning Pump
Hot Supply from Pump on Outdoor Furnace
Return to Outdoor Furnace
1" Copper Piping
NOTE
Outdoor furnace water temperature setpoint should be set at 185˚F (85˚C) minimum.
NOTE
Installer must comply with all applicable codes and regulations.
Mixing Valve
NOTE
A pump must be installed in the hot supply line between the outdoor furnace and thermostatic valve.
Top View
Insulation
Slab
1/2" Central PEX® piping is spaced 6" (15 cm) from outside wall. Remaining piping is spaced 12" (30.5 cm) on center.
Insulation
Poly Vapor Barrier
Heating Upper Level
Minimal heat radiated downward
Floor Covering
1/2" Central PEX Piping
Underlayment
Sub Floor
2" Minimum
Insulation
Floor Joist
Sheet Rock
PEX Hangers should be installed every 18" (46 cm).
It is recommended that you maintain a 2" (5 cm) cavity between piping and insulation for best performance.

Fig. 31

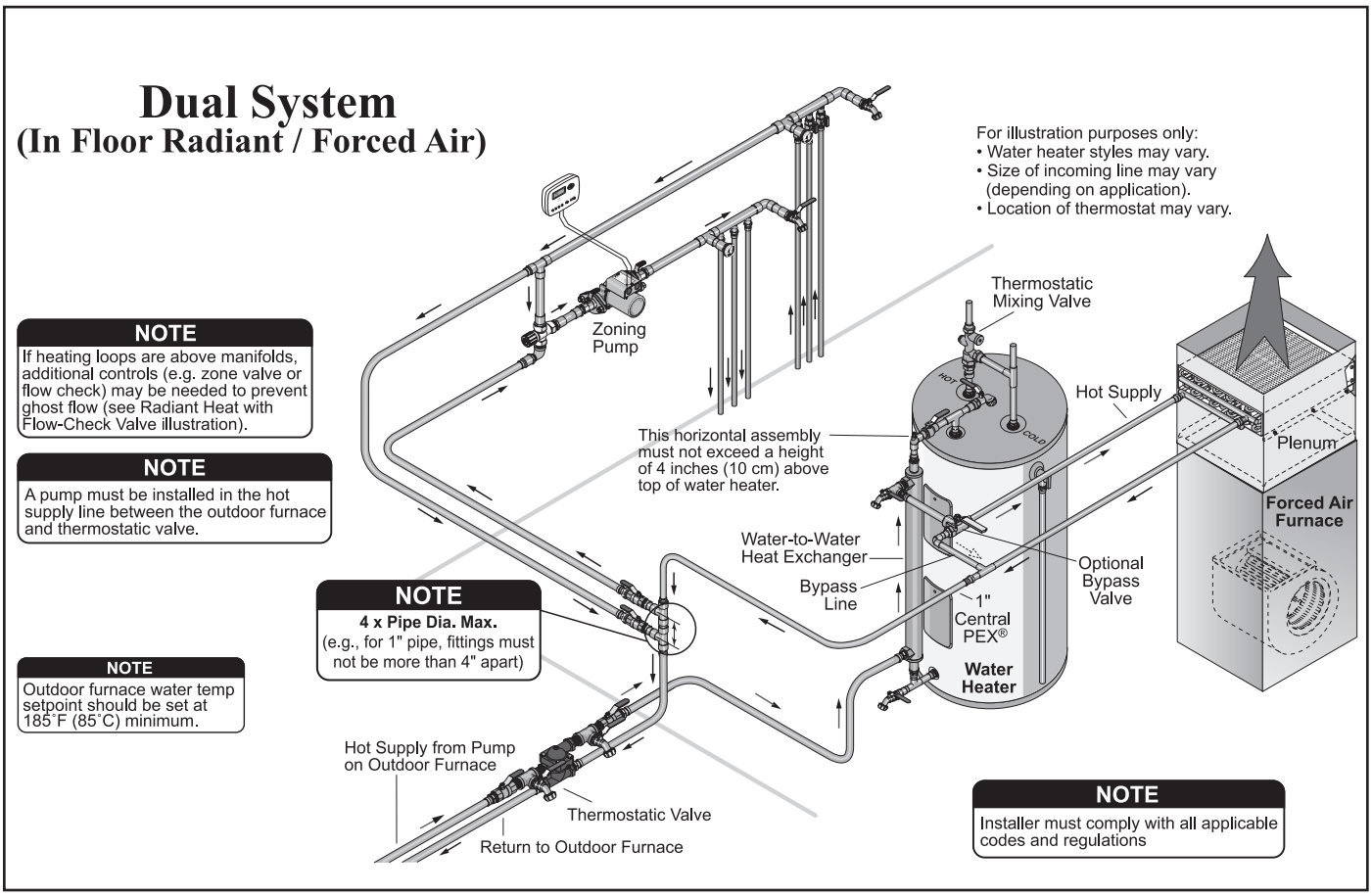

Dual System
(In Floor Radiant / Forced Air)
For illustration purposes only:
• Water heater styles may vary.
• Size of incoming line may vary (depending on application).
• Location of thermostat may vary.
NOTE
If heating loops are above manifolds, additional controls (e.g. zone valve or flow check) may be needed to prevent ghost flow (see Radiant Heat with Flow-Check Valve illustration).
NOTE
A pump must be installed in the hot supply line between the outdoor furnace and thermostatic valve.
NOTE
Outdoor furnace water temp setpoint should be set at 185˚F (85˚C) minimum.
Zoning Pump
Thermostatic Mixing Valve
Hot Supply
Plenum
Forced Air Furnace
This horizontal assembly must not exceed a height of 4 inches (10 cm) above top of water heater.
Water-to-Water Heat Exchanger
Optional Bypass Valve
Bypass Line
1" Central PEX®
Water Heater
NOTE
4 x Pipe Dia. Max.
(e.g., for 1" pipe, fittings must not be more than 4" apart)
Hot Supply from Pump on Outdoor Furnace
Thermostatic Valve
Return to Outdoor Furnace
NOTE
Installer must comply with all applicable codes and regulations

Fig. 32

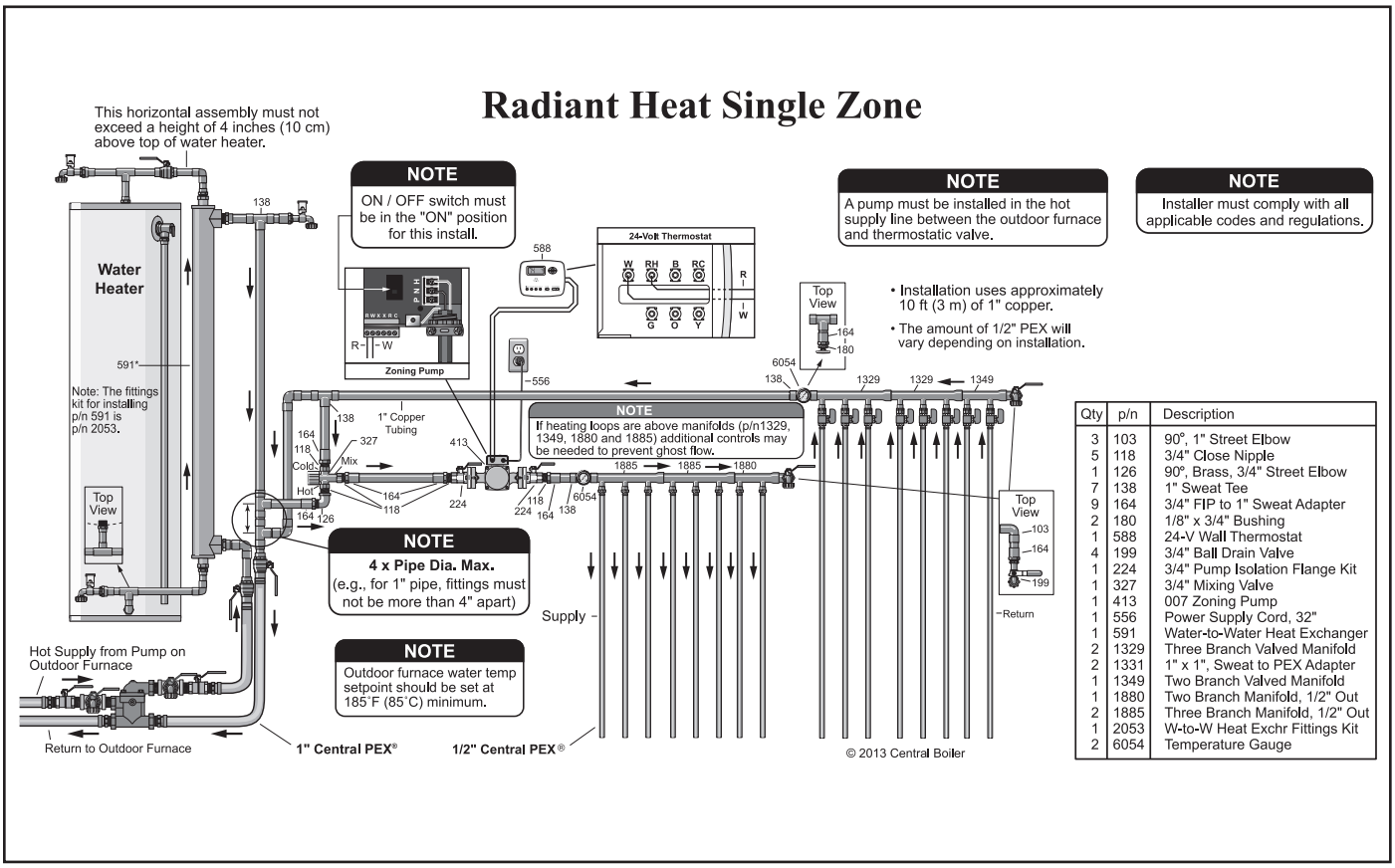
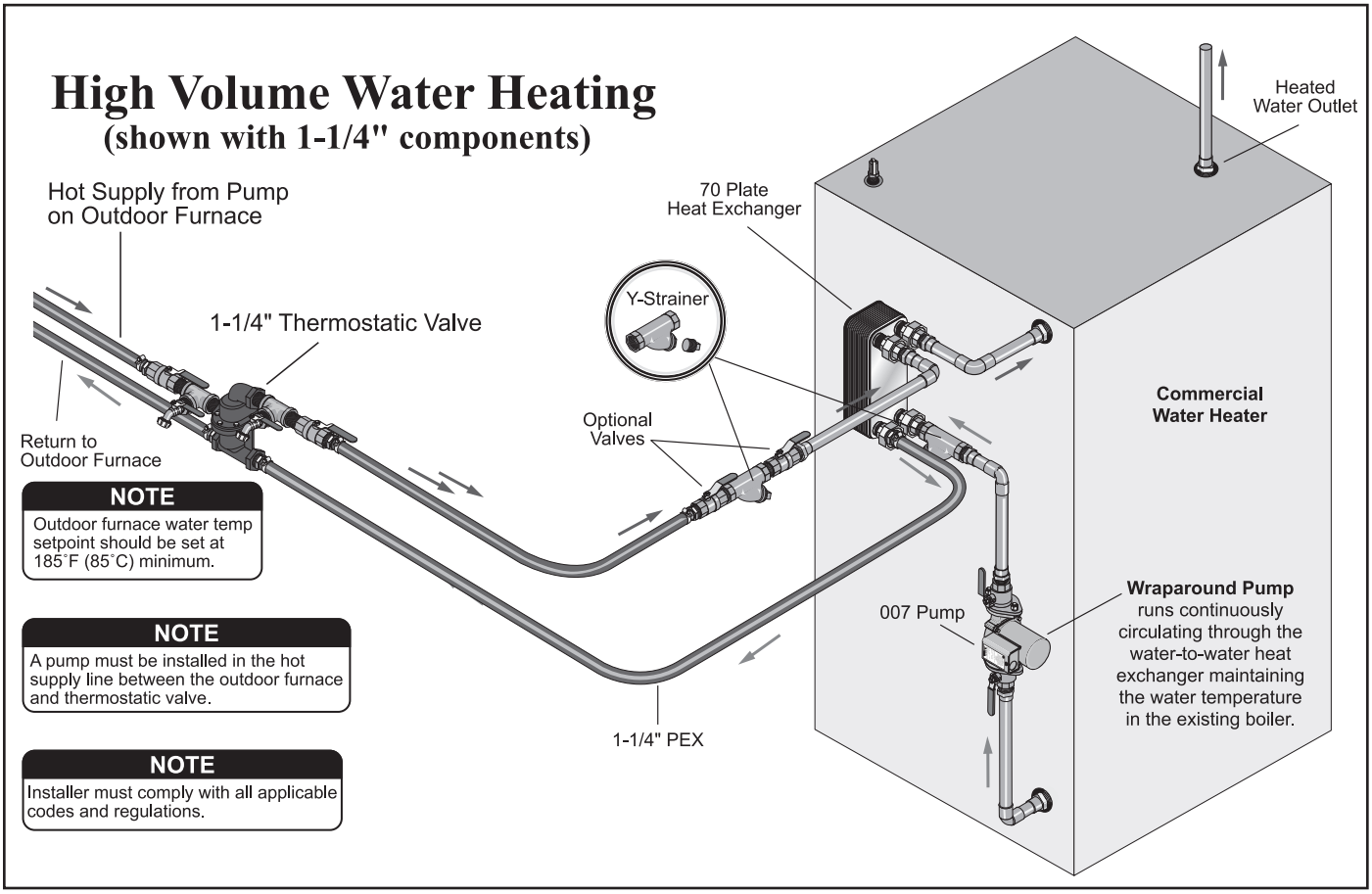

Radiant Heat Single Zone
This horizontal assembly must not exceed a height of 4 inches (10 cm) above top of water heater.
NOTE
ON / OFF switch must be in the "ON" position for this install.
NOTE
A pump must be installed in the hot supply line between the outdoor furnace and thermostatic valve.
NOTE
Installer must comply with all applicable codes and regulations.
Water Heater
24-Volt Thermostat
W RH B RC R G O Y W
Zoning Pump
R W
Top View
• Installation uses approximately 10 ft (3 m) of 1" copper.
• The amount of 1/2" PEX will vary depending on installation.
Note: The fittings kit for installing p/n 591 is p/n 2053.
1" Copper Tubing
Cold
Mix
Hot
NOTE
If heating loops are above manifolds (p/n1329, 1349, 1880 and 1885) additional controls may be needed to prevent ghost flow.
NOTE
4 x Pipe Dia. Max.
(e.g., for 1" pipe, fittings must not be more than 4" apart)
NOTE
Outdoor furnace water temp setpoint should be set at 185˚F (85˚C) minimum.
Supply
Return
Hot Supply from Pump on Outdoor Furnace
Return to Outdoor Furnace
1" Central PEX®
1/2" Central PEX®
© 2013 Central Boiler
Qty p/n Description
3 103 90°, 1" Street Elbow
5 118 3/4" Close Nipple
1 126 90°, Brass, 3/4" Street Elbow
7 138 1" Sweat Tee
9 164 3/4" FIP to 1" Sweat Adapter
2 180 1/8" x 3/4" Bushing
1 588 24-V Wall Thermostat
4 199 3/4" Ball Drain Valve
1 224 3/4" Pump Isolation Flange Kit
1 327 3/4" Mixing Valve
1 413 007 Zoning Pump
1 556 Power Supply Cord, 32"
1 591 Water-to-Water Heat Exchanger
2 1329 Three Branch Valved Manifold
2 1331 1" x 1", Sweat to PEX Adapter
1 1349 Two Branch Valved Manifold
1 1880 Two Branch Manifold, 1/2" Out
2 1885 Three Branch Manifold, 1/2" Out
1 2053 W-to-W Heat Exchr Fittings Kit
2 6054 Temperature Gauge

Fig. 33


High Volume Water Heating
(shown with 1-1/4" components)
Heated Water Outlet
Hot Supply from Pump on Outdoor Furnace
70 Plate Heat Exchanger
1-1/4" Thermostatic Valve
Y-Strainer
Optional Valves
Return to Outdoor Furnace
Commercial Water Heater
NOTE
Outdoor furnace water temp setpoint should be set at 185˚F (85˚C) minimum.
NOTE
A pump must be installed in the hot supply line between the outdoor furnace and thermostatic valve.
NOTE
Installer must comply with all applicable codes and regulations.
007 Pump
Wraparound Pump runs continuously circulating through the water-to-water heat exchanger maintaining the water temperature in the existing boiler.
1-1/4" PEX

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. 34). 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 information.

CAUTION

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

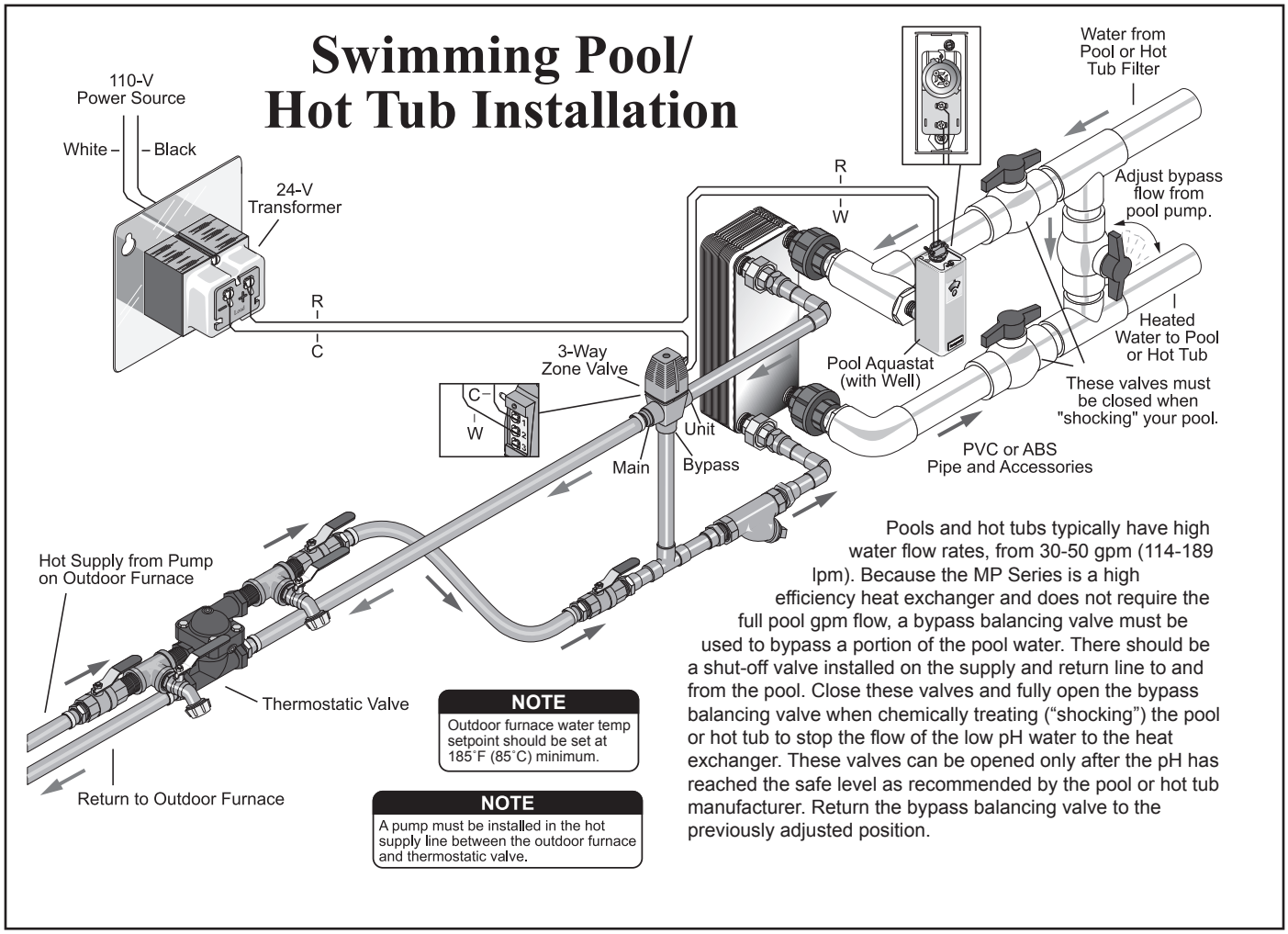
WARNING

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. 34



FINALIZING THE INSTALLATION

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

1. **Remove the strapping securing the vent cap**. The vent cap must fit loosely over the outdoor furnace vent.
2. **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/cm^2) 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.
3. **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.
4. **Add Corrosion Inhibitor Plus™**. 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. Refer to Water Quality and Maintenance.
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.

FILLING OUTDOOR FURNACE WITH WATER AND PURGING AIR

NOTE: The items referred to in this procedure correspond to the items in Fig. 35. Refer to Fig. 35 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.

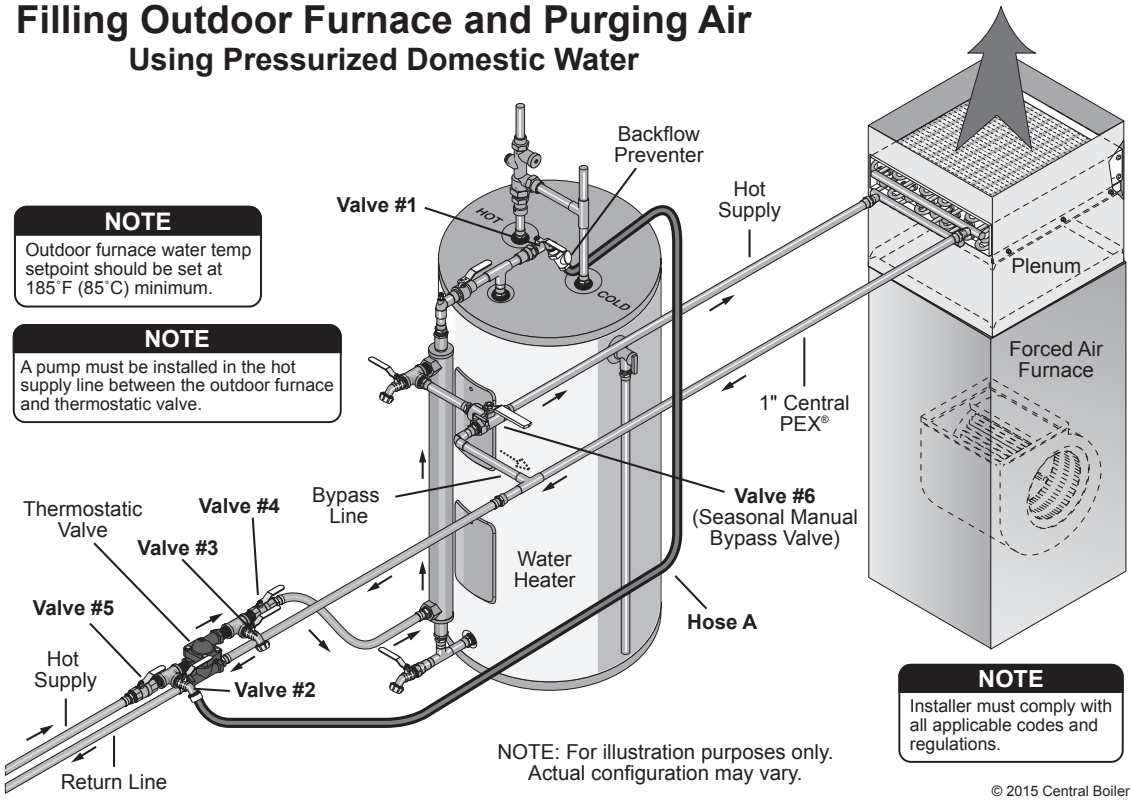
NOTE: If the outdoor furnace is being filled with water when the temperature is below freezing, circulate the water immediately after filling to prevent freezing the water lines.

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.

Fig. 35



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 water reaches the full mark.
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

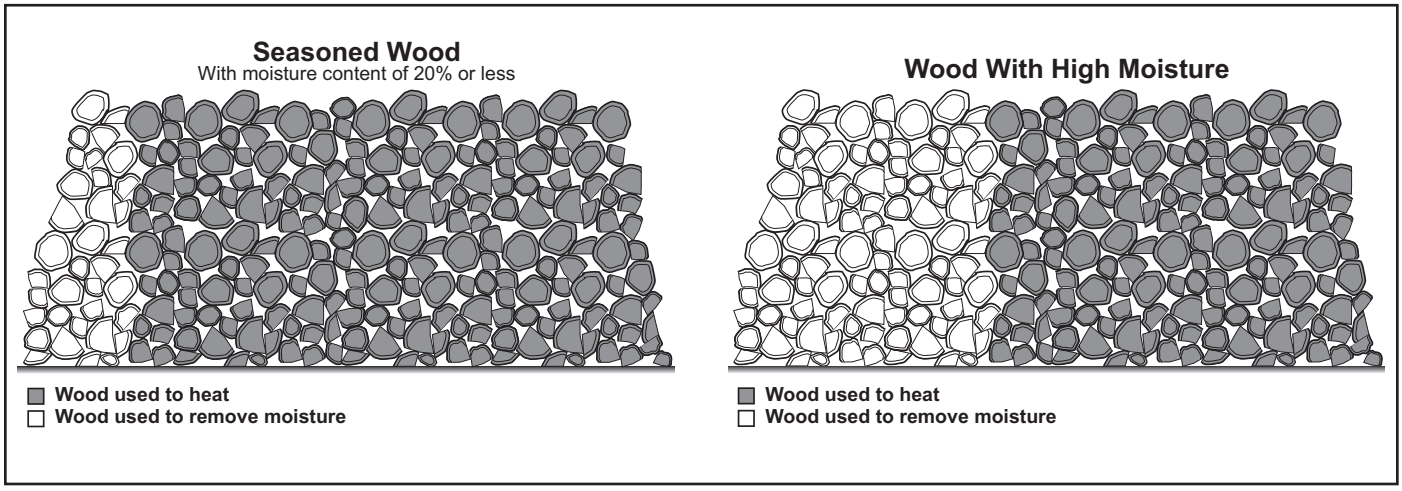
Be sure the outdoor furnace is filled with water before firing. Never fire the outdoor furnace when the water level is more than 1" (2.5 cm) below the FULL mark on the sight gauge.

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

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.

Fig. 36



Wood Selection and Preparation

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

- Seasoned wood burns more efficiently, minimizes the amount of creosote formation, reduces emissions and extends the life of the outdoor furnace.
- Maintain a quantity of smaller, drier pieces of wood for relighting the fire and for other situations when larger pieces of wood don't work as well.
- The larger the heat load on the outdoor furnace, the drier the wood needs to be in order to maintain an adequate glowing coal bed.

Following are some reasons that green, unseasoned wood should not be used:

- Green wood contains about 50% moisture by weight. Energy is required to heat the wood and evaporate the moisture - energy which could have been used to provide heat. The illustration shows that burning drier, seasoned wood provides more energy for heating compared with burning green, unseasoned wood that uses more energy to evaporate the moisture and provides less energy for heating.
- Unseasoned wood provides less heat, resulting in more condensates (moisture) in the firebox and increased wood consumption.
- Increased moisture in the firebox can result in corrosion.
- Unseasoned wood causes reduced performance, lower combustion rates and lower heat output.
- The full heating potential is unlikely to be achieved with unseasoned wood.
- Burning wood with an excessively high moisture content increases maintenance requirements and can lower the service life of the outdoor furnace.
- The higher the moisture content of the wood being burned, the harder it is to maintain a glowing coal bed because it burns more slowly.

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

FIRING THE FURNACE

NOTE: Before firing the outdoor furnace for the first time, make sure the proper amount of Corrosion Inhibitor Plus™ has been added and the water level is 1" below the full mark on the sight gauge.

CAUTION

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

The outdoor furnace is equipped with a digital temperature controller that closes the outdoor furnace damper when the water temperature reaches the controller's setting. The setting can be adjusted so the outdoor furnace will operate with a water temperature within a range of 150°F-195°F.

CAUTION

If the water in the outdoor furnace boils, be sure to check the water level and restore to full. Add Corrosion Inhibitor Plus™ (p/n 1650) as needed (see Water Quality and Maintenance).

NOTE: At the completion of the initial start-up procedures, the gas/oil burner should be cycled for a test run. During the test run, set all burner settings according to the instructions and settings in the burner manual. If converting to a different type of gas (i.e., LP to NG or NG to LP), install only the manufacturer's certified kit.

1. To cycle the outdoor furnace with wood for the first time, turn the control switch to the **Wood** position; then place dry kindling wood near the front of the firebox. Use a **small** amount of paper to light fire or operate the dual fuel burner in the Clean Start mode.
2. Add larger pieces of wood to the fire but do not fill the firebox completely.
3. When the water temperature reaches the controller setting (185˚F) and the damper closes, let the outdoor furnace cycle a few times to be sure it is operating properly; then add more wood.
4. Adjust your fill schedule so that a minimum amount of unburned wood and coals remain. This will make it easier to stir the ashes along the sides of the firebox and to pull coals forward (see Firebox Maintenance).

NOTE: Be sure to clean and inspect the firebox as outlined in Section 3.

CAUTION

Failure to clean the firebox as indicated will result in excessive corrosion.

Periodically during the normal operation of the outdoor furnace, look at the water temperature display. It should indicate a reading that is within 10°F of the controller setting.

A reading of 212°F or above indicates either a low-water condition or a malfunctioning temperature controller or snap disc (unless the door is open or not sealing properly). If the condition persists and the water level is correct, call your dealer for service.

FILLING THE FIREBOX

WARNING

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

1. Unlatch the doors; then stay as far away as possible as the firebox doors are opened as smoke and hot gases escaping through the firebox door opening could ignite. From a safe distance, observe the fuel load.

Prior to filling the firebox with wood, **always** pull the hot coals forward to the draft area (front and center of the firebox). With the hot coals pulled to the draft area, added wood ignites faster because combustion air is forced through the hot coals and into the newly added wood. If the coals are pushed to the back, a less efficient burn will result. If needed to extend the burn time, the outdoor furnace may be completely filled.

2. If necessary, clean the firebox of excess ashes and/or crusty deposits.
3. Pull the hot coals forward to the draft area (front and center) of the firebox.

NOTE: Allow the fire to burn down to 5-10 inches of coals; then rack the coals forward and level.

WARNING

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

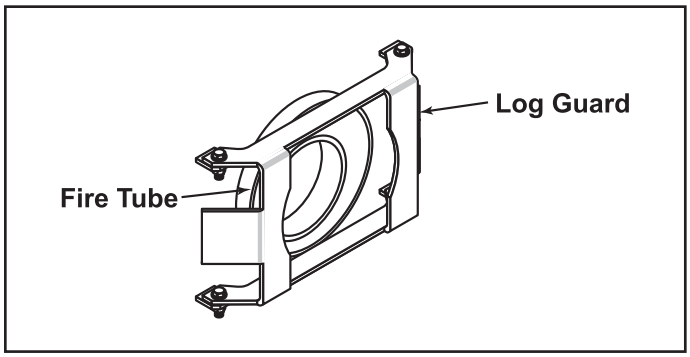
4. Load the firebox with wood being careful not to be pinched between the wood and any part of the outdoor furnace.

NOTE: The Pallet Burner is designed to allow loading with a forklift.

5. If operating in **Clean Start** or **Backup** mode, do not pack wood between the log guard and the end of the fire tube (see Fig. 37).

NOTE: Use extreme care if adding wood when a large amount of wood and coals are already present. Very hot gases will be coming out of the firebox door.

Fig. 37



WARNING

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

5. Close and secure the firebox doors. **Do not use the firebox doors to ram wood into the outdoor furnace. Do not operate the outdoor furnace with the firebox doors open**. Combustion in the firebox cannot be controlled if the firebox doors are left open or unsecured. If the firebox doors are left open, an uncontrolled burn will result. To return to a controlled burn, close and secure the doors.

CLEANING AND INSPECTING

WARNING

Stay as far away as possible from the door area when opening the door.

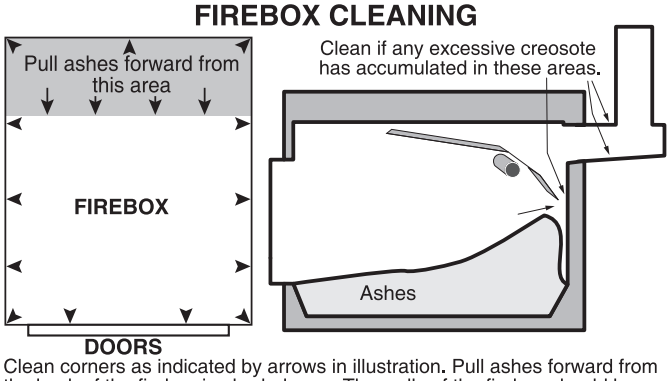
1. Open the door to the firebox and if necessary, clean the front area of the firebox of excess ashes or deposits.

NOTE: Use extreme care when accessing the firebox to clean out ashes. Hot gases could be released out of the firebox door.

2. Close and secure the firebox door. **Do not operate the outdoor furnace with the firebox door open**. Combustion in the firebox cannot be controlled if the firebox door is left open or unsecured. If the firebox door is left open, an uncontrolled burn will result. To return to a controlled burn, close and secure the door.

NOTE: Creosote is an accumulation of combustion by-products on the surfaces of wood-burning appliances. Twice a month during the heating season, inspect for excessive creosote buildup on the firebox walls, flue and chimney. If present, the buildup should be removed for proper operation and fire safety. Creosote, if ignited in the chimney, results in an extremely hot chimney fire. In case of a chimney fire, close the firebox door.

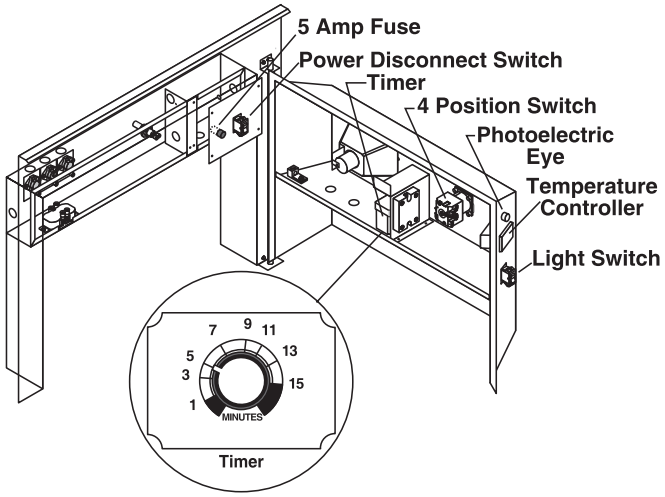
Fig. 38



Clean corners as indicated by arrows in illustration. Pull ashes forward from the back of the firebox in shaded area. The walls of the firebox should be scraped from the ash line and below. Clean excessive creosote as necessary.

CONTROL LOCATIONS

Fig. 39



ADJUSTING WATER TEMPERATURE

The high water temperature setting can be adjusted anywhere between a range from 150ºF-195ºF. At 10˚F less than the temperature setting (10˚F being the thermostatic differential), the controller will start the draft cycle by opening the damper (and activating the optional draft inducer, if so equipped). When OUT is indicated on the display, the outdoor furnace is calling for heat.

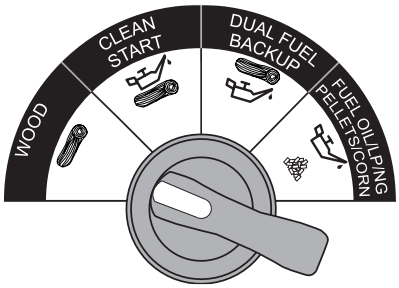
The controller has been preset at the factory to 185ºF. To change the setting, use the following procedure.

NOTE: The high water temperature can be set only between 150ºF and 195ºF. It is not recommended to set the temperature below 185°F. If set below 185˚F, the Dual Fuel system may start unnecessarily when in the Clean Start or Backup mode.

1. Press the SET button on the temperature controller. "SP" will appear in the display.
2. Press SET again to display the current setpoint temperature. The factory preset is 185˚F.
3. Press the UP or DOWN button until the desired value is displayed. This setting can only be set between 150˚F and 195˚F.
4. Press SET to save the setting. "SP" will appear.
5. To exit the programming mode, either press the SET and DOWN buttons at the same time or wait one minute and the controller will automatically exit.

MODES OF OPERATION

Fig. 40



Pallet Burner outdoor furnaces are equipped with a four-position switch (located to the left of the side light on the outdoor furnace side panel) for selecting the operational mode of the outdoor furnace. The switch positions are WOOD, CLEAN START, DUAL FUEL BACKUP and FUEL OIL/LP/NG PELLETS/CORN.

NOTE: The four-position switch must stay in the WOOD position until the power burner is installed. When a Bio-Advantage® power burner is used, the selector switch must stay in the PELLETS/CORN position.

A safety interlock switch is built into the firebox door so that if the firebox door is opened when the burner is operating, the burner will immediately shut down.

Wood

In Wood mode, the outdoor furnace operates burning wood only in the firebox. The fire must be maintained in the firebox in order for the outdoor furnace to heat. On a call for heat, the damper opens and the optional draft inducer fan (if installed) turns on. Maintain adequate coals in the firebox for restarting the fire when loading the outdoor furnace with wood.

Clean Start™

The Clean Start mode operates the auxiliary burner at the beginning of the burn cycle to provide an immediate high-temperature combustion, helping to reduce visible emissions and creating a secondary combustion of unburned gases. The amount of time the auxiliary burner operates may be preset by the operator. The timer (located within the side panel) should be set between 5 and 7 minutes. The timer may be set for a longer duration (up to 15 minutes) if the wood is less seasoned than desired. The Clean Start mode also provides Dual Fuel backup if the wood load is depleted.

Dual Fuel Backup

In the Dual Fuel Backup mode, the outdoor furnace will operate by burning wood in the firebox. However, if there is a call for heat and the wood load is depleted, the outdoor furnace will activate the auxiliary burner until the firebox is reloaded with wood to sufficiently maintain heat. Dual Fuel Backup mode will engage when the water temperature in the furnace drops to 145˚F and will shut off once the water temperature reaches 160˚F.

Fuel Oil/LP/NG Pellets/Corn

In this mode, the outdoor furnace will operate the auxiliary burner (or Bio-Advantage) to burn fuel only. Operating temperatures are set with the digital controller.

OPERATING OPTIONAL BURNER

The burner manufacturer's installation and operation manual is included with each type of burner supplied by Central Boiler. For specific operating instructions not included in this manual, refer to those instructions. All burner service work must be provided by a qualified serviceman according to the specifications and schedule in the burner manual.

Use only the fuel designated on the burner rating plate and stated in the gas or oil burner Operator's Manual. Also, if restarting after an ignition failure, purge the firebox of any excess fuel (or LP or NG) prior to attempting to restart the burner. If using fuel oil, use heating oil (either #1 or #2) of the proper viscosity for the coldest anticipated operating temperatures.

WARNING

DO NOT USE GASOLINE, CRANKCASE OIL OR ANY OIL CONTAINING GASOLINE. DO NOT ATTEMPT TO START THE BURNER WHEN EXCESS OIL HAS ACCUMULATED OR WHEN THE BURNER IS HOT.

SECTION 3 – MAINTENANCE INSTRUCTIONS

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: Before first operation of season	Daily	Weekly	Monthly	Semi-Annually	Post Season	See Section Number
Broadcast Ashtrol in firebox.		●					3-3
Check water level.	●	●					3-1
Completely remove ash.					C	●	3-7
Inspect firebox door seal.			D			●	3-5
Inspect chimney.	●	A	●			●	3-6
Check vent cap.	●	A					3-2
Stir ash and pull toward front of firebox.			B				3-4
Scrape bottom of firebox.				●		●	3-8
Lubricate door handle.					●		3-9
Check pH and nitrite levels of water.	●				E	●	F
Inspect, clean and adjust auxiliary burner.					●	●	3-10

NOTE: Check daily for build-up of creosote until experience shows how often cleaning is necessary.

A When the outdoor furnace is new, daily for the first week.

B Twice a week.

C After one month, then midway through the heating season.

D Weekly until interval for your application can be determined.

E When new, after three months, then every six months thereafter.

F Refer to **Testing Treated Water in 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 of wood used, and outdoor temperatures.

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

CAUTION

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

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

3-1. Water Level

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

3-2. Vent Cap

Check that the vent cap fits loosely on the vent opening.

WARNING

Vent cap must fit loosely on the vent opening (Fig. 1). 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.

3-3. Ashtrol

Add Ashtrol to the firebox. Use a spoon as directed to broadcast the powder in the firebox, alternating the location. For example, broadcast on the fire or hot coals one day and then on the walls the next day. Ashtrol is a pH modifier that helps to neutralize acids that may form in the firebox.

3-4. Stir Ash

Stir the ashes in the firebox and pull them forward to prevent the ashes from sealing in moisture on the bottom and along the edges. It is especially important to scrape the walls and the four corners at the ash line and below. If this maintenance operation is not performed as directed, deterioration can result from the moisture trapped between the ashes and the steel.

1. Remove any heavy or solidified ashes. When ashes build up to either the door frame in the front or the top of the beveled ash pan of the firebox, they should be removed. A hoe, ash rake and shovel for this procedure may be purchased from your Central Boiler dealer. Leave enough ashes and coals to relight the fire.

CAUTION

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

2. **Disposal of ashes** - Place ashes in a metal container with a tight-fitting metal lid. It can take many days before the ashes are completely cooled. Other waste should not be placed in this container.

3. Each time the ashes are cleaned out, inspect the door rope (see Section 3-5) to make sure it is sealing properly.

WARNING

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

3-5. Firebox Door Seal

The firebox door rope must be in good condition to ensure an airtight seal. Look for wear spots or portions of the door rope lacking an indentation from the firebox door. The door rope should have a uniform indentation in it all the way around.

1. Open the firebox door. One way to check that the door rope is sealing all the way around the firebox door is to insert a piece of paper similar in size and shape to a dollar bill in several locations around the perimeter of the door and then to close and latch the firebox door.

2. At each location, pull on the piece of paper. If it pulls out easily, either the door rope is sealing improperly and needs to be replaced, or the firebox door needs to be adjusted.

3. Check that the damper is properly sealing when closed. Normal wear over time can create a groove or dent where the damper lid strikes the casting when closing. Replace the damper if it is not sealing properly.

4. Inspect the door casting and heat shields. If the door casting is not cracked through or broken, allowing air to leak in, the door casting should not need to be replaced. Like the damper, it is normal for heat shields to show wear over time. The heat shield should be replaced if it is no longer providing coverage of the casting beneath the heat shield.

NOTE: If the outdoor furnace has been improperly operated with the door partially open, close the door and allow the outdoor furnace to cycle normally for 1 hour before inspecting the door for proper sealing.

3-6. Chimney

NOTE: Creosote is an accumulation of combustion by-products on the surfaces of wood-burning appliances. Twice a month during the heating season, inspect for excessive creosote buildup on the firebox walls, flue and chimney. If present, the buildup should be removed for proper operation and fire safety. Creosote, if ignited in the chimney, results in an extremely hot chimney fire. In case of a chimney fire, close the firebox door.

1. If the flue passageway behind the baffle becomes plugged, it must be cleaned.
2. Inspect the chimney for excessive buildup of creosote and clean, if necessary.

3-7. Completely Remove Ash

1. Remove all ashes from the firebox.

CAUTION

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

2. Use a wire brush and small scraper to clean the firebox, side walls, back wall and ash pan. Use a light to inspect for corrosion. If corrosion is present, contact your dealer. Lubricate the solenoid plunger with a light petroleum distillate (e.g., WD-40 or equivalent).
2. **Disposal of ashes** - Place ashes in a metal container with a tight-fitting metal lid. It can take many days before the ashes are completely cooled. Other waste should not be placed in this container.
3. Each time the ashes are cleaned out, inspect the door rope (see Section 3-5) to make sure it is sealing properly.

WARNING

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

3-8. Scrape Bottom of Firebox

Scrape the bottom 12 inches of the firebox clean. Allow the fire to get very low; then move the coals to one side of the firebox. Use a hoe to clean the other side. Move the coals to the other side and finish cleaning the firebox, leaving some ashes with the live coals. Pull the coals and ashes to the draft area (front and center of the firebox). When the furnace is filled, the coals remaining in the firebox will light the fire.

NOTE: Regular cleaning of the firebox, particularly at the ash line and below, reduces the possibility of corrosion.

The top of the firebox and walls of the firebox above the ash line should be scraped clean if large, thick, dry or crusty deposits are present. A thin, tar-like layer of creosote does not cause any problems in the operation of the furnace.

3-9. Door Handle

Lubricate the door handle with a light petroleum distillate (e.g., WD-40 or equivalent).

3-10. Auxiliary Burner

Periodically during the heating season (according to the burner manufacturer's instructions), and at the end of the heating season, the burner should be inspected, cleaned and adjusted (as necessary). Failure to properly maintain the burner may result in inefficient operation. After any maintenance, be sure to install and secure the burner cover to keep the burner and controls from exposure to the elements. Refer to the burner's instructions for all maintenance items and adjustments.

WATER QUALITY AND MAINTENANCE

An important part of furnace maintenance is controlling the quality of the water in the furnace. Central Boiler supplies a pH tape and a nitrite test kit with each new 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. The area in the access panel door where the test kit is located upon arrival from the factory is intended for shipping purposes only. The kit should be moved to an area as stated above as soon as possible after delivery.

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 outdoor 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 water in the sight gauge reaches the bottom of the sight gauge; then add fresh water until it is 1 inch below the FULL mark on the sight gauge. 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. 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 treatement 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 container. The normal rate for the initial treatment is 4 units.

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

1. Remove the vent cap and add the recommended amount of Corrosion Inhibitor Plus™ through the vent pipe at the top of the outdoor furnace. Replace the vent cap.
2. Immediately fill the outdoor furnace to 1 inch below the FULL level mark on the sight gauge.
3. Start the pump(s) and circulate water for 24 hours.

Testing Treated Water in the Outdoor Furnace

1. To obtain a system water sample, it will be necessary to remove the tube from the sight gauge mounting hole and bend it away from the outdoor furnace. Before collecting the sample, open the valve and drain about a quart of water from the sight gauge tube; then carefully fill the sample container without contaminating the sample. **Be sure to properly install the sight gauge tube and close the valve when finished**. The water in the sight gauge valve and tube will drain when the valve is closed.

CAUTION

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

2. 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).

3. 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.

4. Rinse and fill the sample tube to the 25 mL mark with treated water from the outdoor furnace.

5. 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.

6. 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, and stays pink for at least one minute.

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

7. If the nitrite level is not at least 20 drops by nitrite test, add 1/2 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.

8. 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 water level just reaches the bottom of the sight gauge. Then perform steps 2-3 from Corrosion Inhibitor Plus™ and Initial Treatment and steps 1-9 from Testing Treated Water in the Outdoor Furnace.

CAUTION

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

9. After the proper nitrite level has been obtained, check pH to make sure it is between 8 and 9.5.

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 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 if the outdoor furnace is not being used for an extended period of time. Check pH and nitrite levels as described in the Water Quality and Maintenance section.

1. At the end of the heating season, clean all the ashes out of the outdoor furnace. Scrape the walls and floor of the firebox taking special care to clean at the ash line and below, especially in the corners.

2. Check behind the baffle and in the chimney flue. Clean out any excessive buildup. Any large or dry crusty deposits on the walls, baffle or heat exchanger area should be removed. A thin, tar-like coating of creosote above the ash line does not need to be scraped clean as it works like a protective coating on the metal. When cleaning the firebox, be sure to wear the appropriate personal protective gear.

3. When the 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.

4. After the inspection is completed, apply a thin coat of new motor oil to the firebox being sure to work oil into all corners.

5. Place a cover over the chimney to keep rain from entering the outdoor furnace. Clean and oil the chimney flue to the firebox.

Flushing the System

If the system water is brown or orange, it is an indication the Corrosion Inhibitor Plus™ level has not been maintained and corrosion is present in the water jacket. The water jacket should be thoroughly flushed and the system refilled with the proper amount of Corrosion Inhibitor Plus added. Be sure to test the system water to verifiy the proper amount of Corrosion Inhibitor Plus.

1. De-energize the pumps and close the supply and return valves on the outdoor furnace. Remove the inspection panel and insulation covering the drain to gain access to the drain. Remove the cap and connect a hose to the drain.

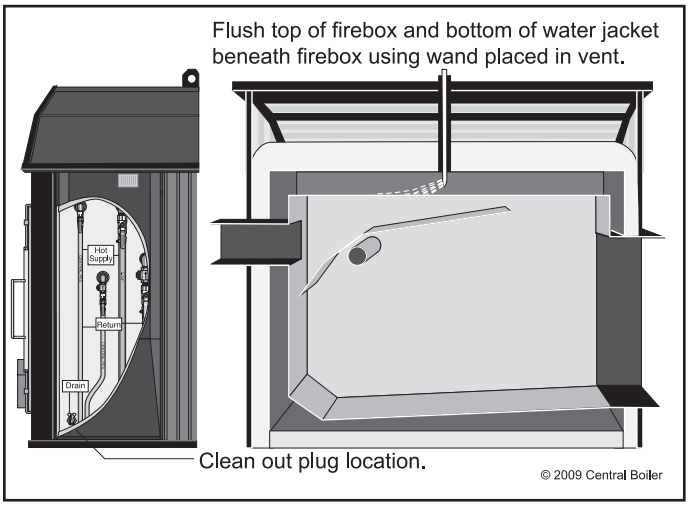
NOTE: Refer to General Installation Information for information on draining treated system water.

2. Open the drain to drain the system; then flush the top of the firebox and bottom of the water jacket beneath the firebox using a wand placed in the vent (Fig. 41).

CAUTION

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

Fig. 41



3. Close the drain valve securely and replace the cap on the drain after flushing the outdoor furnace.

4. Fill the furnace following the procedure in Water Quality and Maintenance making sure to operate the pump(s) to thoroughly mix the Corrosion Inhibitor Plus™ .

5. Insulate the area using either canned urethane foam insulation or a mat of fiberglass insulation.

6. Install the inspection panel and secure with self-tapping screws.

SECTION 4 – OWNER SERVICEABLE ITEMS

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

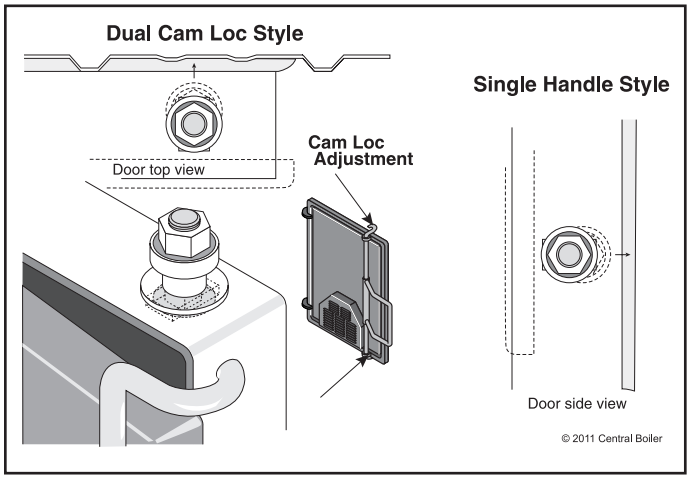
NOTE: Use only genuine Central Boiler parts and accessories if it ever becomes necessary to replace any component on the outdoor furnace.

FIREBOX DOOR CAM LOC ADJUSTMENT

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

1. Loosen the adjustment nut (two nuts on the dual Cam Loc® style door) and slide the lock assembly in slightly toward the furnace; then tighten securely (see Fig. 42). On the dual Cam Loc doors, make sure to adjust both the top and bottom for equal pressure when latched.

Fig. 42



FIREBOX DOOR SEAL ROPE

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

1. Disconnect power to the furnace. Open the firebox door.

WARNING

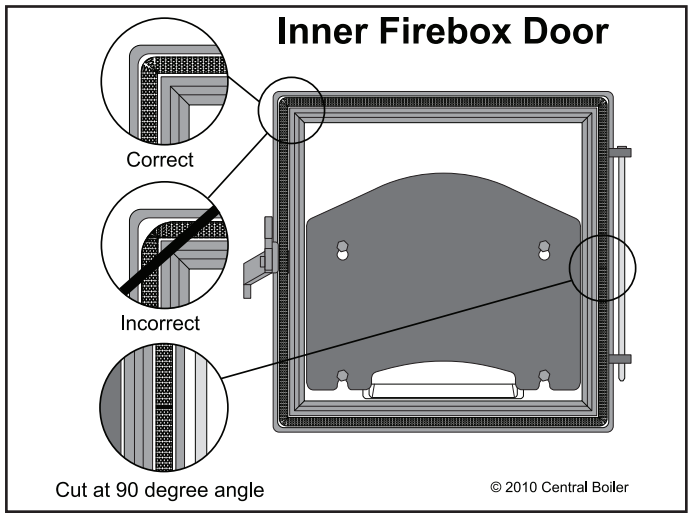
Remove all wood, coals and ash from the firebox and allow the outdoor furnace to thoroughly cool down before performing maintenance.

2. Using a scraper, remove the firebox door seal rope and clean any remaining silicone adhesive from the groove. Any residue left in the groove will interfere with the new seal.

4. Apply a 1/4" (6 mm) diameter bead of silicone sealant into the entire firebox door seal groove.

5. Starting at the center of the top side of the firebox door, insert the new door seal rope into the groove, pressing it firmly into the bead of silicone sealant. Make sure the firebox door seal rope is not stretched as it is pressed into the corners. Force the firebox door seal rope out to fill in the corners as shown in Fig. 43.

Fig. 43



6. When the seal has been pressed into the groove all the way around the firebox door, cut the end of the rope about one inch (2,5 cm) longer than required and press it tightly against the beginning end of the rope.

7. Close the firebox door.

SOLENOID

Before replacing the solenoid, check the following items:

- Check to be sure there is incoming power to the furnace.
- Check inside the control panel to see if the fuse has blown. If the fuse is blown, check the draft opening to be sure the linkage operates freely and that there are no obstructions to the door; then replace the fuse.
- To test the solenoid with a multimeter, turn the Power Disconnect Switch to the OFF position and refer to Testing Solenoid.
- If solenoid still does not operate, turn the Power Disconnect Switch to the OFF position and replace the solenoid (see Replacing Solenoid).

TESTING SOLENOID

WARNING

Do not attempt service on the solenoid without first disconnecting the electrical power at the main power source.

1. Remove the screws securing the draft enclosure cover; then remove the cover.

CAUTION

Solenoid may be hot.

2. Carefully disconnect the two wire leads connected to the left side of the solenoid by gently pulling and moving them from side to side.
3. Using a multimeter set to Ohms, test the solenoid's resistance by touching the meter leads to the solenoid terminals.
4. If the multimeter reading is between 15 and 30 Ohms, the solenoid is good. If the multimeter reading is less than 15 Ohms or more the 30 Ohms, the solenoid is faulty and should be replaced.
5. If the solenoid is good, carefully attach the wire leads onto the solenoid terminals (white wire connected to the upper terminal).
6. Install the cover and secure with the screws.
7. Turn the Power Disconnect Switch to the ON position.

REPLACING SOLENOID

WARNING

Do not attempt service on the solenoid without first disconnecting the electrical power at the main power source.

1. Remove the screws securing the draft enclosure cover; then remove the cover.

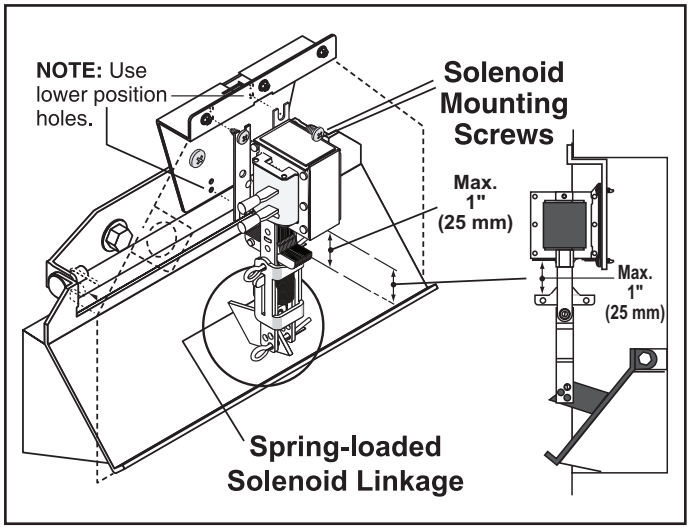
CAUTION

Solenoid may be hot.

2. Carefully disconnect the two wire leads connected to the left side of the solenoid by gently pulling and moving them from side to side.
3. Remove the top cotter key of the linkage.
4. While supporting the solenoid with your hand, remove the top two solenoid mounting screws and loosen the bottom two.
5. Lift up on the solenoid until it clears the screw heads and remove.
6. Place the new solenoid into position and lightly secure with the screws. Adjust the solenoid up or down until the solenoid plunger free length is between 15/16" and 1"; then tighten the screws securely. Connect the solenoid to the linkage with the cotter pin. Slightly spread the legs of the cotter pin. Check that the spring-loaded linkage and damper door are not binding and that the spring is not broken or missing.
7. Carefully attach the wire leads onto the solenoid terminals (white wire connected to the upper terminal).
8. Install the cover and secure with the screws.
9. Turn the Power Disconnect Switch to the ON position.

NOTE: If the solenoid rattles during operation, the alignment between the solenoid and the lift tab is incorrect. To align the solenoid and lift tab, loosen the four solenoid mounting screws and move the solenoid until the solenoid plunger aligns with the lift tab. Secure the solenoid; then make sure it operates smoothly.

Fig. 44



TEMPERATURE CONTROLLER

1. Disconnect the electrical power at the main power source to the outdoor furnace; then open the control panel door. Remove the screws securing the inner door panel; then remove the panel.

WARNING

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

2. Carefully label each of the wires connected to the temperature controller according to the numbered connections identified on the top of the controller.

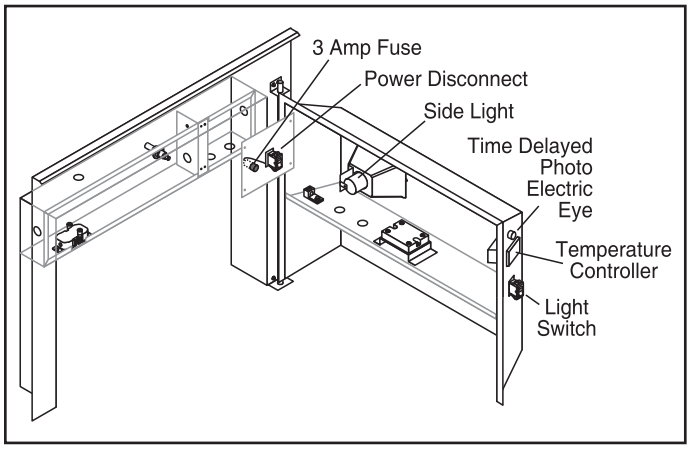
3. Using a small screwdriver, loosen the screws securing each of the wires; then pull the wires out of the controller.
4. Depress the tabs on the side of the controller mounting strap; then slide the strap off the controller. Remove the controller from the control panel.
5. Place the new gasket onto the controller. Slide the new controller into position (making sure it is positioned upward) in the control panel; then secure with the mounting strap.
6. Slide each of the labeled wires into their proper positions on the controller; then tighten each of the screws securely.
7. Place the inner door panel into position on the door and secure with the screws.
8. Close and secure the door. Connect power to the outdoor furnace.

WATER TEMPERATURE SENSOR

WARNING

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

Fig. 45



To test the water temperature sensor using a multimeter, see Testing Water Temperature Sensor. If the sensor needs to be replaced, see Replacing Water Temperature Sensor.

TESTING WATER TEMPERATURE SENSOR

1. Disconnect the electrical power at the main power source to the outdoor furnace; then open the control panel door. Remove the screws securing the access box panel; then remove the panel.

WARNING

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

2. Disconnect the sensor wires from the controller.
3. Using a multimeter set to Ohms, touch the meter leads to the wires disconnected from the controller. A reading of 1000 Ohms or less indicates the temperature sensor is good; a reading of more than 1000 Ohms indicates the temperature sensor is faulty and should be replace.

REPLACING WATER TEMPERATURE SENSOR

1. Disconnect the electrical power at the main power source to the outdoor furnace; then open the control panel door. Remove the screws securing the access box panel; then remove the panel.

WARNING

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

2. Disconnect the sensor wires from the controller.
3. Remove (by pulling) the sensor from the well.
4. Firmly press the new sensor into the well. Secure the sensor in place following the instructions provided with the new sensor.
5. Connect the sensor wires to the controller.
6. Place the access box panel into position and secure with the screws.
7. Close and secure the door. Connect power to the outdoor furnace.

SECTION 5 – TROUBLESHOOTING

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

1. **Out of wood** - Check firebox to see if fire is out. Add wood as necessary. Use good quality wood since poor quality wood will have very short burn times.

2. **Circulation valve(s) closed** - Be sure all valves in the system are open.

3. **Circuit breaker off** - Check the circuit breaker that supplies power to the outdoor furnace. If the circuit breaker has tripped, determine the cause before resetting it.

4. **Solenoid not operating properly** - Disconnect power to the furnace; then check the fuse in the control panel. If fuse is blown, check damper door for obstructions and for free movement. Be sure damper door works freely; then replace the fuse. Check the solenoid plunger free length. With the damper door fully closed, the correct length is between 15/16" and 1" (see Fig. 44). Adjust if necessary, but do not exceed 1". Be sure that the damper door (when activated by the solenoid) does not contact the louvered cover. Lubricate or adjust as necessary. Check that the spring-loaded linkage and damper door are not binding and that the spring is not broken or missing.

5. **Circulation pump(s) not operating** - Check that circulation pumps are operating. If not, disconnect power to the pump. Close valves at the pump. Disassemble the pump and try to turn the pump shaft. If the shaft is stuck, replace the pump cartridge. Replace only the cartridge whenever possible. If necessary, replace the pump. Follow instructions supplied with the pump.

6. **Air in system** - Check for air in the water lines or heat exchangers. If you hear a gurgling sound in a heat exchanger, air is present in the system. Shut off the pump, wait 15 seconds and start the pump. If it is necessary to force air from lines, refer to Initial Start-up Procedures.

7. **Outdoor furnace exhaust obstructed** - Check furnace exhaust for obstructions by observing the amount of smoke coming out of the chimney with the firebox door slightly ajar. If smoke seems very restricted, remove the firewood and hot coals; then check the chimney (top and bottom) and behind the baffle for obstructions.

8. **Building(s) poorly insulated or uninsulated** - Poorly insulated or uninsulated buildings, buildings with uninsulated or poorly insulated ceilings, or a lack of proper insulation under radiant flooring can cause excessive fuel consumption and/or heating problems.

9. **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.

10. **Circulation pump(s) installed backwards** - Check that pump flow direction is correct. If not, shut off power to pump. If the flow is not in the correct direction, disconnect pump from water line and reverse pump mounting to correct flow direction. If the pump is not mounted on the outdoor furnace, check for proper pump mounting location.

11. **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 10º F or colder.

12. **Supply and return lines uninsulated** - Uninsulated supply and return lines in areas that are not intended to be heated (unheated crawl spaces, etc.) may cause excessive heat loss. Insulate the supply and return lines.

13. **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.

14. **Burner not operating properly** - See section H and/or troubleshoot burner according to manufacturer's instructions. Ensure the firebox door is closed and the door switch is operating properly.

B. OUTDOOR FURNACE IS OVERHEATING

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

2. **Air entering through the damper** - Check to be sure the damper is operating correctly as explained in section A.4. Be sure the damper closes all the way and that no obstructions are present. The damper can wear a groove or the bracket can loosen over time. If that is the case, the damper may need replacement and/or the bracket may need to be adjusted and tightened.

   If the solenoid is sticking, lubricate with silicone spray or a light petroleum distillate (WD-40 or equivalent). Check linkage for binding, or for a missing or broken spring.

NOTE: If the water in the outdoor furnace boils, identify the cause and correct immediately. The outdoor furnace will not typically be damaged by boiling unless it reduces the water level more than 1" below the full mark on the sight gauge. If water boils, restore water level to full and add Corrosion Inhibitor Plus™ as needed. If water is added frequently it will cause deterioration in the water jacket which will reduce the life of the outdoor furnace.

3. **Temperature controller set incorrectly** - The temperature controller should not be set above 195°F.

4. **Water is not circulating** - The pump should run continuously and water needs to circulate continuously through the supply and return lines to keep water temperature uniform in the outdoor furnace.

5. **Circulation valve(s) closed** - Be sure the proper valves in the system are open to allow circulation.

C. SOLENOID DOES NOT OPERATE

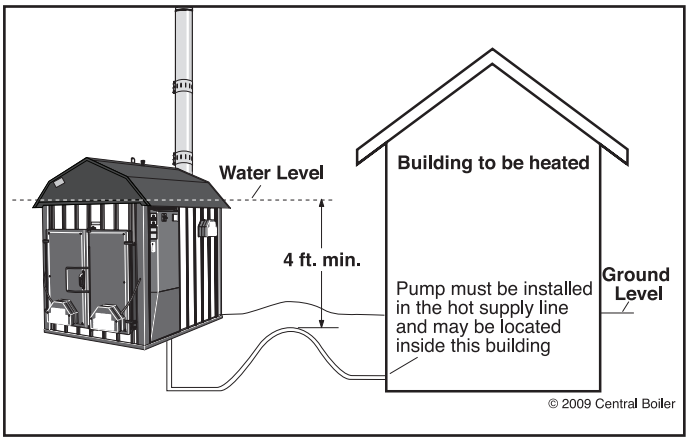
1. **Fuse blown** - Check the fuse. Check damper and solenoid area for obstructions or damage. Be sure the damper door operates properly; then replace the fuse.

2. **Solenoid not operating properly** - Solenoid may be damaged. If so, be sure to check the linkage for free movement and for creosote buildup between the damper door and draft opening. Replace the solenoid if burned out or stuck in the open position. Check that the spring-loaded linkage and damper door are not binding and that the spring is not broken or missing. The solenoid is an owner serviceable item (see instructions for replacement in Section 4).

D. FREQUENT PUMP TROUBLE OR POOR WATER CIRCULATION

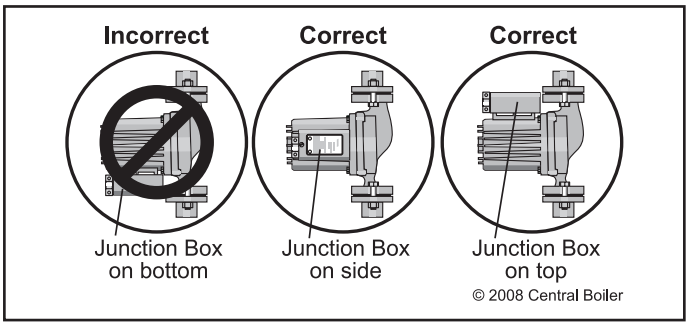
1. **Pump mounted incorrectly** - If the pump is not mounted on the outdoor furnace, it must be mounted at a minimum of four feet lower than either the top water level in the outdoor furnace or the highest point of the hot supply lines (see Fig. 46).

Fig. 46



Make sure the pump motor is installed in a horizontal position. The junction box must not be located below the pump motor (see Fig. 47). If necessary, remove the four screws and rotate the pump body.

Fig. 47



2. **Deposits in water lines/heat exchanger walls** - If water high in silica or other mineral content has been used, material deposits may build up on the insides of the supply and return lines and on the heat exchanger walls. If this occurs, the system will need to be drained and then cleaned using Sludge Conditioner (p/n 166). The system must then be refilled with the proper amount of Corrosion Inhibitor Plus™ (p/n 1650) and fresh water.

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), the system must be purged (see Initial Start-up Procedures).

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. ERRATIC TEMPERATURE READING ON GAUGE

1. **Return water too cold** - Water circulation may be too slow. The return water should be no more than 20°F-25°F less than the hot supply water. If the water returning to the outdoor furnace is too cold, it may cause erratic temperature readings. Check for partial air lock or install larger pump.

F. BURNING AN EXCESSIVE AMOUNT OF WOOD

1. **High volume water heating** - High volume water heating (e.g., car wash, swimming pool, etc.) will require high wood consumption.

2. **Excessive heat loss** - See items 9-12 of Outdoor Furnace Does Not Heat.

3. **Air entering through door** - See item 1 of Outdoor Furnace is Overheating.

4. **Excessive draft** - If a very tall extension is added to the chimney, the increased draw through the draft may cause excessive wood consumption. Decreasing the draft opening may increase efficiency and reduce wood consumption.

5. **Supply and return line heat loss** - If supply and return lines are buried in a wet, low-lying area, there may be a large heat loss which would greatly increase wood consumption.

6. **High heat demand** - Concrete slabs (with radiant heat) that are poorly insulated or are exposed to water or cold outside temperatures will require increased wood consumption (see Hydronic Installations section). Bringing a concrete slab up to temperature the first time will take a considerable amount of time and wood; once warm, wood consumption will be reduced if the concrete slab and building are insulated properly. The following will also have a high heat demand: poorly insulated buildings, buildings with large amounts of glass windows/ doors, buildings with overhead doors, greenhouses, uninsulated crawl spaces, outdoor air infiltration and air leaking through foundation.

G. CONTROLLER LED DISPLAY MESSAGES

1. **Controller displays "•oo" or "•--"** - Temperature sensing probe has failed. Replace the temperature sensing probe. If controller displays same message after sensing probe has been replaced, replace the digital temperature controller.

2. **Controller displays "•--" or "•Er"; controller may display erratic readings or incomplete numbers** - Digital temperature controller may have failed. Replace the digital temperature controller.

H. GAS BURNER IS NOT OPERATING OR NOT PERFORMING PROPERLY

1. **Fuel source empty** - Check that the fuel source (e.g., propane tank) is not empty.

2. **Valve closed** - Check that the valve on the fuel source and on the outdoor furnace are open.

3. **Control switch turned off** - Check that the control valve on top of the gas valve is turned to the ON position.

4. **Burner tube close-off not opening** - Check that there is power to the damper actuator. Contact your Central Boiler Dealer or a qualified technician for further assistance.

5. **Gas burner motor not starting** - If the gas burner motor fails to start, check that the damper position switch is closing. Contact your Central Boiler Dealer or a qualified technician for further assistance.

6. **Gas burner does not light** - Refer to the burner manufacturer's installation and operation manual for troubleshooting recommendations or contact a qualified technician for further assistance.

CONTACT A QUALIFIED CENTRAL BOILER DEALER FOR FURTHER ASSISTANCE OR TO SCHEDULE A SERVICE CALL.

SECTION 6 – GENERAL INFORMATION

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

DO NOT BURN GARBAGE

Burning garbage causes damage to components of wood burning appliances.

Refer to your Owner's Manual.

HPBA Hearth, Patio & Barbecue Association

BURN RESPONSIBLY

Preserve Your Right to Burn Wood

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

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

p/n 7000212

⚠WARNING

For safety, keep firebox door latched. Leaving the firebox door open may lead to a runaway fire. In the event of a runaway fire, close the firebox door.

⚠AVERTISSEMENT

Par mesure de sécurité, maintenez la porte de tirage verrouillée. Le fait de laisser la porte de tirage ouverte peut entraîner un incendie échappé. En cas d'incendie échappé, fermez la porte de tirage.

⚠CAUTION

Do not start fire until water level is full. Keep face away from firebox door area.

⚠ PRÉCAUTIONS À PRENDRE

N'allumez pas le feu tant que le niveau d'eau n'est pas plein. Gardez le visage éloigné de la porte de tirage et de ses alentours.

p/n 7000211

⚠ WARNING

WHAT TO DO IF YOU SMELL GAS OR OIL:

- DO NOT light the furnace.
- Extinguish any open flames.
- DO NOT touch any electrical switch.
- Call your fuel supplier and follow their instructions.

⚠AVERTISSEMENT

QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ OU DE HUILE:

- N'allumez PAS la chaudière.
- Éteignez tout feu nu.
- NE touchez AUCUN interrupteur électrique.
- Appelez votre fournisseur de combustible et suivez leurs instructions.

p/n 7000216

NOTICE

Chimney pipe and all extensions must be insulated.

REMARQUE

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

⚠ CAUTION

HOT Surfaces

Do NOT Touch During Operation

⚠ ATTENTION

Surfaces BRÛLANTES

NE touchez PAS pendant le fonctionnement

p/n 7000240

NOTICE

Ensure firebox draft is a minimum of -.02" water column in all modes of operation.

When using the fuel oil option, for proper operation use either #1 or #2 fuel oil of the proper viscosity for the ambient temperature of the power burner. In colder temperatures #1 fuel oil may be necessary.

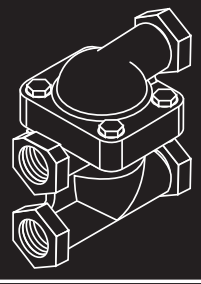
See Power Burner Installation Manual.

p/n 6087

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

⚠WARNING

Disconnect power before removing this panel.

⚠AVERTISSEMENT

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

p/n 7000245

⚠ WARNING

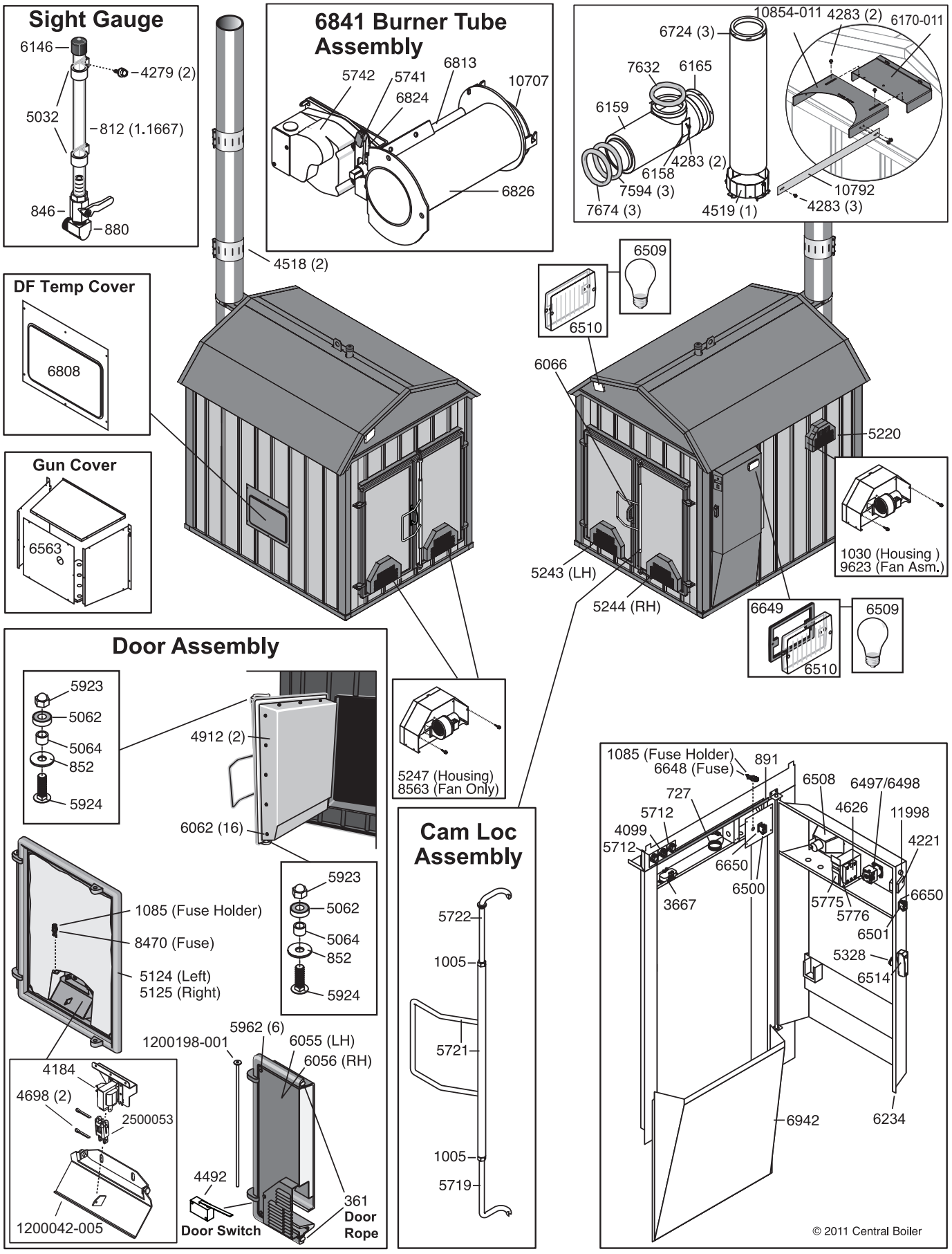
Vent cap must fit loosely over pipe.

p/n 626

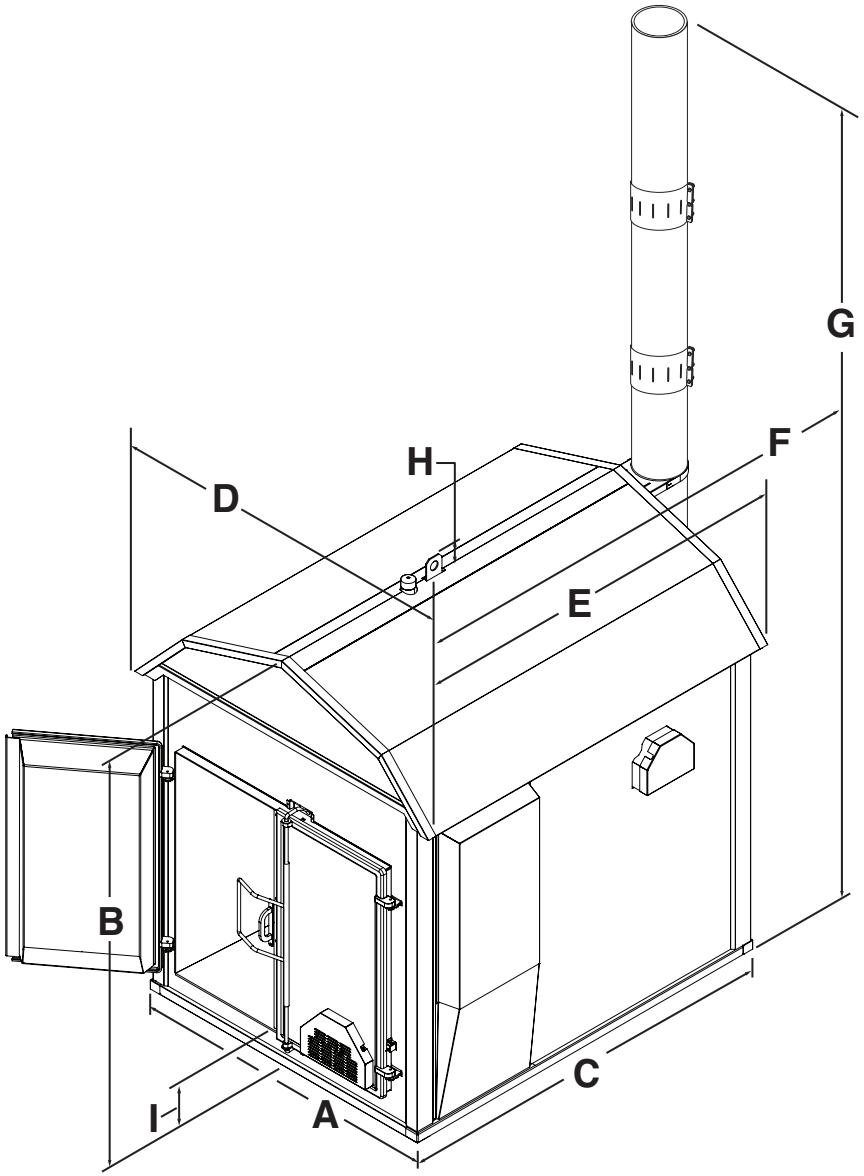
⚠ WARNING

Remove strapping over vent cap before filling or operating furnace.

PARTS LISTING



FURNACE MEASUREMENTS



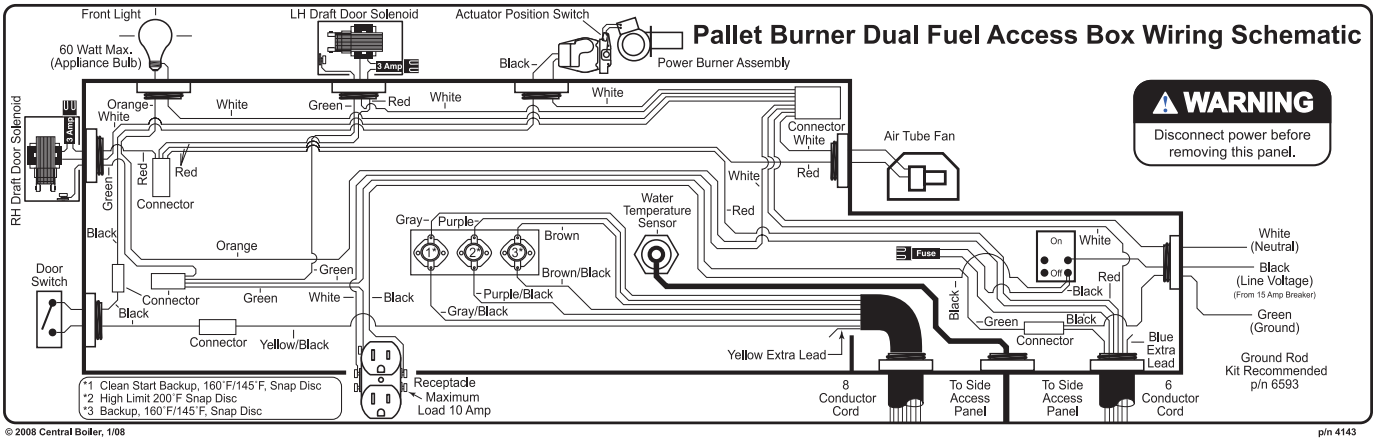
FURNACE MEASUREMENTS									
	A	B	C	D	E	F	G	H	I
Pallet Burner	70"	93"	88"	78"	89"	104"	260"*	4"	8"

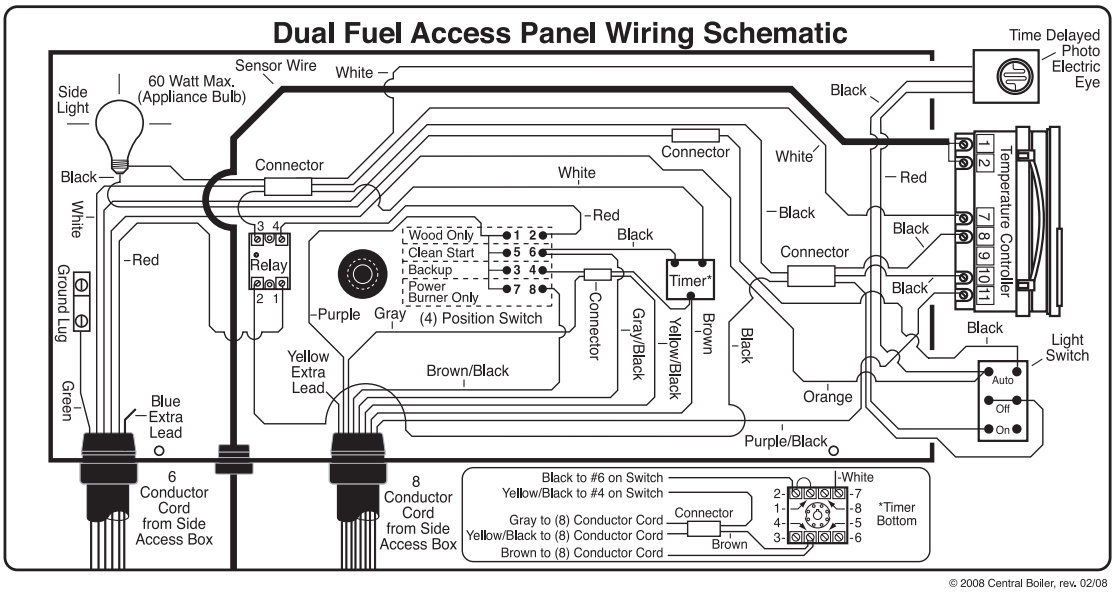
*** Measurement includes three chimney sections.**

DIMENSIONS DE LA CHAUDIÈRE (cm)									
	A	B	C	D	E	F	G	H	I
Pallet Burner	178	236	224	198	226	264	660*	10	20

*** Dimension comprend troid sections de cheminée.**

© 2014 Central Boiler


Pallet Burner Dual Fuel Access Box Wiring Schematic
Front Light
60 Watt Max. (Appliance Bulb)
LH Draft Door Solenoid
Actuator Position Switch
Power Burner Assembly
RH Draft Door Solenoid
WARNING
Disconnect power before removing this panel.
Air Tube Fan
Water Temperature Sensor
Door Switch
Connector
Receptacle Maximum Load 10 Amp
Yellow Extra Lead
Blue Extra Lead
White (Neutral)
Black (Line Voltage)
(From 15 Amp Breaker)
Green (Ground)
Ground Rod Kit Recommended p/n 6593
8 Conductor Cord
To Side Access Panel
6 Conductor Cord
*1 Clean Start Backup, 160˚F/145˚F, Snap Disc
*2 High Limit 200˚F Snap Disc
*3 Backup, 160˚F/145˚F, Snap Disc
© 2008 Central Boiler, 1/08
p/n 4143


Dual Fuel Access Panel Wiring Schematic
Time Delayed Photo Electric Eye
Sensor Wire
Side Light
60 Watt Max. (Appliance Bulb)
Temperature Controller
Relay
Wood Only
Clean Start
Backup
Power Burner Only
(4) Position Switch
Timer*
Light Switch
Ground Lug
Yellow Extra Lead
Blue Extra Lead
6 Conductor Cord from Side Access Box
8 Conductor Cord from Side Access Box
Black to #6 on Switch
Yellow/Black to #4 on Switch
Gray to (8) Conductor Cord
Yellow/Black to (8) Conductor Cord
Brown to (8) Conductor Cord
*Timer Bottom
© 2008 Central Boiler, rev. 02/08

1-YEAR LIMITED WARRANTY

Central Boiler, Inc. (hereinafter referred to as Central Boiler) warrants the original owner of a Central Boiler Pallet Burner outdoor wood furnace to be free from defects in the workmanship of all parts of the outdoor wood furnace manufactured by Central Boiler for a period of 1 year from date of manufacture. Central Boiler reserves the right to repair or replace any defective part(s), to replace the outdoor wood furnace with a comparable model, or to refund the purchase price. This warranty covers the cost of parts and labor to replace such parts for the repair of the workmanship defect.

If the outdoor wood furnace need be removed from its location for repair, the warranty excludes the cost of shipping, labor for removal and installation, plumbing labor and/or parts, and replacement of water or water additives. Physical damage caused by misuse or abuse, unauthorized work, alterations to the furnace, and normal wear items (such as door gasket, exterior paint, and replaceable chimney parts) are not considered warrantable items. Components such as aquastats, pumps, actuators, etc., that are used on the outdoor wood furnace or in the heating system, carry their own warranty provided by their manufacturer.

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

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow the exclusions or limitation of incidental or consequential damages, so certain limitations or exclusions under the warranty may not apply to you.

Printed in U.S.A.

©2015 Central Boiler
(p/n 9000345 REV. A) - 26-AUG-15