

EMPYRE

OUTDOOR HOT WATER WOOD FURNACE

Installation and Operation Instructions



PRO-FAB
INDUSTRIES INC.

Introduction..... 3-4
 The Empyre Outdoor Hot Water Wood Furnace 3
 Model & Serial Number Information 4

Safety 5-7
 Safety Precautions..... 5
 Canadian CSA Requirements..... 6
 Safety Alert Symbol..... 6
 Signal Words 6
 Safety Decals 7

Features.....8
 Identifying Main Components..... 8

Installation9-16
 Suggested Material Required to Complete an Installation 9
 Site Requirements 9
 Foundation Dimensions 10
 Trench for Underground Pipes 10
 Chimney Installation..... 11
 Installing the Furnace..... 11
 Typical Installation 12
 Hookup to the Existing Heat System (Water to Air) 13
 Belt Driven Hot Air Fan 13
 Direct Drive Fan 13
 Thermostat..... 13
 Under Floor Heat..... 13
 Side Arm Installation 14
 Optional Heat Exchanger..... 14
 Auxiliary Heat (Water to Water)..... 15
 Hookup with Existing Indoor Furnace (Water to Water Plate Heat Exchanger)..... 15
 Baseboard Distribution 16
 Pool & Spa Hookup..... 16
 Common Header Set Up..... 16

Operation..... 17-19
 First Fill 17
 Maintaining Proper Water Level..... 17
 Starting the Fire in the Outdoor Hot Water Wood Furnace 18
 Outdoor Best Burn Practices 19

Maintenance20-21
 During Heating Season 20
 End of Heating Season..... 20
 Cleaning the Ash Tray 21
 Power Outages..... 21

Reference22-25
 Operating the Digital Temperature Switch (DTS)..... 22
 Outdoor Hot Water Wood Furnace Wiring Diagram - CPW 250 & CPW 450..... 23
 Furnace Reference Chart..... 24

TABLE OF CONTENTS

Forced & Natural Draft Door	24
Furnace Specifications	25
Troubleshooting	26-27
Furnace Troubleshooting.....	26
Digital Controller Troubleshooting	27
Warranty	Back Cover

The Empyre Outdoor Hot Water Wood Furnace

You have selected one of the best outdoor wood furnaces on the market today! It has been designed and built to old fashioned standards, and we are proud to offer a 20 year limited warranty!

To ensure maximum benefit from your new Empyre furnace, it is suggested that the Installation and Operation Instruction manual be read from cover to cover and all instructions followed carefully.

The Empyre furnace has been designed for outdoor installation and is ideally suited for both domestic and industrial use, and has been tested to meet UL Standards 391, 762 and 2523, and CSA Standard B366-1-N91.

Please keep this manual for future reference.



CPW 250

CPW 450

INTRODUCTION

Model & Serial Number Information

Locate and record the model number and serial number in the space provided. See page 7 for location of decal on furnace. Have this information available when contacting the dealer for service, warranty or other information.

EMPYRE		818642R00
Outdoor Wood Fired Hydronic Heater / Fournaise hydronique au bois extérieure		
CERTIFIED HEATING APPLIANCE	<input type="checkbox"/> EMPYRE 250 <input type="checkbox"/> EMPYRE 450	APPAREIL DE CHAUFFAGE
CSA STANDARD B366-1-M91		NORME B366-1-M91 DE LA CSA
UL STANDARD 391, UL 762, UL 2523	SERIAL NO./N° DE SÉRIE _____	NORME 391, 762, 2523 DE ULC
CERTIFIED AS AN ADD-ON MODEL 07/12		CERTIFIÉE COMME MODÈLE COMPLÉMENTAIRE, 07/12
<p>Electrical ratings: volts 120, 1 phase, 60HZ, 15 amps max. For outdoor use only. Boiler Fuel - Burn wood only. Shaker Grate Fuel - Coal or Wood Use only Flue Pipe that is approved by manufacturer. Base - Noncombustible, concrete preferred. Outdoor Wood Fired Hydronic Heater must be kept in good condition, clean chimney and firebox at end of season. Store wood and all combustible materials outside the installation clearances. Installation clearances: 60" (152 cm) above/ 48" (122 cm) front/ 6" (15 cm) from sides/ 18" (46 cm) from Flue pipe. Keep doors closed tightly. Do not pressurize. Risk of fire or explosion. Do not connect this unit to a chimney flue serving another appliance. Load fuel carefully to prevent damage to boiler. Do not burn garbage, gasoline, naphtha or engine oil. Do not use chemicals or fluids to start fire. Never run boiler with water level below add mark. Do not leave door open, or dump ash tray close to any combustible materials, may lead to runaway fire. Refer to owner's manual for complete instructions.</p>	<p>Caractéristiques électriques: 120 volts, courant monophasé, 60HZ, max. de 15 ampères. Pour usage extérieur seulement. Combustible - Brûler seulement que du bois. Combustible agitateur - Charbon ou bois N'utiliser qu'un conduit de fumée approuvé par le fabricant. Base - Utiliser des matériaux incombustibles, de préférence du béton. Les appareils de chauffage au bois doivent être maintenus en bon état. Nettoyer le cheminée et la chambre de combustion à la fin de chaque saison. Entreposer le bois et toutes les matières combustibles suffisamment loin de l'appareil. Dégagement minimum: 152 cm (60 po) du plafond, 122 cm (18 po) à l'avant, 15 cm (6po) sur les côtes et 46 cm (18 po) du conduit de fumée. Garder les portes fermées hermétiquement. Faites l'aucun pressurisent. Risque de feu ou d'explosion. Ne pas raccorder l'unité à une cheminée desservant un autre appareil. Charger soigneusement l'appareil afin de prévenir les dommages. Ne pas brûler de déchets, de lessence, du napthe ou de l'huile à moteur. Ne pas utiliser de produits chimiques, solides ou liquides, pour allumer le feu. Ne pas faire fonctionner la fournaise avec le niveau d'eau sous l'indicateur de demande de rajout d'eau. Toujours fermer la porte de l'appareil et ne jamais vider un cendrier près de matières combustibles. Un incendie peut se déclarer très facilement. Consulter le manuel du propriétaire pour obtenir des instructions complètes.</p>	
		



SAFETY PRECAUTIONS

- The Empyre furnace is designed to work in conjunction with another heat source. We recommend this furnace not to be used as a stand alone unit. Should the system fail or run out of wood, a backup system should be in place.
- **BURN WOOD ONLY.** For best efficiency and cleanest burn use only seasoned fire wood. NEVER burn trash, tires, solvents, plastics, gasoline, engine oil or other flammable liquids, rubber, naphtha, household garbage, material treated with petroleum products (particle board, railroad ties and pressure treated, painted, or kiln dried wood), leaves, paper products, or cardboard.
- Start the fire with paper and small kindling.
- The Empyre furnace is designed for outdoor use only. NEVER install the Empyre furnace indoors.
- Keep area around the furnace clean at all times to avoid possible fire hazards. Adhere to installation clearance and restrictions.
- The Empyre rear access door is equipped with a latch locking bolt. Because of an electrocution hazard and hot surfaces keep children away. ALWAYS secure door with latch locking bolt and tighten bolt with wrench.
- If this boiler is connected to an existing boiler system it must be installed without (a) interfering with the normal delivery of heated water from the original boiler, and (b) be installed without affecting the operation of the electrical and mechanical safety controls of the original boiler.
- Read the manual carefully and read all decals on the Empyre furnace. Should you have any questions not answered in this manual, contact your dealer.

WARNING: EXPLOSIVE GASES

Gases formed during solid-fuel combustion may cause a small explosion when the furnace is refueled.

Door Opening Instructions:

1. Switch blower off.
2. Stand back behind door.
3. SLOWLY open door.
4. Wait for smoke to clear (30 seconds).
Close door if smoke continues.
5. Open door fully.
6. After loading, always close and latch door firmly.
7. Switch blower on.

CAUTION!

Hot surfaces. Do not touch during operation.

Keep children a safe distance from the furnace.

- **DO NOT** use chemicals, gasoline, oil or any other combustible fluid to start the fire.
- **DO NOT** store fuel or combustible materials within the installation clearance area.
- **DO NOT** connect the unit to a chimney flue that serves another appliance.
- **DO NOT** burn trash in this furnace.
- **DO NOT** pressurize water in furnace.
- **DO NOT** damage furnace. Load wood carefully.
- **DO NOT** run furnace with water level below add mark.
- **DO NOT** dump ash close to any combustible materials.
- **DO NOT** operate with loading or ash removal doors open.
- **DO NOT** add fuel during a power outage.
- **DO NOT** allow ash and creosote buildup. Furnace must be kept in good condition. Follow cleaning instructions in the Installation and Operation Instruction Manual.
- **DO NOT** modify this unit in any way. Any modification will void the warranty.

In the event of loss of electrical power:

1. Open all flow-check and zone valves in the system. Depending on system design, this may allow convective circulation.
2. It is important to remember that the heating system cannot dispose of a great deal of heat without the circulators running. Avoid over-firing! **DO NOT LOAD LARGE AMOUNTS OF SOLID FUEL INTO THE FURNACE!** Fire the furnace cautiously until it is determined how quickly the heat system is able to dissipate the heat being produced by the furnace.
3. When the power has returned, reset all flow-check and zone valves and resume normal operation of the system.

In the event of a runaway fire:

1. Make sure the firebox door is tightly closed.
2. Close all the combustion air inlets on the furnace.

To cool an overheated furnace:

1. Turn all thermostats in the house to their highest temperature setting.

SAFETY

Canadian CSA Requirements

Installation of the Empyre as an add-on unit in the Canadian provinces and territories must comply with the requirements of CAN/CSA-B365, and changes to the installation must comply with the following CSA requirements:

CSA B139 – for oil fired

CSA C22.1 – for electric

CAN/CGA-B149.1 or CAN/CGA-B149.2 – for gas fired

Safety Alert Symbol

The Safety Alert symbol identifies important safety messages in the manual and on the furnace. When this symbol is present, be alert to the possibility of injury or death. Follow all the instructions in the safety message given. This symbol means attention, be alert, and your safety is involved.



Why is SAFETY important to you? Three very important reasons:

1. Accidents disable and kill.
2. Accidents cost.
3. Accidents can be avoided.

Signal Words

Note the use of the signal words: **DANGER**, **WARNING** and **CAUTION** with the safety messages.

The appropriate signal word has been selected using the following guidelines:

DANGER

DANGER: Indicates an imminently hazardous situation that, if not avoided, WILL result in death or serious injury if proper precautions are not taken.

WARNING

WARNING: Indicates a potentially hazardous situation that, if not avoided, COULD result in death or serious injury if proper precautions are not taken.

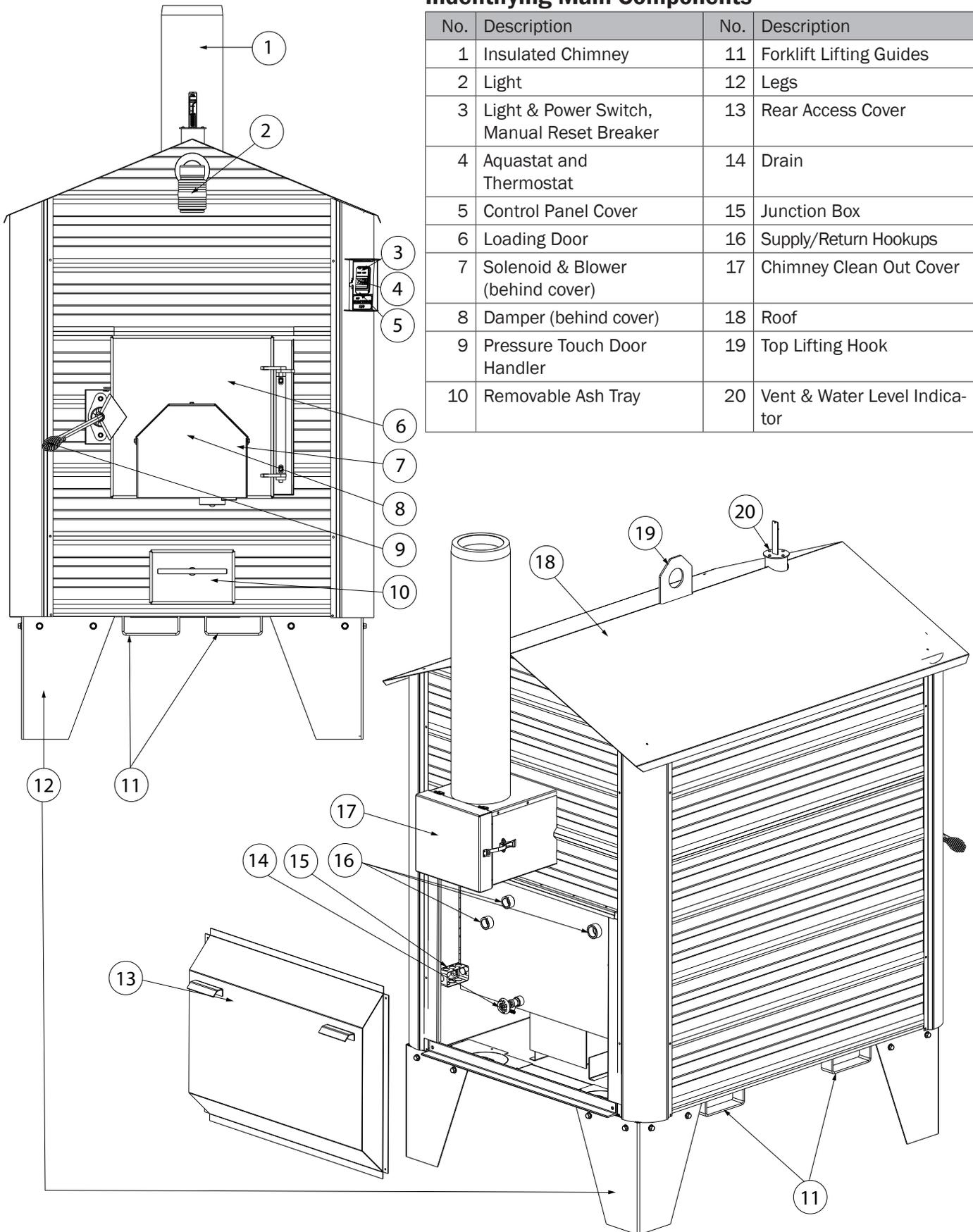
CAUTION

CAUTION: Indicates a potentially hazardous situation that, if not avoided, MAY result in minor or moderate injury if proper practices are not taken, or serves as a reminder to follow appropriate safety practices.

FEATURES

Identifying Main Components

No.	Description	No.	Description
1	Insulated Chimney	11	Forklift Lifting Guides
2	Light	12	Legs
3	Light & Power Switch, Manual Reset Breaker	13	Rear Access Cover
4	Aquastat and Thermostat	14	Drain
5	Control Panel Cover	15	Junction Box
6	Loading Door	16	Supply/Return Hookups
7	Solenoid & Blower (behind cover)	17	Chimney Clean Out Cover
8	Damper (behind cover)	18	Roof
9	Pressure Touch Door Handler	19	Top Lifting Hook
10	Removable Ash Tray	20	Vent & Water Level Indicator



Suggested Material Required to Complete an Installation

For the installation of a single family residential hookup with the furnace approximately 50 feet (15.24 m) from the building to be heated, the following will be required:

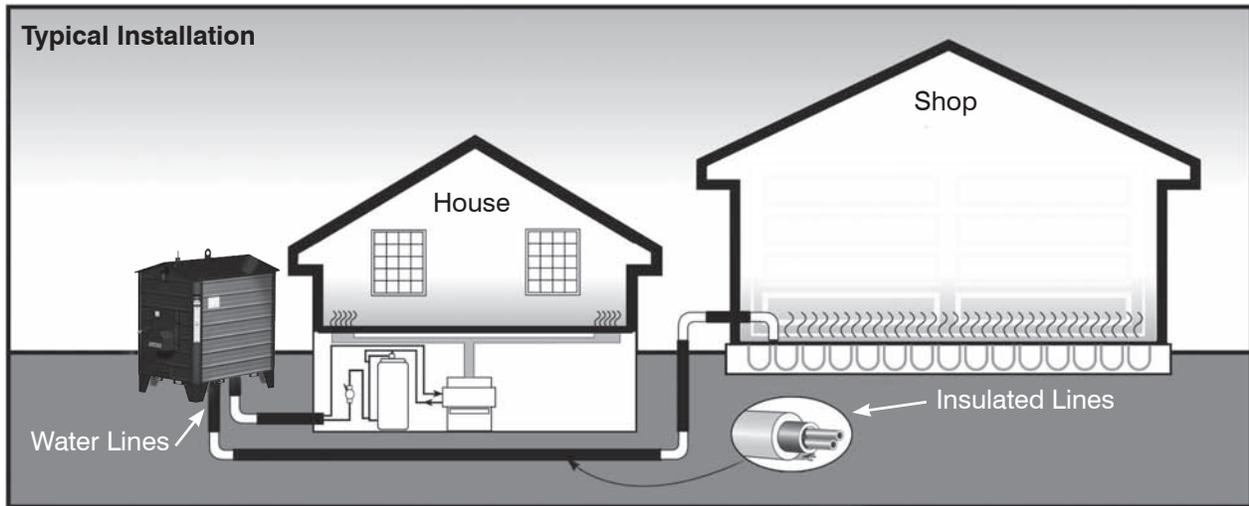
- a. Empyre Outdoor Wood Stove (furnace)
- b. Concrete pad for furnace base
- c. 150 feet (45.72 m) of supply and return line
- d. 50 feet (15.24 m) of underground line insulation
- e. Forced air furnace heat exchanger (radiator or coil)
- f. Domestic hot water tank heat exchanger (optional)
- g. Circulating pump
- h. Pipe fittings
- i. Two ball valves
- j. Approved rust inhibitor
- k. Thermostat
- l. Installation and Operation Instruction Manual

Site Requirements

1. The Empyre furnace must be installed on a noncombustible floor pad, such as concrete or patio blocks.
2. There must be a minimum clearance between the furnace and any combustible material as follows:
 - From top of furnace 60 inches (152 cm)
 - From front of furnace 48 inches (122 cm)
 - From side of furnace 6 inches (15 cm)
 - From rear of furnace 48 inches (122 cm)
 - From flue pipes 18 inches (46 cm)
3. Install the furnace in a location that best suits wind direction for your home and building(s) and neighbouring residents.
 - Consult with an insurance provider to confirm acceptable furnace installation distance from all buildings.
4. The Canadian Standards Association requires a minimum 5 feet (1.52 m) of insulated chimney in order to obtain the best draft in the furnace.
5. Installation of the Empyre furnace must be completed in accordance with local, state, provincial or federal building and fire codes which may differ from this manual.

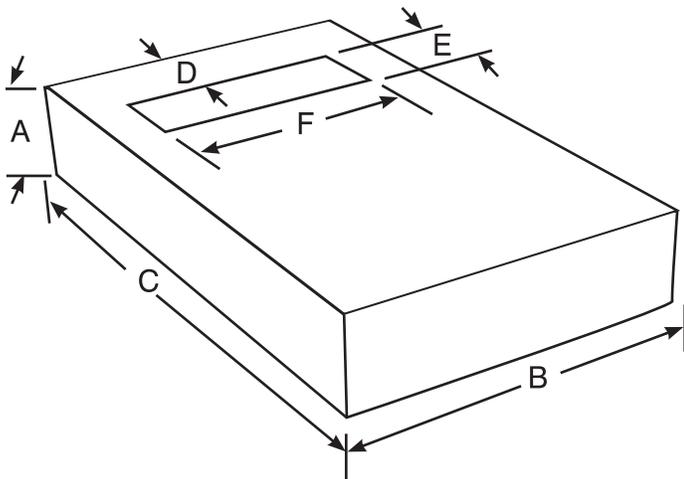
IMPORTANT: Contact an insurance provider prior to installation to ensure that installation is in compliance with local insurance requirements and all terms have been met.

INSTALLATION



Foundation Dimensions

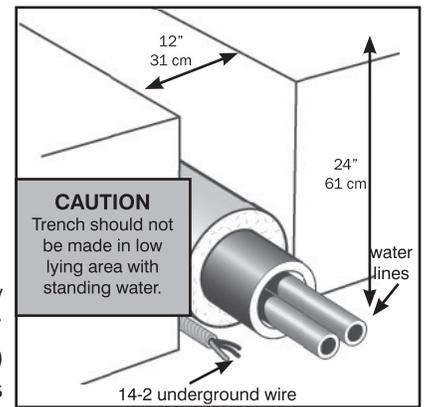
1. The furnace should be installed on a concrete pad.* Slope the pad 1/2" (1.27 cm) towards the front of the furnace in order to drain off any condensation that may accumulate in the ash tray.
*For furnaces without legs an option is to heighten the pad for easier loading and ash tray removal.
2. If the soil is somewhat unstable, a good bed of crushed rock or a grade beam will help prevent the furnace from shifting.



	CPW250		CPW450	
	in	cm	in	cm
A	4	10	5	13
B	49	124	55	140
C	64	163	82	208
D	6	15	6	15
E	10	25	10	25
F	31	79	37	94

Trench for Underground Pipes

1. The water lines must be properly insulated to minimize heat loss. Ask your dealer for the right underground water line insulation.
2. Dig a trench, ideally 24" (61 cm) deep* and 12" (31 cm) wide, and make as level as possible to avoid damage to the tubing.
*Trench should be at least 36" (92 cm) deep under driveways.



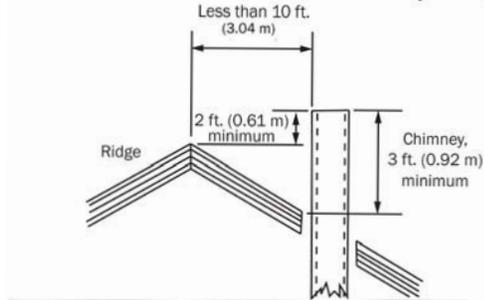
3. The water lines should be a minimum of 3/4" (2 cm) inside dimensions*, rated and approved for use with high temperature water and antifreeze.
*Size of water lines depends on distance; check with a qualified heating professional to determine the line size necessary to meet the demands of your specific application.
Note: Size of piping must be such that excessive pressure will not be developed in any portion of the boiler system.
4. Identify each water line clearly in order to correctly locate the hot and return lines.
5. Lay down 14-2 underground wire approved for underground installation. Obtain the required electrical permit and confirm local electrical code requirements prior to installation.

Chimney Installation

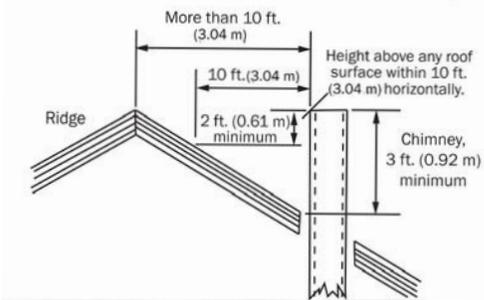
Install a 1 inch (2.54 cm) wall thickness insulated chimney that is listed to ULC-S610 and ULC-S604 standards. Apply a bead of high temperature silicone on the outside of the chimney.

For tall chimneys, chimney braces are recommended. Pro-Fab Industries recommends a minimum chimney length of 5 feet (1.52 m).

CHIMNEY TERMINATION (LESS THAN 10 FT. (3.04 M))



CHIMNEY TERMINATION (MORE THAN 10 FT. (3.04 M))



Furnace	Flue Diameter
Empyre 250	6" (15 cm)
Empyre 450	8" (20 cm)

Installing the Furnace

We recommend that the furnace be installed by a qualified installer.

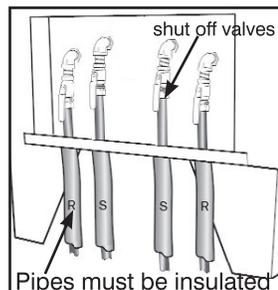
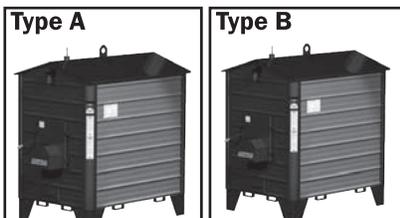
Position furnace on pad. **Note:** Lift only by top lifting hook or bottom forklift guides. Use caution! Furnace is heavy.

Once the unit has been placed into position, remove the back cover and the light globe from the firebox and install.

Type "A" furnace requires a tight silicone seal around the base to keep out rodents, etc.

The furnace is now ready to hook up the heater to the underground water lines.

1. Install shut off valves on all lines attached to the furnace to prevent loss of water during maintenance and repairs. Fittings and valves to be attached to the furnace should either be stainless steel or brass.



2. **IMPORTANT:** A spark arrester must be installed if the Empyre Outdoor Wood Burning Furnace is used in a high fire risk area.

3. The water circulating pump must be mounted in the hot supply line several feet below the top of the furnace water level to minimize air lock problems, see Figure 1, 2, or 3.

IMPORTANT: Pump must always be in lowest part of the line system and horizontal with the ground, see Figure 4.

Figure 1 - Ideal Set Up

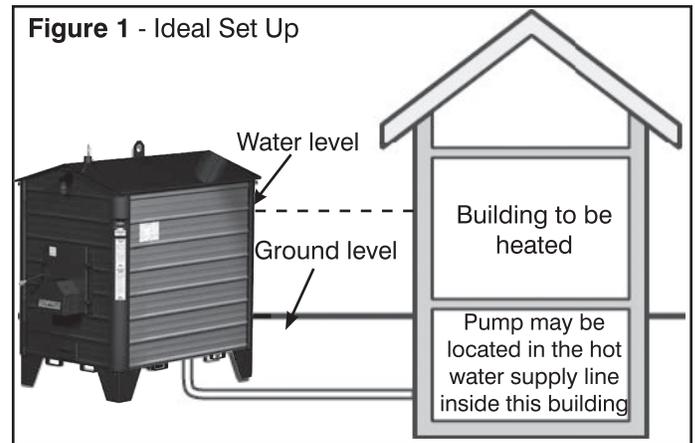


Figure 2

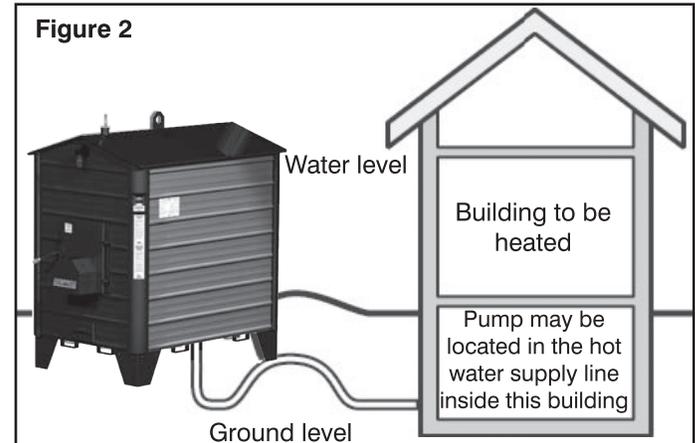


Figure 3

When water is to be pumped uphill, pump must be located in the hot water supply line at the furnace.

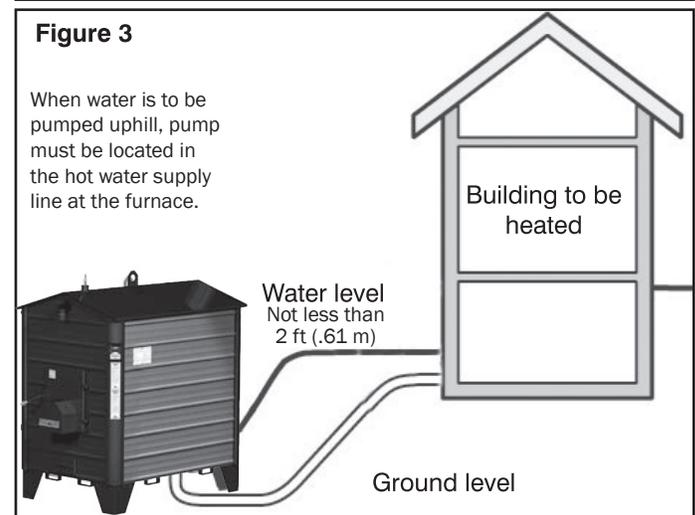


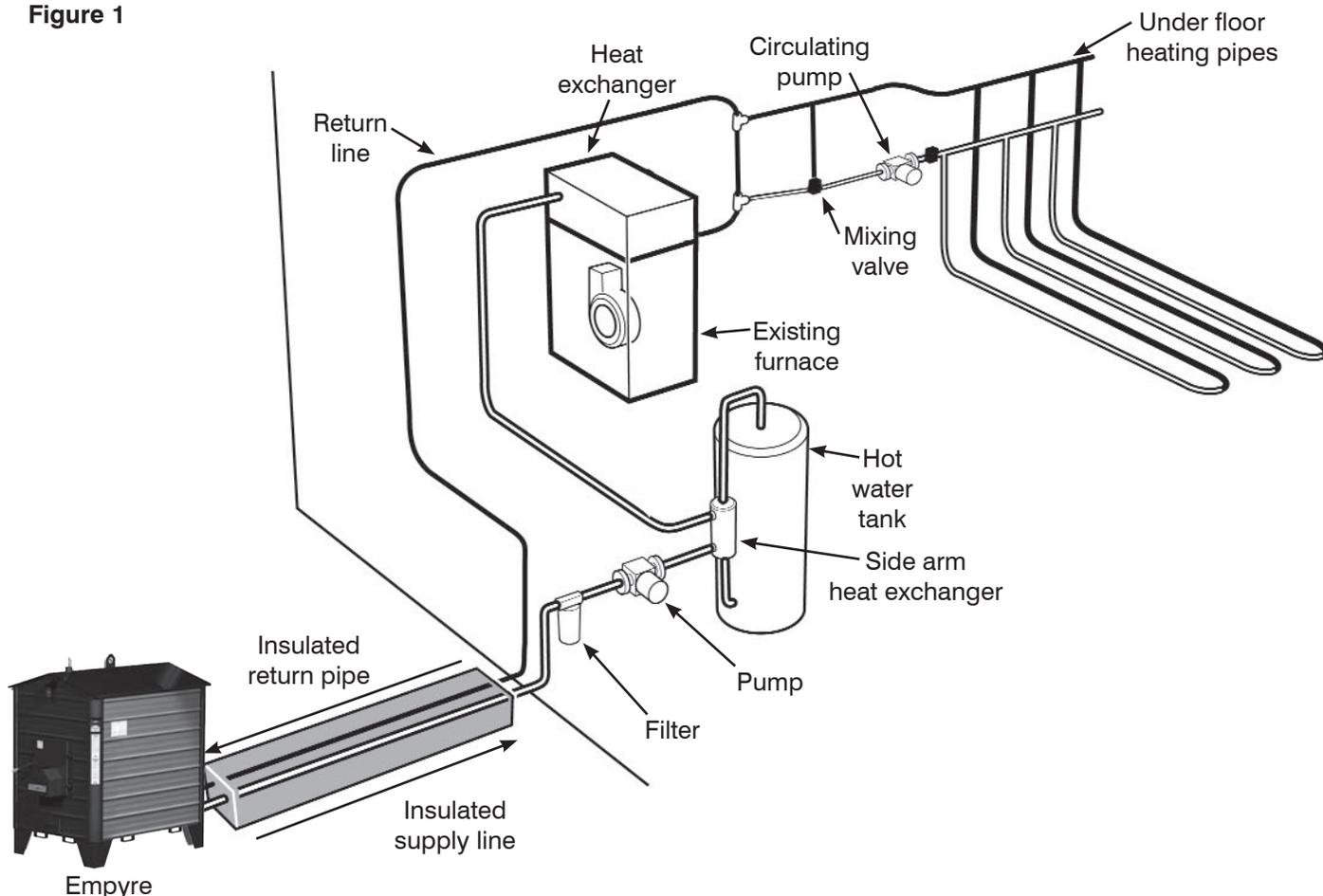
Figure 4



INSTALLATION

Typical Installation

Figure 1



Note: The installation of the Empyre as an add-on unit must be installed without changing the function of the controls or rewiring the original boiler. A wiring interconnection is permitted. The electrical system of both boilers must be powered from a single branch circuit without exception.

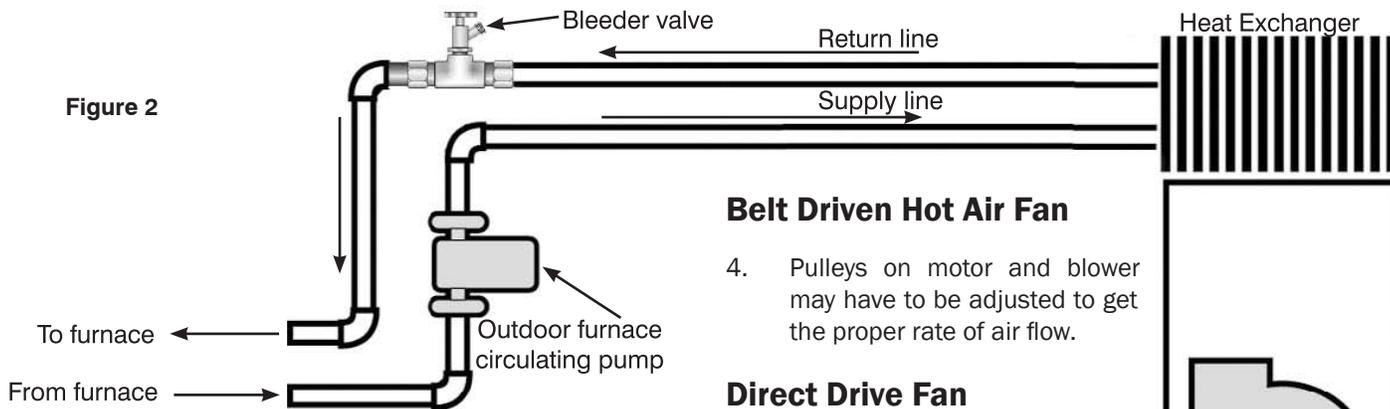
IMPORTANT:

The installation drawings in this manual are typical layouts shown as examples of types of layout only. We recommend that you engage a professional plumbing and heating company to ensure that your installation is suitable for your application, will serve your needs and conform to all local codes.

The Pro-Fab Industries warranty covers the Empyre furnace only and does not include anything outside of the Empyre furnace. Pro-Fab Industries takes NO responsibility for faulty installations, etc. DO NOT modify this unit in any way. Any modification will void the warranty.

These drawings should help in establishing a list of material required for a typical installation. All parts should be available from your Empyre provider. Ask your dealer for a parts list.

Figure 2



Hookup to Existing Heat System (Water to Air)

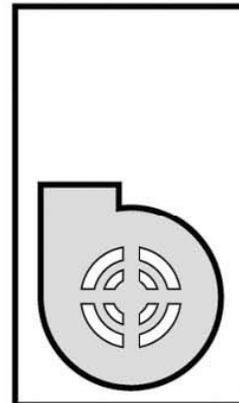
1. Install the circulating pump on the supply line and ensure that the pump's motor is in a horizontal position.
2. Install the heat exchange radiator in the hot air plenum of the forced air furnace, Figure 2, according to the manufacturer's instructions, taking care to seal all joints and holes.
3. After installing the heat exchanger to the forced air furnace system, check to ensure that the air flow is the same as specified by the manufacturer of the existing heating system. The furnace fan should not generally need to be changed in order to accommodate the addition of the heat exchanger.

Belt Driven Hot Air Fan

4. Pulleys on motor and blower may have to be adjusted to get the proper rate of air flow.

Direct Drive Fan

5. Adjust the motor speed to obtain the correct air flow.



Thermostat

6. Install a second thermostat to allow the blower to cut in separately from the furnace.
7. The existing thermostat should be set several degrees lower than the new thermostat. This will allow the regular system to cut in, should the Empyre run out of wood and the temperature drop below the second setting.

IMPORTANT: Have a qualified electrician check to ensure that these changes do not cause the electrical motor to be overloaded. **Any modification to the EXISTING forced air heating system must be made in accordance with the manufacturer's specifications and performed by qualified, licensed personnel in accordance with local building codes.**

Under Floor Heat

1. A 24 V thermostat with relay should be used in a house. For garage or shop, wire pump through an in-line thermostat.
2. Each zone can be manually adjusted with the ball valves on the supply header.
3. Adjust mixing valve to run supply water temperature between 110°F - 120°F (43°C -49°C) in concrete floor installation.

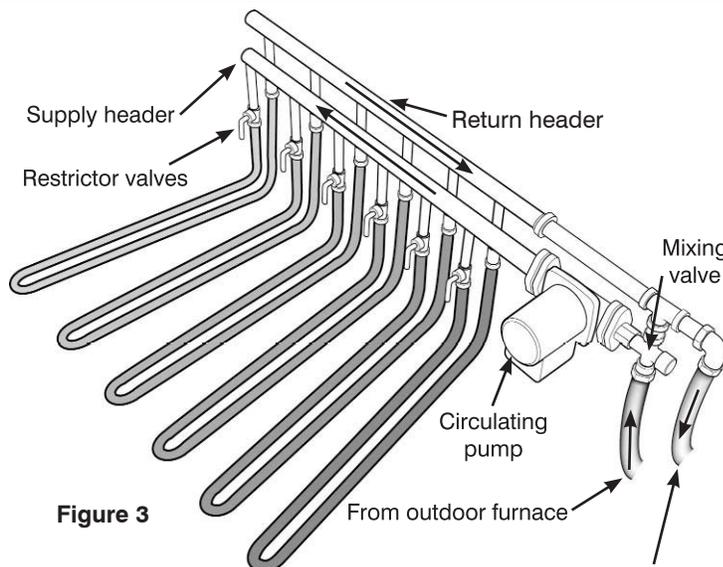
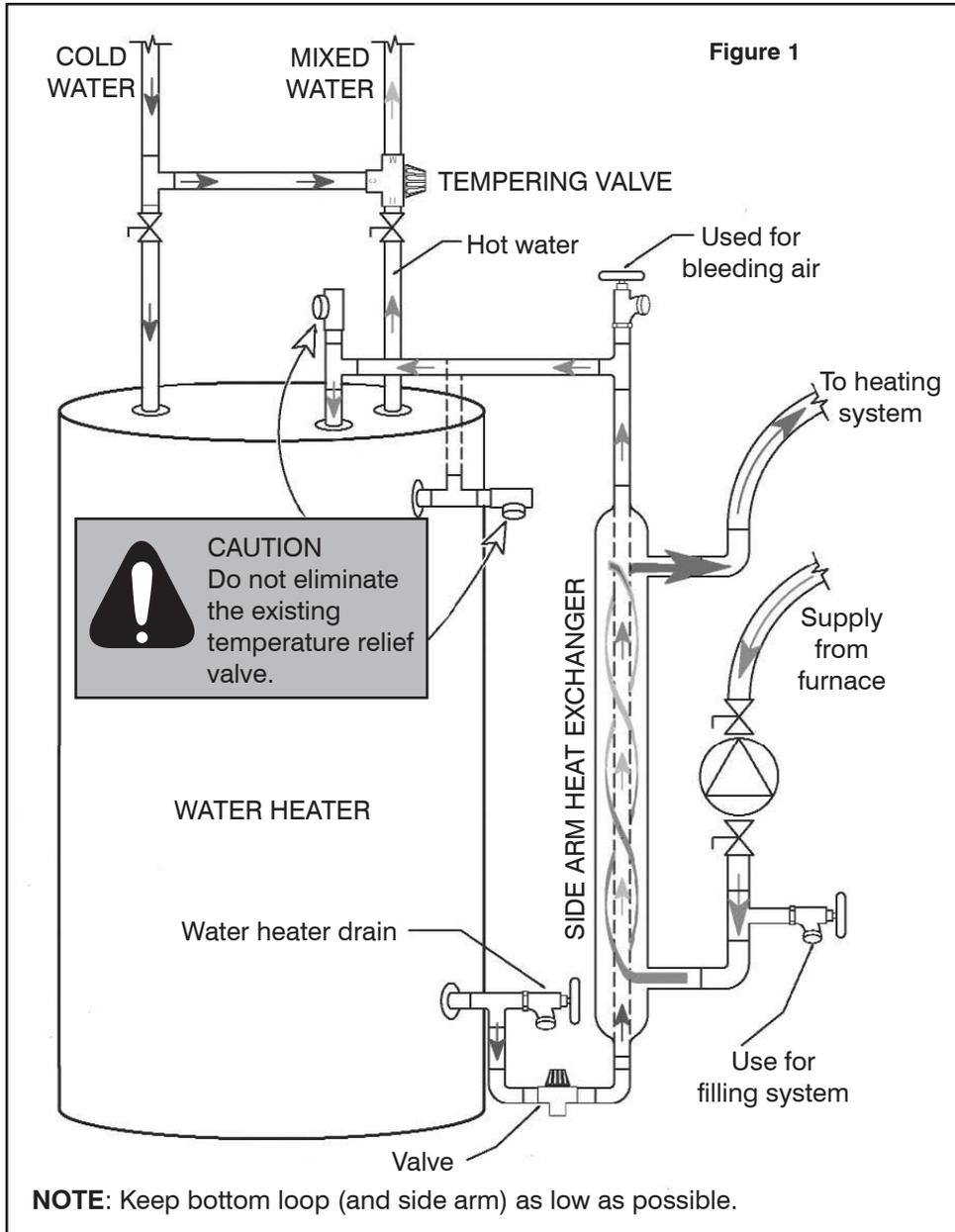


Figure 3

INSTALLATION

Side Arm Installation



SYMBOL INDEX

-  PUMP
-  BALL VALVE
-  THERMOMETER
-  BOILER DRAIN
-  TEMPERING OR MIXING VALVE

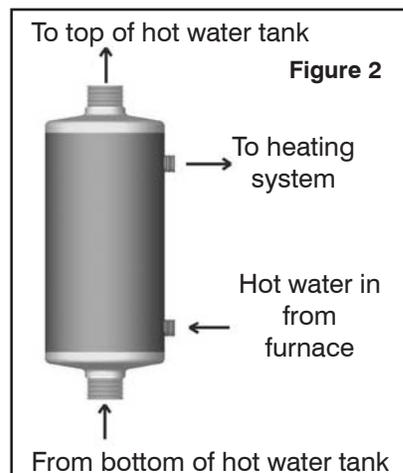
Have a qualified electrician and plumber check to ensure all connections to the furnace are in accordance with the manufacturer's specifications and performed by qualified, licensed personnel in accordance with local building codes.

IMPORTANT

When hooking up the Empyre to a domestic hot water heater, a tempering valve must be installed, to prevent scalding hot water from reaching the hot water outlets.

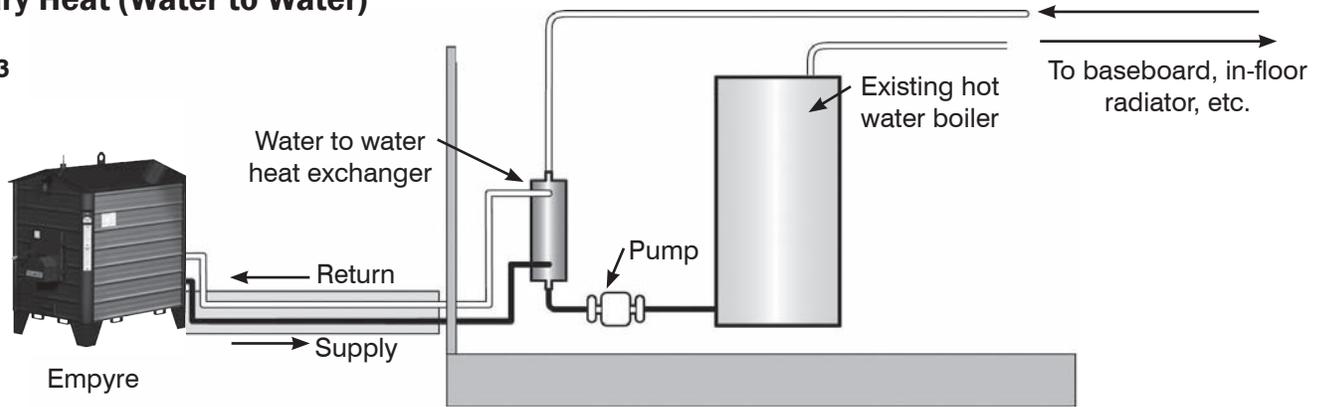
Optional Heat Exchanger

Stainless Steel Water to Water Heat Exchanger, Figure 2, can be used in place of a side arm.



Auxiliary Heat (Water to Water)

Figure 3

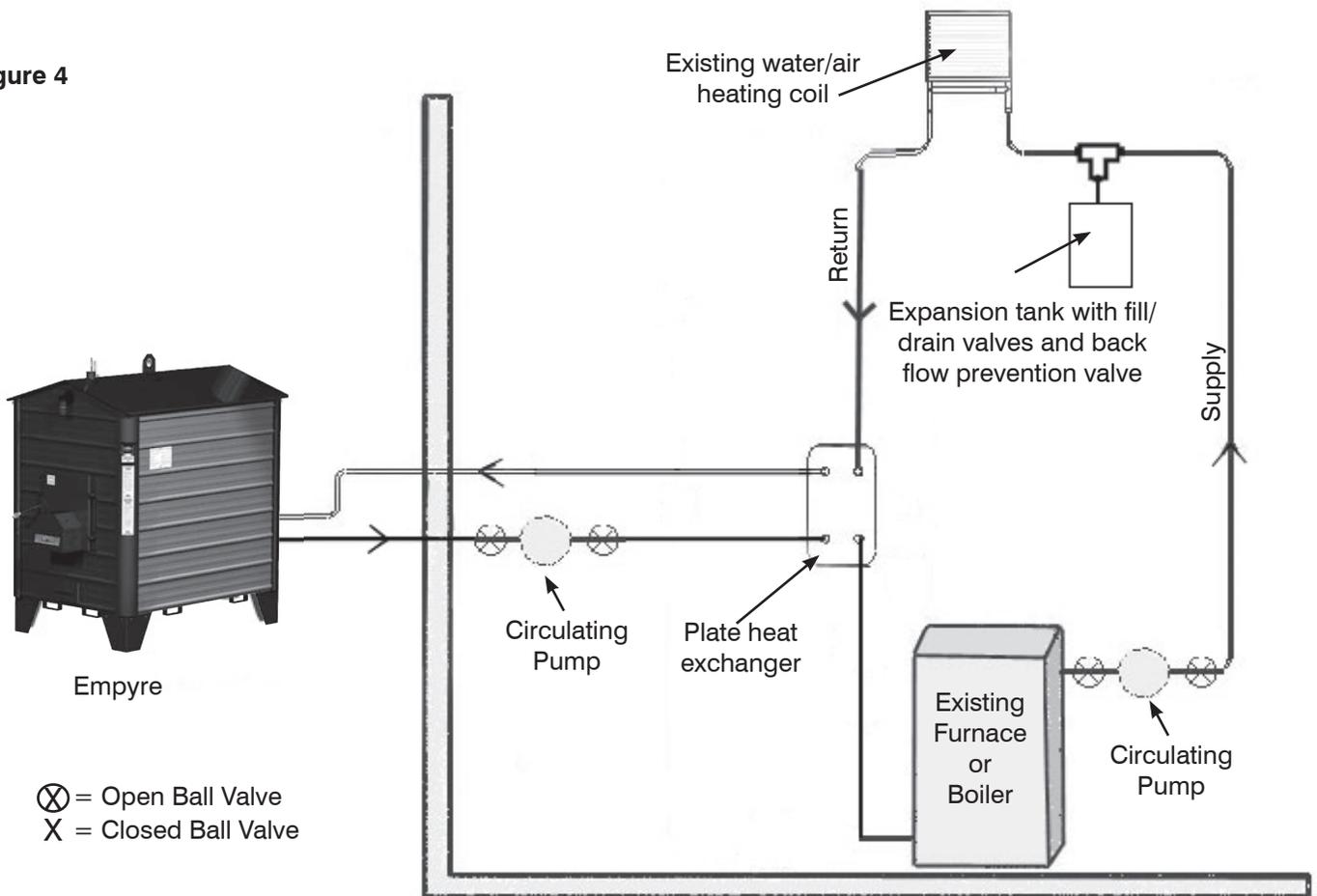


A regular furnace system is left intact and automatically cuts in when the Empyre Outdoor Wood Furnace runs out of wood, Figure 3.

Note: Whichever furnace is to be the standby unit, the aquastat on that furnace is to be set lower than the main furnace.

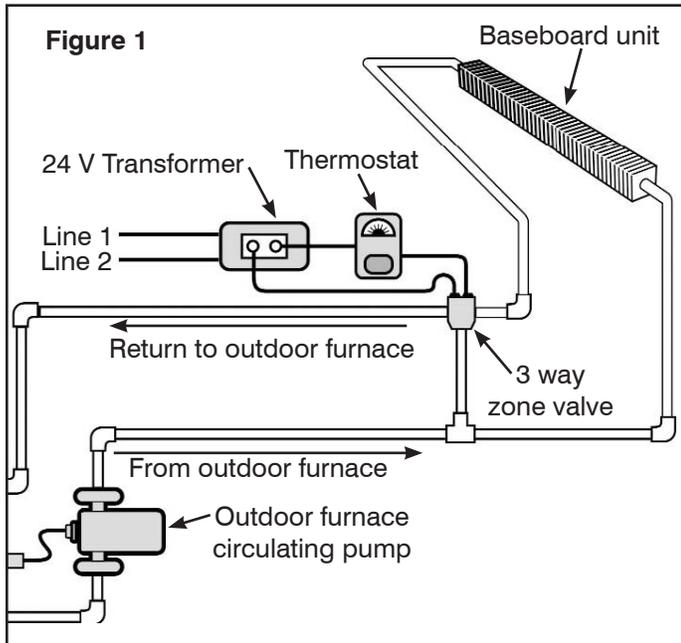
Hookup with Existing Indoor Furnace (Water to Water Plate Heat Exchanger)

Figure 4

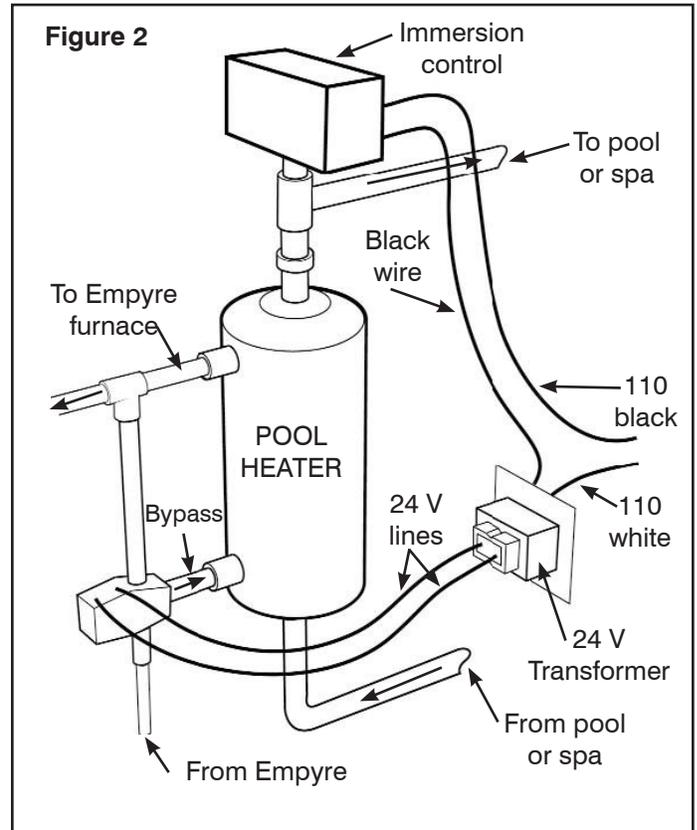


INSTALLATION

Baseboard Distribution

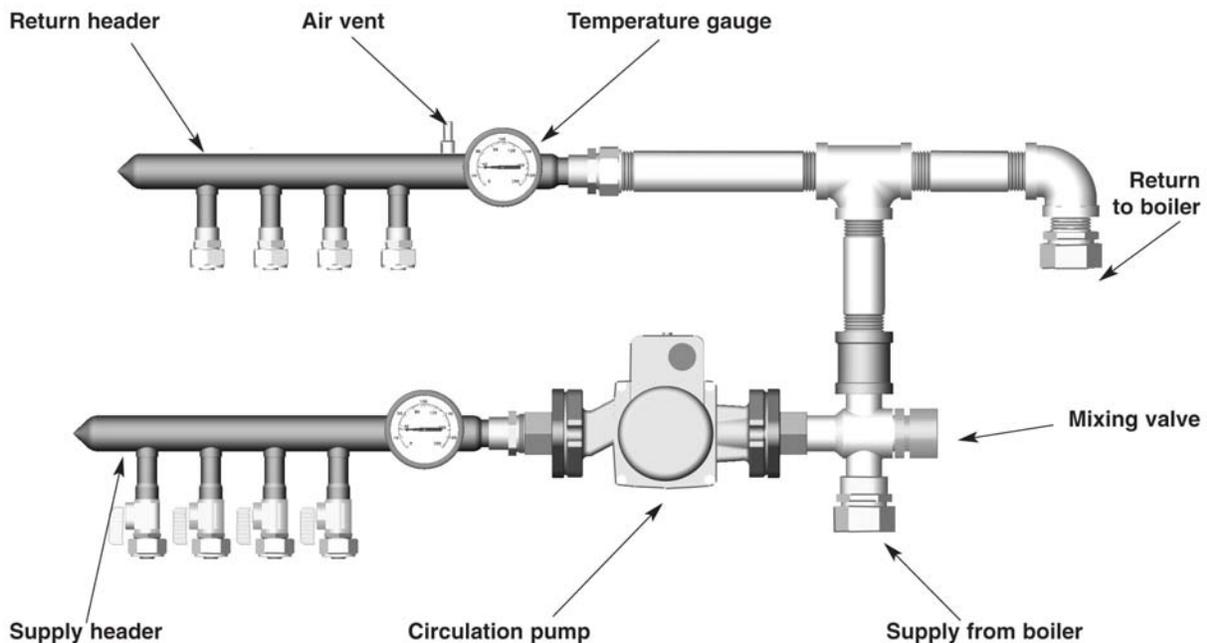


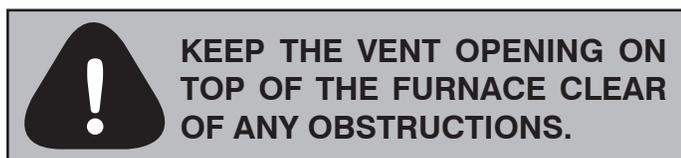
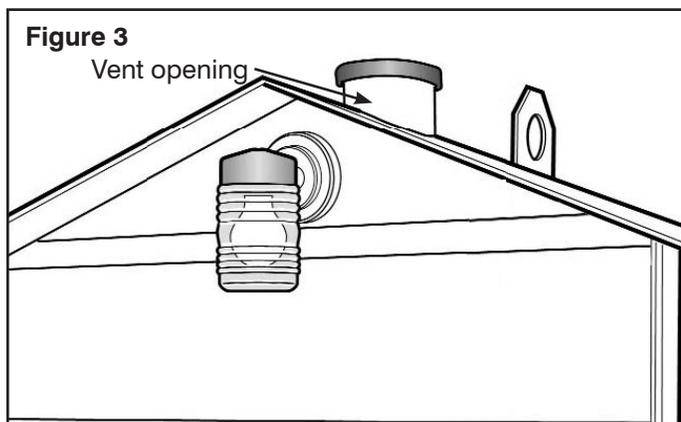
Pool & Spa Hookup



Common Header Set Up

Pump can be wired through an in-line thermostat. Each zone can be manually adjusted with the ball valves on the supply header. Adjust mixing valve to run entering water temperature between 110°F - 120°F (43°C - 49°C) in concrete floor installations.





KEEP THE VENT OPENING ON TOP OF THE FURNACE CLEAR OF ANY OBSTRUCTIONS.

IMPORTANT:

1. Use only soft, clean, filtered water in the Empyre. Add Pro-Fab approved water treatment to the water to prevent corrosion (available from your Empyre dealer).
2. Add approved antifreeze to the water chamber to prevent freezing should the furnace and the pump shut down due to a power failure or other cause. For amount of antifreeze to add follow instructions on the container.

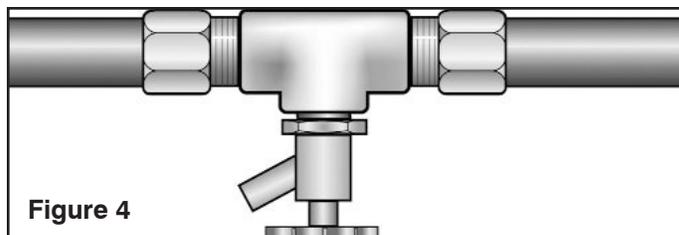
Use only environmentally friendly, propylene glycol based, low toxicity, non-petroleum based antifreeze designed for use in hot water furnace systems.

Available from your Empyre dealer.

First Fill

1. To fill the furnace with water from the inside of the building being heated, install a plumbing "T" in the return or supply line complete with a check valve and boiler drain, see Figure 4.
2. Attach a garden hose, with two female ends, from the water supply to the filler valve.
3. Isolate the furnace by closing off supply and return valves securely at the back of the furnace.

IMPORTANT: The Empyre may need to be drained of its contents at some time in the future. Be sure to place the line fill/drain assembly in a location where water can easily be drained and will not cause damage to the surrounding area.



4. Turn on the water to pressurize the line system and check for leaks in the system.
DO NOT PRESSURIZE THE FURNACE.
5. CHECK ALL LINES AND CONNECTORS FOR LEAKS.
6. After checking for leaks in system, open the SUPPLY valve at the furnace and let water run for 2 minutes and then close it.
7. Now open the RETURN valve at the furnace and let water run for 2 minutes and then close it.
8. Repeat above procedure 3 to 4 times during filling of the furnace. Alternating between lines will ensure that most of the air is bled from the system.
9. When the Empyre is full, shut off water and close the in-line filler valve and disconnect the garden hose.
10. Mix Pro-Fab approved water treatment, with one to two gallons of warm water and pour through vent opening, Figure 3.

Maintaining Proper Water Level

When water level is low, the Empyre may be filled or topped up through the vent opening, Figure 3.

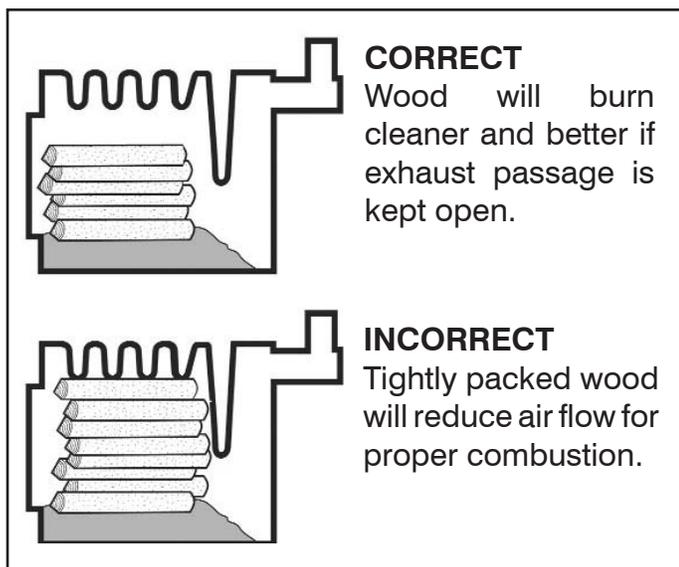
OPERATION

Starting the Fire in the Outdoor Hot Water Wood Furnace

Once the Empyre has been properly installed, all connections checked thoroughly and the water system is filled to the proper level, the unit is ready for starting a fire.

1. Place some dry split kindling at the back of the firebox, on top of some paper, and ignite.
2. Once the kindling begins to burn, add large pieces of wood until the fire burns briskly. Do not fill the firebox of the furnace to capacity until the water in the furnace is hot.
3. Only put enough wood into the furnace as may be burned during a twelve hour period. Do not fill the firebox above the top of the loading door.

A small intense fire burns cleaner and is preferable to long smoldering fires which may create excessive creosote deposits in the chimney.



DO NOT OPERATE WITH LOADING OR ASH REMOVAL DOORS OPEN.

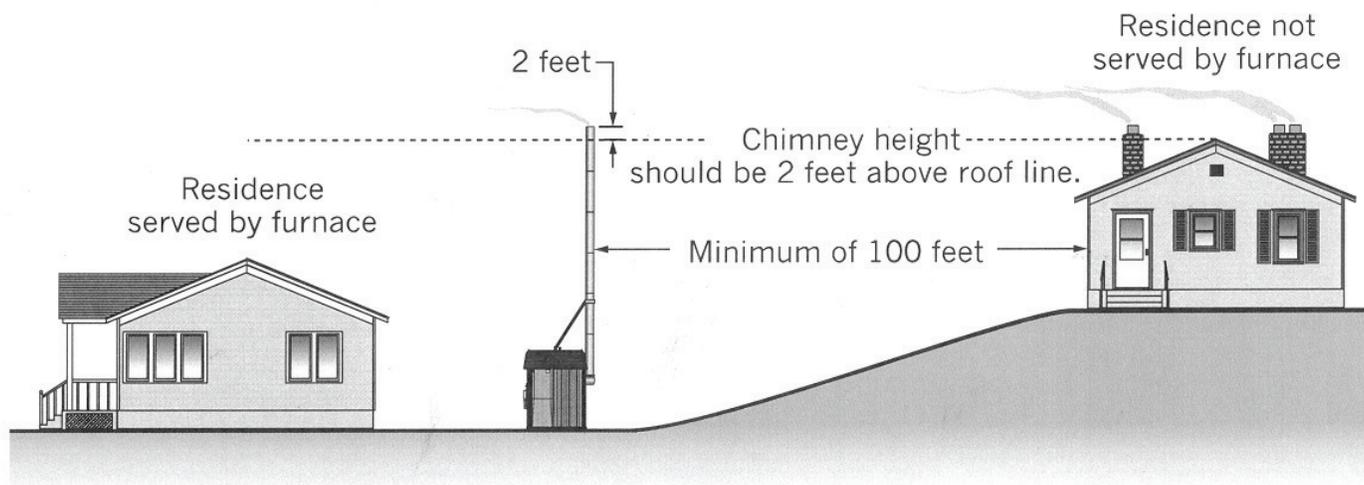
DO NOT USE THE DOOR AS A LEVER TO FORCE WOOD INTO THE FIREBOX!

Note: The Empyre has been pressure tested at the factory for water leaks. Some condensation may be observed in the firebox while the furnace is heating up after the water has become completely cold.

OUTDOOR BEST BURN PRACTICES

1. Read and follow all operating instructions supplied by the manufacturer.
2. **FUEL:** Use only those fuels recommended by the manufacturer of the unit. Never use the following: trash, plastics, gasoline, rubber, naphtha, household garbage, material treated with petroleum products (particle board, railroad ties and pressure treated wood), leaves, paper products, and cardboard.
3. **LOADING FUEL:** For a more efficient burn, pay careful attention to loading times and amounts. Follow the manufacturers 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 consideration to 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 of any residence not served by the furnace, it is recommended that the stack be at least two feet higher than the peak of that residence.
6. Always remember to comply with all applicable state/provincial and local codes.

Chimney Height Installation Scenario



OUTDOOR FURNACE MANUFACTURER'S CAUCUS

During Heating Season

1. Inspect the vent periodically for any blockages. Always ensure that the vent cap fits loosely in order to prevent the unit from becoming pressurized.

The Empyre is designed as an “Open to Atmosphere” system and should never be under pressure!

2. The ash tray must be checked weekly and emptied as necessary. Ensure that the ash tray is securely closed after each cleaning. Adjust the latch if necessary.

Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground, well away from all combustible material, pending final disposal. Other waste should not be placed in the container with the ashes.

3. Check the water level at least once a week to ensure the level is well above the “ADD” mark.

Oxygen buildup causes corrosion inside the water system. Keeping the water reservoir completely full avoids oxygen buildup, especially during the summer months when the furnace is not in use.

4. Check the door gasket to ensure an air tight fit and maintain in good condition. Replace if necessary.

5. Turn off power.

6. Check and clean the damper cover to prevent creosote buildup. Do this weekly until experience shows how often cleaning is necessary.

A creosote buildup could cause the damper to seize, causing the circuit breaker to disengage.

7. Inspect the chimney and chimney connector monthly during the heating season to determine if a creosote buildup has occurred. Maintain and clean if there is a buildup of creosote. When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow burning fire. As a result, creosote residue accumulates on the flue lining. When ignited, this creosote makes an extremely hot fire. When burning wood, the chimney connector and chimney should be inspected monthly during the heating season, and if creosote has accumulated, it must be removed to reduce the risk of a chimney fire.

A buildup of creosote will also cause a poor draft.

8. Cover plates and guards must be in place at all times, except during maintenance and servicing.

9. Canadian requirements for supplementary (add-on) boilers:

- operate the original gas, oil or electric boiler periodically to ensure that it will operate satisfactorily when needed;

- do not relocate or bypass any of the safety controls in the original gas, oil or electric boiler installation;

- the operation of a gas boiler must be verified for acceptable operation, before and after installation of the add-on appliance, by a gas fitter who is recognized by the local and national regulatory authority;

- do not connect to any chimney or vent serving a gas appliance.

End of Heating Season

Cleaning of the heat exchanger, flue pipe, chimney and draft inducer if used, is especially important at the end of the heating season to minimize corrosion during the summer months caused by accumulated ash.

1. Thoroughly clean the furnace of any creosote or ash buildup.

Hardened creosote or ashes are easier to be removed when furnace is still warm.

2. Check to ensure there is no moisture in any part of the inside of the firebox, or in the ash tray.

Failing to properly clean the furnace and protect it from moisture during the off-season will void the warranty.

3. Cover and seal the chimney to prevent any rain or moisture from entering the firebox chamber while not in use.

4. Ensure the water reservoir is full during the non-heating season to prevent corrosion inside the water jacket.

5. Add a sufficient amount of Pro-Fab approved water treatment to the water system each year after the heating season. Operate the water circulating pump for 24 hours after adding water treatment to ensure proper mixing of the water treatment with the water.

6. A water sample must be drawn 30 days after purchase of the unit and forwarded to your dealer for testing. Maintain the results of this test on file. Thereafter, draw a water sample once a year and forward to your dealer for testing.

Water properly treated with Pro-Fab approved water treatment should be between 8.8 and 11.0, a nitrate level between 730 and 1460 ppms as NaNO₂, and a conductivity must be less than or equal to 4000 mmhos.

If the pH or nitrite level is low, more Pro-Fab approved water treatment should be added. If the level of conductivity is too high, 1/2 the water in the unit should be drained and replaced with fresh water.

Failing to use Pro-Fab approved water treatment in accordance with the Installation and Operation Instructions will void the warranty. See your dealer for authorized supplies. It is the responsibility of the owner to maintain yearly water sample results on file.

Cleaning the Ash Tray



1. The ash tray must be checked weekly and emptied as necessary. Ensure that the ash tray is securely closed after each cleaning.
2. To avoid a buildup of ashes in the firebox, stir ashes daily to allow them to fall through to the ash tray. Keep ashes away from the air injection tubes.

Caution: Ashes should be removed when fire is out, do not remove burning material or glowing embers.

3. Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

Power Outages

The Empyre furnace, unlike a gas or oil fired appliance, does not stop generating heat when the power is interrupted even though the blower automatically shuts off causing the fire to die down. As a result the heat transfer fluid in the furnace may over heat and boil off through the vent. When power resumes be sure to check the fluid level.

Operating the Digital Temperature Switch (DTS)

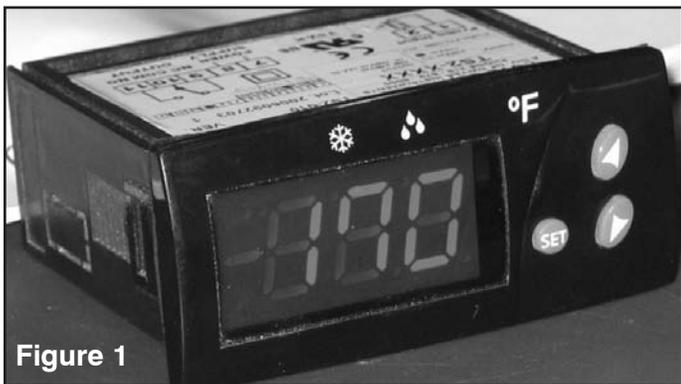
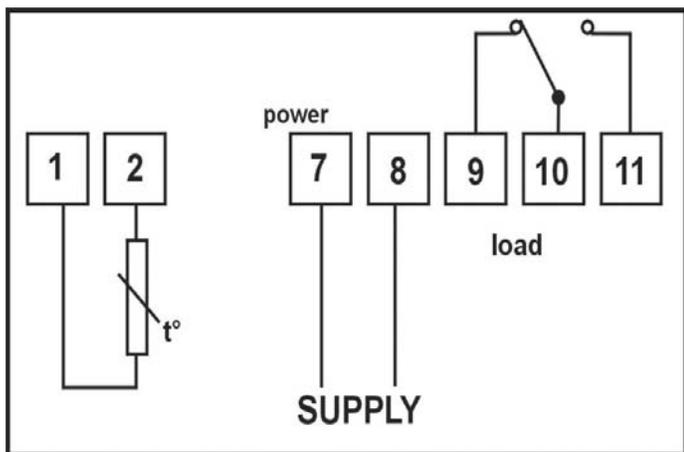


Figure 1

DTS Description

The digital temperature switch is designed for many heating and cooling applications. The probe temperature (Figure 1) is displayed on the bright 3-digit, red light emitting diode (LED). The user is able to adjust the set point using the front keypad. The unit features a 16 amp, single pole, double throw (SPDT) relay with the temperature display in degrees Fahrenheit.

DTS Wiring Diagram



DTS Display Messages

In normal operation, the probe temperature will be shown on the display. In case of an alarm or error, the following messages will be shown:

Er = Memory error

-- = Short-circuit probe error

∞ = Open probe error

DTS Physical Data

Accuracy: $\pm 1^\circ$

Output: 16 Amp SPDT relay

Supply voltage: 110 V

Front panel protection: NEMA 4 (Ip65)

Display: 3-digit, red. Digit height: 1/2" (1.27 cm)

DTS Programming

- Press SET. SP text will appear on the display.
- Press SET again. The real value is shown on the display.
- The value can be modified with the UP and DOWN arrows.
- Press SET to enter new values.
- Press SET and DOWN at the same time to exit programming or wait one minute and the display will automatically exit the programming mode.

NOTE: Only the temperature setting is programmable. All other settings are locked.

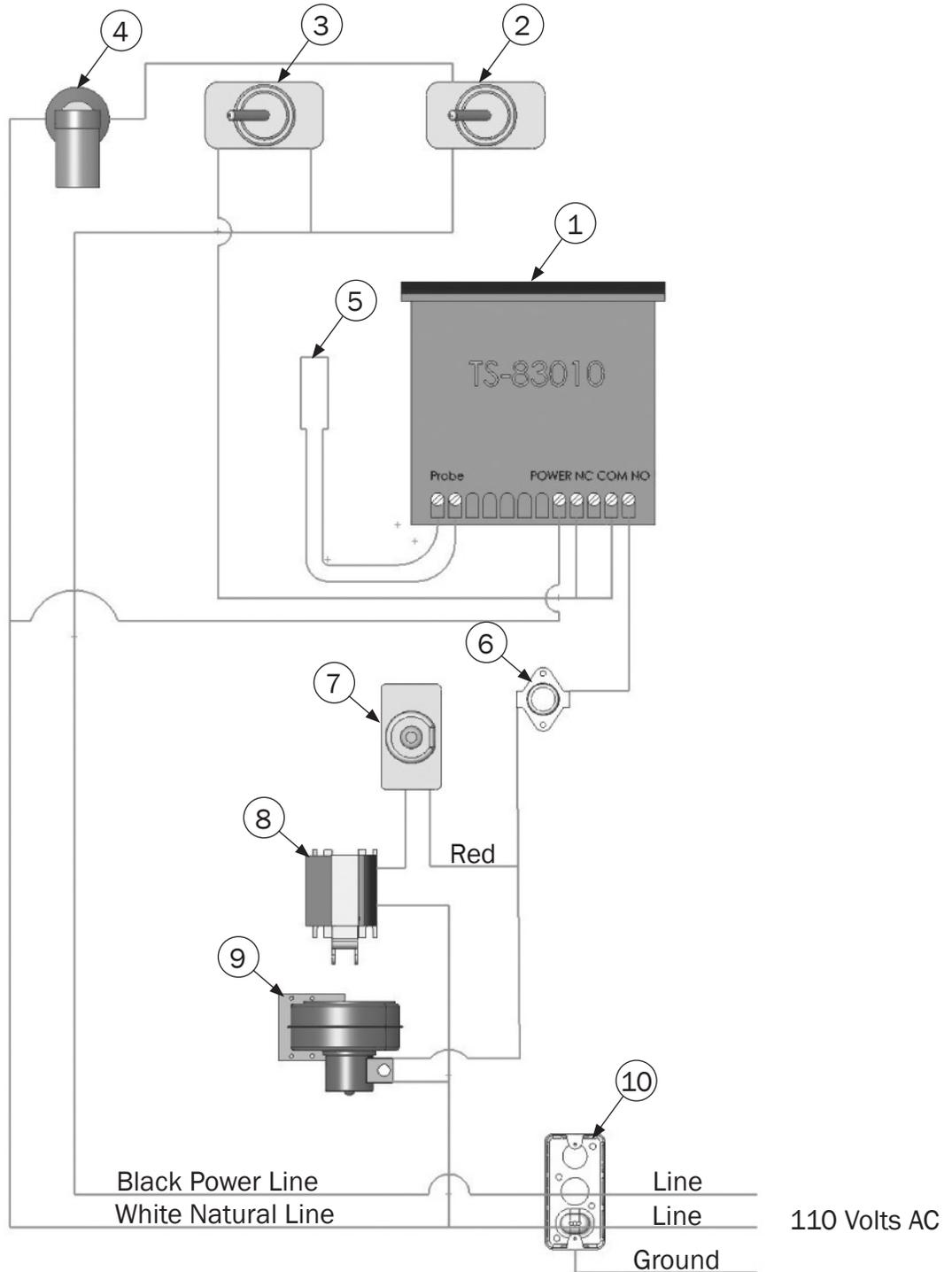
DTS Maintenance/Repair

After final installation of the digital temperature switch, no routine maintenance is required. This device is not field repairable and should be returned to the factory if recalibration or other service is required.

Any modification or tampering with the factory settings of the DTS will void the furnace warranty.

Outdoor Hot Water Wood Furnace Wiring Diagram - CPW250 & CPW450

1. Love Controller
2. Light Switch
3. Damper Switch
4. Light
5. Probe
6. Snap Disc
7. Circuit Breaker
8. Solenoid
9. Blower
10. Junction Box



CAUTION



DO NOT CONNECT THE ELECTRICAL COMPONENTS OF THIS UNIT TO ANY OTHER ELECTRICAL APPLIANCE.
DO NOT MODIFY THE ELECTRICAL COMPONENTS OR ANY OTHER PART OF THIS FURNACE. MODIFICATION TO ANY PART OF THIS FURNACE WILL VOID THE WARRANTY.

REFERENCE

Furnace Reference Chart

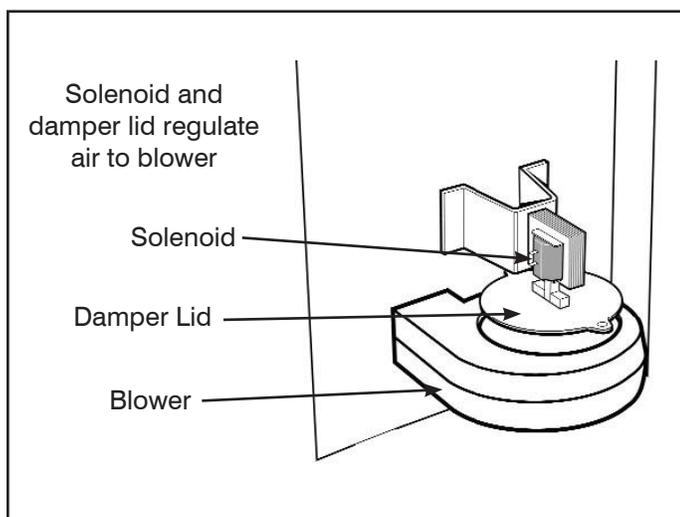
When ordering parts please use this reference chart.

MODEL NUMBER	CPW250	CPW450
Warranty	20 Years	20 Years
Capacity		
- Imperial gallons	125	250
- U.S. gallons	150	300
- Litres	568	1,136
Options		
Front Draft		
Forced	Yes	Yes
Natural	Optional	Optional
Rear Draft	Optional	Optional
Legs	Included	Included
Ash Tray	Included	Included

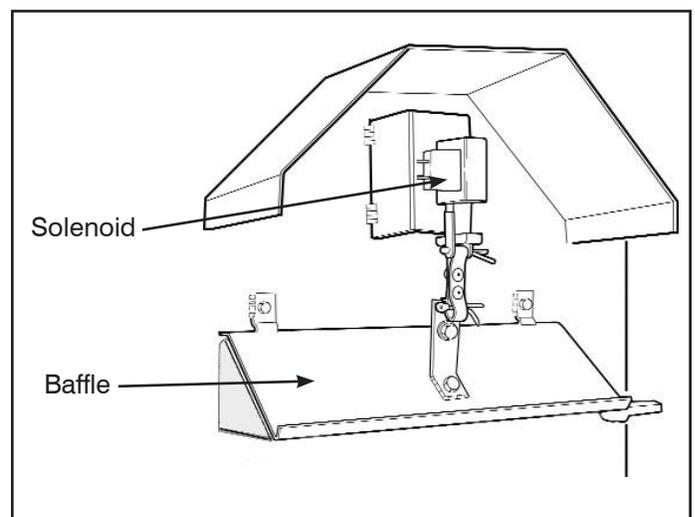
When ordering parts be sure to specify:

1. Serial Number _____
2. Model Number _____
3. Applicable Option _____

Standard Forced Draft Door



Optional Natural Draft Door



Furnace Specifications

FURNACE MODEL	CPW250		CPW450	
Units	in	cm	in	cm
Total Width	49	125	57	145
Body Width	47	119	55	140
Total Length	80	203	97	246
Body Length	59	150	77	196
Chimney Size	6	15	8	20
Loading Door Size				
in	20 x 20		20 x 24	
cm	51 x 51		51 x 61	
Firebox Size				
H	30	76	36	91
W	33	84	45	114
L	42	107	60	152
Water Capacity				
Imperial gallons	125		250	
U.S. gallons	150		300	
Litres	568		1,136	
Shipping Weight				
lbs	1,400		2,100	
kg	635		952	

Note: Weights and measurements may vary slightly.

TROUBLESHOOTING

Furnace Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
Damper does not open.	High limit switches may be shut off because the water temperature is higher than aquastat setting permits.	Wait for the water to cool down.
	Circuit breaker may have disengaged due to creosote buildup on and around the damper causing the damper cover to stick.	Clean damper area. Push reset button on breaker (see page 8).
	No electricity.	Check the power supply.
	Damper solenoid defective.	Replace.
Hot water is not reaching the building.	Water level is low.	Fill system to proper water level.
	No water circulating.	No power to pump. Faulty pump - fix or replace pump, or replace cartridge.
	Air in water lines.	Bleed lines to release water and reprime the circulating pump.
Little or no draft.	Furnace is cold.	Start small fire with dry kindling before reloading furnace with firewood (see page 18).
	Chimney is plugged.	Clean regularly, as per instructions in the manual.
Furnace overheats and boils.	Main door has been left open.	Close door.
	Main door and/or ash tray gaskets are leaking.	Replace gaskets or adjust latches and/or hinges.
Circuit breaker disengages.	Damper is sticking (solenoid overloaded).	Clean damper thoroughly.
	Blower not functioning (forced draft only).	Clean and oil blower.
Solenoid rattles during operation.	The alignment between the solenoid and the lift tab is out.	Loosen all four adjustment screws and realign the solenoid until it operates smoothly.
Extensive condensation and creosote buildup.	Differential on aquastat not large enough, unit cuts in too often.	Increase differential settings.
	Wet or poor quality of wood.	Use dry seasoned firewood only.
Ash tray is sticking.	Creosote or condensation buildup.	Oil drawer slides and edges as required and remove tray more often.

Digital Controller Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
The LOW (red light) is on but the water is completely full. (If applicable)	The front relay and/or the bottom level switch is faulty.	Unplug the thin red wire from front relay pole #3 as shown on the wiring diagram. If the power to the damper (and blower) is restored, replace the front relay. If needed replace the bottom level switch.
The water overheated and boiled over and now after refilling it, the water temperature is below operating range but there is no power coming through to the damper (and blower).	The High Limit Switch (snap disc) has tripped the circuit.	This high limit switch is designed to reset automatically when the temperature drops down to approximately 130°F (54°C). When the snap disc function is defaulted the power should be restored.
The demand for heat is on with sufficient wood in the firebox but no power is coming to the damper (and blower).	The damper lid may be stuck causing the Reset Switch to pop out.	Loosen the damper lid and push in reset button.
While reloading the firebox there seems to be an excessive amount of smoke coming out of the door (more than usual).	The draft is restricted due to creosote buildup in the chimney stack.	Clean the chimney stack, most buildup tends to be at the top of the stack.

EMPYRE

OUTDOOR HOT WATER WOOD FURNACE

Limited Warranty

Warranty service may only be performed by Pro-Fab Industries or a Pro-Fab Authorized Empyre Furnace Dealer or a Pro-Fab Authorized Empyre Furnace Service Centre.

PRO-FAB INDUSTRIES INC. WARRANTY

Pro-Fab Industries Inc. (hereinafter called "Pro-Fab") warrants to the original owner of the Empyre Furnace (hereinafter called the "Empyre") the following:

A three (3) year warranty on the workmanship of the furnace and workmanship on all parts manufactured by Pro-Fab such as the door, ash tray, from the purchase date, and excluding normal wear items such as (but not limited to) the door gasket (if applicable), insulation, exterior finish and chimney.

A one (1) year warranty for any labour required for any repair or replacement of the furnace or parts from the date of purchase based on Pro-Fab's predetermined labour rates and allowable hours.

A limited pro-rated warranty coverage (which includes the one (1) year labour coverage at Pro-Fab rates and hours as stated above) for the stainless steel of the firebox and water jacket only, based on the following pro-rated scale from the date of purchase:

- Years one (1) to five (5) – one hundred percent (100%) coverage;
- Years six (6) to ten (10) – sixty-six percent (66%) coverage;
- Years eleven (11) to fifteen (15) – forty percent (40%) coverage;
- Years sixteen (16) to twenty (20) – twenty percent (20%) coverage;

Pro-Fab will not be responsible or liable for any of the following: a) If warranty work requires removal or replacement of all or a part of the furnace, Pro-Fab is not responsible for the cost of plumbing, freight, permits, removal or disposal of damaged furnace or parts, replacement of water or additives, labour after the one (1) year warranty coverage expires, or any cost other than the warranted replacement part itself or the furnace; b) The care, maintenance and safe operation of the Empyre Furnace, which is the responsibility of the owner of the furnace; c) Any accidents, injury, damage or loss incurred due to a heating system failure; d) Any accidents, injury, damage or loss incurred due to faulty installation, operation or maintenance; e) Any cost incurred for replacing or repairing of parts not manufactured by Pro-Fab which carry their own manufacturer's warranty (except for the one (1) year labour coverage at Pro-Fab rates and hours as stated above); f) Any out-of-pocket expenses, alternative accommodations or loss of revenue due to defective parts or furnace; g) Performance problems caused by improper sizing of the furnace, vent connection, or air openings;

There are no other warranties, expressed or implied, by Pro-Fab or its Authorized Empyre Furnace Dealers or Authorized Empyre Furnace Service Centres regarding the Empyre Furnace except the warranty expressed herein. ANY IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE APPLICABLE WARRANTY PERIODS SPECIFIED ABOVE. PRO-FAB'S SOLE LIABILITY, WITH RESPECT TO ANY DEFECT, SHALL BE AS SET FORTH IN THIS LIMITED WARRANTY, AND ANY CLAIMS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES ARE EXCLUDED.

Absolutely no warranty is provided after twenty (20) years from the date of purchase.

Note: All parts NOT manufactured by Pro-Fab carry their own manufacturer's warranty. The owner is responsible for all costs necessary to replace those parts unless covered by the applicable manufacturer (except for the one (1) year labour coverage at Pro-Fab rates and hours as stated above).

The above warranties are based on the following factors:

Pro-Fab reserves the right to repair or replace at its discretion any defective part or furnace, in whole or in part.

Use of Pro-Fab approved water treatment. **IMPORTANT:** Pro-Fab approved water treatment is available from your local dealer or service centre and must be used and validated for warranty coverage. The pH balance must remain between 8.8 and 11.0, the nitrite level must remain between 730 and 1460 ppm as NaNO₂, and conductivity must be less than or equal to 4000 mmhos. A copy of the invoice itemizing the purchase of approved water treatment will be required as proof of maintenance in the event of a warranty claim. All laboratory reports must be kept as proof of maintenance (as indicated in the Installation and Operation Instruction Manual).

All instructions in the Empyre Installation and Operation Instruction Manual must be followed.

The Warranty Registration and a copy of the original bill (invoice) must be forwarded to Pro-Fab within thirty (30) days of the date of purchase to validate the warranty.

h) Damages, malfunctions or failures resulting from the use of any attachment not authorized by Pro-Fab; i) Units installed outside the continental United States, Alaska, or the provinces or territories of Canada without prior approval from Pro-Fab; j) Units with their safety certification labels removed; or k) Damages, malfunctions or failures caused by force majeure, abuse, accident, fire, or acts of God.

Any available warranty will be void if: a) Maintenance procedures are not followed (as indicated in the Installation and Operation Instruction Manual); b) Water treatment and proper additives are not used as specified in the Installation and Operation Instruction Manual; c) The Empyre Furnace has been altered in any way; d) Any material other than Pro-Fab approved fuel has been used; e) Any instruction given in the Installation and Operation Instruction Manual which has not been followed including during installation or regular maintenance; or f) Any claim made under the warranty for a person other than the original owner.

No person is authorized to bind Pro-Fab to any other warranty whatsoever.

Pro-Fab reserves the right at any time to make changes or improvements to the design, materials, or specifications of the Empyre line of furnaces or parts without thereby becoming liable to make similar changes in the furnaces or any of its parts previously manufactured.

Manufactured by:
Pro-Fab Industries Inc.
Box 112 Arborg, MB R0C 0A0

PRO-FAB
INDUSTRIES INC.