



# **Ultimizer Series BL 2840 & BL 3444**

PORTAGE & MAIN  
WOOD-FIRED OUTDOOR WATER FURNACE



## **INSTALLATION AND OPERATION MANUAL**

PLEASE SAVE THESE INSTRUCTIONS AND REFER TO THEM FOR SAFETY AND  
EFFICIENT PERFORMANCE.

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## **PORTAGE & MAIN WOOD OUTDOOR WATER FURNACE**

Manufactured by  
Piney Manufacturing Ltd.  
Box 130, Piney  
R0A 1K0, MB  
Canada

Thank you for purchasing a Portage & Main Outdoor Water Furnace which has been tested and approved by the Canadian Standard Association (CSA MC231278).

Please observe the instructions contained in this Manual and affixed to the unit to enjoy the full benefits of heating your home, other buildings and your domestic water in a safe and efficient way. We also recommend that you consult and comply with your local electrical, plumbing and fire codes, which override these instructions. We have also included some maintenance procedures and tips that will ensure efficient, economic and trouble-free operation.

For more information regarding the installation, operation and maintenance of this unit, please contact us or your nearest dealer.

**Piney Manufacturing Ltd.**

## THE PORTAGE & MAIN OUTDOOR WATER FURNACE

The Portage & Main Outdoor Water Furnace is safe and highly efficient, conveniently installed outside your house to give you the comfort you desire for your heating season using the oldest and most environmentally friendly fuel of all: WOOD.

This unique system has a fire pot and heat exchanger which are surrounded with a water jacket that keeps its components from overheating and warping. The front door is insulated and built of heavy gauge material to eliminate warping. The multi-pass heat exchanger is designed to extract useful heat from the flue gases before they exit through the insulated stainless steel chimney.

The water temperature is maintained at the desired level by aquastats. The heated water is pumped to the house and the other buildings by means of individual circulating pumps through an individual underground loop for each building or application.

The heating loop will provide the required amount of heat to your house or building, regardless of your existing heating systems as described later on. You can also add a water-to-water heat exchanger to your system to provide you with all your domestic hot water requirements to increase your fuel savings considerably.

The Portage & Main Outdoor Water Furnace is equipped with a fan for forced combustion air to modulate the burning rate as required, and with aquastat and hi-limit aquastat which in the event of failure of the A419 control aquastat, the hi-limit aquastat will prevent the water from overheating or boiling.

Please follow the instructions contained in this Manual to enjoy the comforts of heating with wood in a safe manner.

### LOCATION

Check with your local jurisdiction codes. In addition to the local codes other consideration may include:

- Outside your residence for safety and lower insurance rates.
- In a separate structure such as your garage, shop or shed.
- Away from storage of wood, chemicals and other flammable materials.
- Downstream of prevailing winds relative to main residence.
- On the side of pipe entry to residence.

## **RECOMMENDATION**

We recommend a hot water circulation loop that will dissipate at least 10% (ten percent) of the estimated heat output of the water furnace in the event that circulation is reduced because of electrical power failure. This loop shall be such that it can only be made inoperative by a deliberate manual action. The minimum pipe to be used should be 18mm (.75 inch) in diameter.

## **PLACEMENT**

We recommend a concrete or cement (noncombustible) slab for placing the P & M Outdoor Water Furnace. The BL 2840 and BL3440 may be placed with patio bricks or piling or paving stones to establish a level installation.

## **CHIMNEY**

We recommend the use of insulated stainless steel pipe as a stack to minimize creosote formation. A six (6) inch pipe is recommended for BL 2840 and an eight (8) inch pipe for BL 3440. The stack should extend at least four (4) feet above the building where the Outdoor Water Furnace is located.

## **CLEARANCES**

The Outdoor Water Furnace should be placed in a location where it can always get a significant amount of fresh air. This is important for the water furnace to operate efficiently, and to have good combustion.

The minimum installation clearances to combustible materials are:

- Back & Sides: Twelve (18) inches(46 cm)
- Front: Forty-eight (48) inches(122 cm)
- Top Eighteen (18) inches(46 cm)
- Flue Pipe: Eighteen (18) inches(46 cm)

**Note:** Adequate space should also be left around the outdoor water furnace in addition to the required clearances for servicing and maintenance.

## **PIPE TRENCH**

- Pre-insulated pipes such as LOGSTOR Dual Pex Flex, properly sized for circulation requirements are recommended to convey the hot water from the outdoor water furnace to each building. The piping should be laid in a flat trench eighteen (18) inches to thirty six (36) inches deep. If high water table is encountered, the trench may be shallower, traffic permitting. It is to your advantage to be down deeper at the boiler/furnace especially as it makes the bend easier.
- Use of water tight insulation is recommended as all Styrofoam will absorb water to the point it becomes very poor insulation. Use only in high dry well drained areas if using at all.
- All plumbing must be done according to applicable local codes.

## WATER FILL-UP

- After installing the P & M Outdoor Water Furnace in place and connecting to it the supply and return pipe(s) to and from the various buildings to be heated, IN ACCORDANCE WITH APPLICABLE LOCAL CODES, the heating installation is ready to be filled with water.
- Before filling the P & M Outdoor Water Furnace with water, make sure all valves are in “closed” position, and unused supply and return outlets on the front of the outdoor water furnace are tightly capped.
- A permanent water supply to the Outdoor Water Furnace is recommended by tapping into the water mains and connecting it to the top of the Outdoor Water Furnace through a manually operated shut-off valve.
- Add water until the entire heating installation is filled and the level gauge on top of the outdoor water furnace shows full.
- Before starting the outdoor water furnace make sure the entire heating installation is properly vented to facilitate the circulation of water in the heating loop(s).
- Ensure water trap and discharge pipe are properly installed and unobstructed to release any pressure build-up in the outdoor water furnace.

## CORROSION CONTROL

To control corrosion in the Portage & Main Outdoor Water Furnace we recommend the following:

1. Always use **certified boiler treatment**. Submit water sample for testing at initial setup, and annually through your dealer. Keep your records and submit one copy to Piney Manufacturing @ 306-922-1662.
2. Always maintain the proper water level.
3. Add a commercially available antifreeze solution to the water in the order of thirty (30) per cent, during the initial water fill-up. (Optional)
4. When adding large make-up water quantities to compensate for evaporation and to maintain proper water level, use the same ratio of antifreeze solution to the make-up water. For smaller make-up water quantities, no antifreeze solution is required.
5. If sedimentation occurs after the initial few weeks, the water should be treated chemically to adjust its pH level. Consult your dealer for water analysis and treatment.
6. Keep ashes to minimal. Do not burn garbage.
7. Always maintain adequate water level. If level drops occasionally, check for leaks or boiling of hot water and refer to the Troubleshooting Section.
8. Make sure the outdoor water furnace is properly grounded.
9. Remove ashes when outdoor water furnace is not used
10. Cover the chimney during off-season to prevent rainwater from entering the firepot.
11. Clean the firepot during the off-season.
12. Clean the heat exchanger with the cleaning tool provided with the outdoor water furnace, through the cleaning door located above the wood-loading door.

## **ELECTRICAL CONNECTIONS**

- The Portage & Main Outdoor Water Furnace is factory-wired and is ready for connecting it to an AC/120V/60 Hertz supply
- ALL ELECTRICAL CONNECTIONS SHALL BE WIRED ACCORDING TO APPLICABLE LOCAL CODES.
- Make sure outdoor water furnace (and metallic water lines, if used) is well grounded to avoid pitting in the water jacket.

## **STARTING-UP**

- Before starting-up observe the SAFETY WARNINGS contained in this Manual.
- Make sure the Outdoor Water Furnace, circulating loops and existing heat exchangers or baseboard heaters are full of water and properly vented.
- Ensure the circulating pump(s) is properly installed according to manufacturer's instructions. Failure to do so could void the Warranty.
- Inspect the chimney and make sure it is clear from any obstructions.
- Start the fire with kindling and smaller split wood. DO NOT USE ANY FLAMMABLE LIQUIDS TO START THE FIRE. Gradually add larger wood to develop an adequate bed of coals. Once a full coal bed has been developed, the fire may be charged to ultimately last until the next fill time when there will be a full coal bed to ensure that the added firewood will light. Fill the furnace regularly to match heat load. Do not overfill your furnace. Put in just enough wood to maintain temperature until the next fill time usually 12 hours.
- Always turn the power off before loading the appliance with wood or opening the firing door. Keep firing and ash pit doors tightly closed at all times for safety when outdoor water furnace is in use.
- Set the aquastat to the highest temperature setting on the dial (180 °F) as described under SETTING. When the water temperature reaches this set point, the control will turn the combustion fan off to close the air damper at the bottom of the outdoor water furnace. When the combustion fan is shut down, turn the setting dial to a range of 175 °F to 185°F. Now turn the circulating pump(s) on and leave it on at all times. (180°F is ideal operating temp 175°F to 185°F are also good; even as high as 195°F would be good if required-Consult with your Portage & Main Furnace Dealer for more info.)
- Before leaving the Outdoor Water Furnace location, make sure that:
  1. The water level is adequate.
  2. The wood loading door is tightly closed.
  3. The ash pan door is tightly closed.
  4. The area around the outdoor water furnace is clear from any combustible materials.

## **SETTING**

The Portage & Main Outdoor Water Furnace is equipped with a digital display immersion type aquastat controller which operates in response to water temperature changes.

To set the temperature at the desired level, go to page 17-19 of this manual.

## **OPERATING INSTRUCTIONS**

1. Portage & Main Outdoor Water Furnace may be connected to an existing boiler system. Burn natural wood only
2. To avoid damage load wood carefully. Always shut off power before opening firing door or loading the appliance with wood. Unlatch firing door allow ten seconds for smoke to dissipate before opening door fully.
3. Do not use chemical substances or liquid fuels to start or enhance the fire.
4. Do not burn garbage, liquid fuels, engine oil, naphtha or other flammable materials, which may cause a fire or an explosion.
5. Shut off the outdoor water furnace in case of a runaway fire.
6. Clean the heat exchanger regularly to remove accumulated creosote and ash. Flue pipe and chimney need to be cleaned periodically.
7. Clean the Outdoor Water Furnace and cap the chimney at the end of each heating season to minimize corrosion during summer months.
8. Always maintain the Outdoor Water Furnace, flue pipe and chimney in good condition.
9. Do not load the Outdoor Water Furnace with wood during an electrical power failure. Do not leave fire door open. Do not use firing, ash or damper doors to manually regulate combustion.
10. For safety do not store any fuel or combustible materials within the installation clearance of the outdoor water furnace.
11. Keep firing and ash pan doors tightly closed at all times for safety.
12. Always keep the grates at the bottom of the firepot clean and free from ash to allow maximum combustion air to enter the firepot.

## **SAVING TIPS**

1. Keep the circulating pump(s) on all the time to maintain a comfortable environment and avoid temperature swings and settling of suspended matter in the water.
2. Maintain a regular wood-loading schedule to keep the Outdoor Water Furnace operating under steady-state conditions.
3. Turn the circulating pump(s) on occasionally during summer to minimize pump seizure.

## **CREOSOTE CONTROL**

- Creosote is formed when wood is burned at a slow rate. Condensation of creosote vapors occurs in the chimney which is relatively cooler than the Outdoor Water Furnace. This causes creosote to form a lining inside the chimney.
- Accumulations of creosote when ignited may result in chimney fires.
- We recommend inspecting the chimney once a month during the heating season and removal of creosote linings to reduce chimney fire hazards.
- Morning high temperature firing of the furnace, for up to ten (10) minutes, twice a week will eliminate most of the soggy creosote in the heat exchanger and chimney. This is achieved by opening the ash pan door during the high temperature-firing period. The ash pan door should be closed immediately after this high temperature firing to prevent overheating of the outdoor water furnace and water boiling away to an unsafe level.



## ASH DISPOSAL

- Ashes should be removed from the Outdoor Water Furnace regularly or they will block the flow of combustion air from the damper.
- Ashes should be stored in metal containers with tight lids and kept in an area free of combustible materials until finally disposed.
- Do not dispose of ashes while embers are still hot.
- Check local by-laws for ash disposal. Wood ash can be used to reduce soil acidity or as a fertilizer for the garden.

## SAFETY WARNINGS

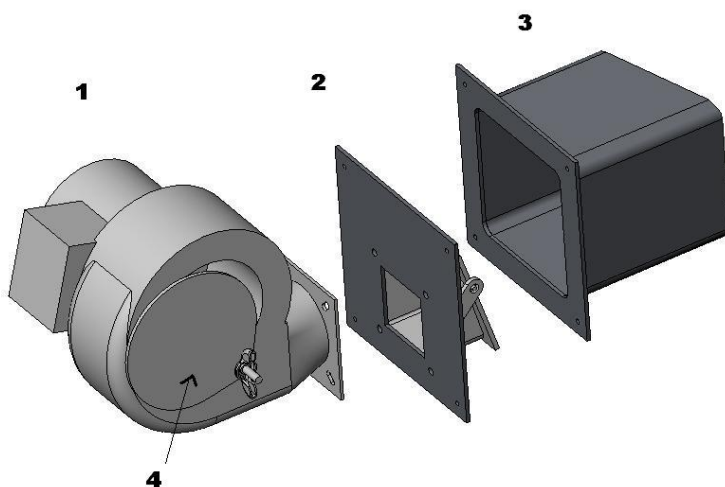
- **Never leave children un-attended near the boiler.**
- **Never add water when outdoor water furnace temperature is close to 212 °f as it may result in steam flashing.**
- **Never perform any service or maintenance work before water temperature drops below 100 °f.**
- DO NOT store combustible materials or liquids near the Outdoor Water Furnace.
- DO NOT burn any materials other than natural wood.
- DO NOT use flammable liquids or materials to start or to enhance the fire.
- DO NOT leave wood loading door open or unlatched.
- DO NOT open the loading door too quickly to avoid blowbacks which could cause severe burns.
- ALWAYS check water level, aquastat and damper setting for a proper and safe operation.
- DO NOT touch any part on the front of the Outdoor Water Furnace, which is insulated to avoid skin burns.
- ALWAYS store ashes in tightly covered metal containers away from combustible materials.
- Always turn the circulating pump(s) on when burning scraps of wood in the summer to prevent system from overheating.

## MAINTENANCE

- Portage & Main Outdoor Water Furnace is designed to operate for many years with the least amount of maintenance. Good housekeeping practices and observance of the instructions contained in this Manual would assist you in maintaining the outdoor water furnace in good and safe working conditions.
- ALWAYS SHUT OFF THE POWER SUPPLY prior to performing any service or maintenance work.
- Refer to the SAFETY WARNINGS and OPERATING INSTRUCTIONS prior to performing any or maintenance work.
- If circulating pump(s) is seized due to a prolonged shutdown, remove the screw in the center of the motor and turn the motor shaft with a screwdriver to loosen it.

The damper lid on the blower fan has to be manually adjusted to the desired amount of air required. This is done simply by moving the air flow adjuster. This blower fan assembly should not be altered in any way for increased fire.

- 1. Blower Fan**
- 2. Fan Mount + Damper Lid**
- 3. Damper Lid Housing**
- 4. Air Flow Adjust, Manual Shutoff**



## CONNECTION TO HEATING SYSTEMS

The P & M Heating System is versatile and can be connected to any existing or new heating system and/or domestic water system as described below. **The corresponding schematics are provided as a guideline only.** ALL CONNECTIONS MUST BE EXECUTED ACCORDING TO LOCAL PLUMBING AND ELECTRICAL CODES.

### 1. EXISTING FORCED AIR SYSTEM

All you need is to install a water-to-air heat exchanger in your existing furnace plenum (on the supply side) to keep your house as comfortable as you desire using a separate thermostat. Your existing furnace would be used as a back up when required. (Refer to Schematic #1)

### 2. EXISTING WATER BASEBOARD SYSTEM

A water-to-water heat exchanger will be required to replace your existing boiler and provide you with all the comfort you require. Your existing boiler would be used as a back up when required. (Refer to Schematic #2). Another alternative would be to convert your existing system into an "open system" with the assistance of an expert in heating system.

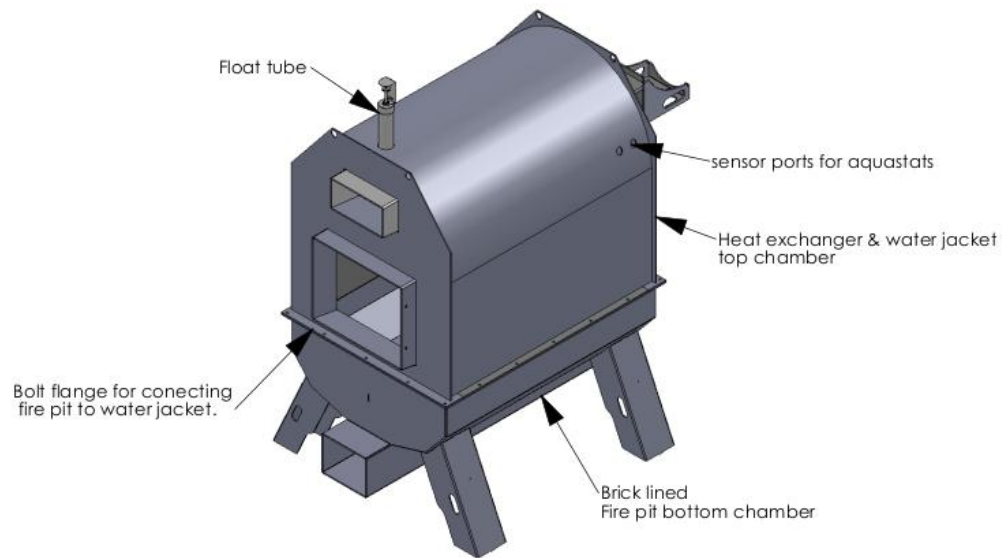
### 3. NEW WATER BASEBOARD SYSTEM

You will not need any heat exchangers in this case as the Portage and Main Heating System is directly connected to the baseboard system to keep your house warm and comfortable. (Refer to Schematic #3)

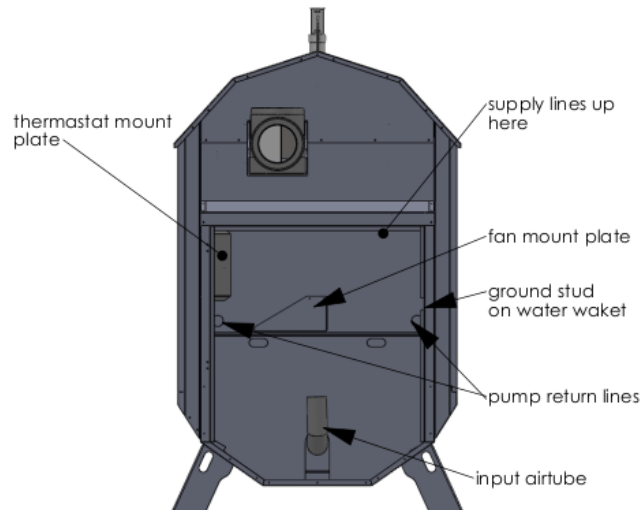
### 4. DOMESTIC WATER HEATER AND HEATING SYSTEM

You can enjoy more energy savings and running hot water during the heating season by connecting your domestic water heater to the Portage & Main Heating System through a sidearm water heater. (Refer to Schematic #4). We would caution you, however, that creosote may increase during summer due to lowered heat demand. **but** if additional heat could be used elsewhere, then creosote formation would be reduced.

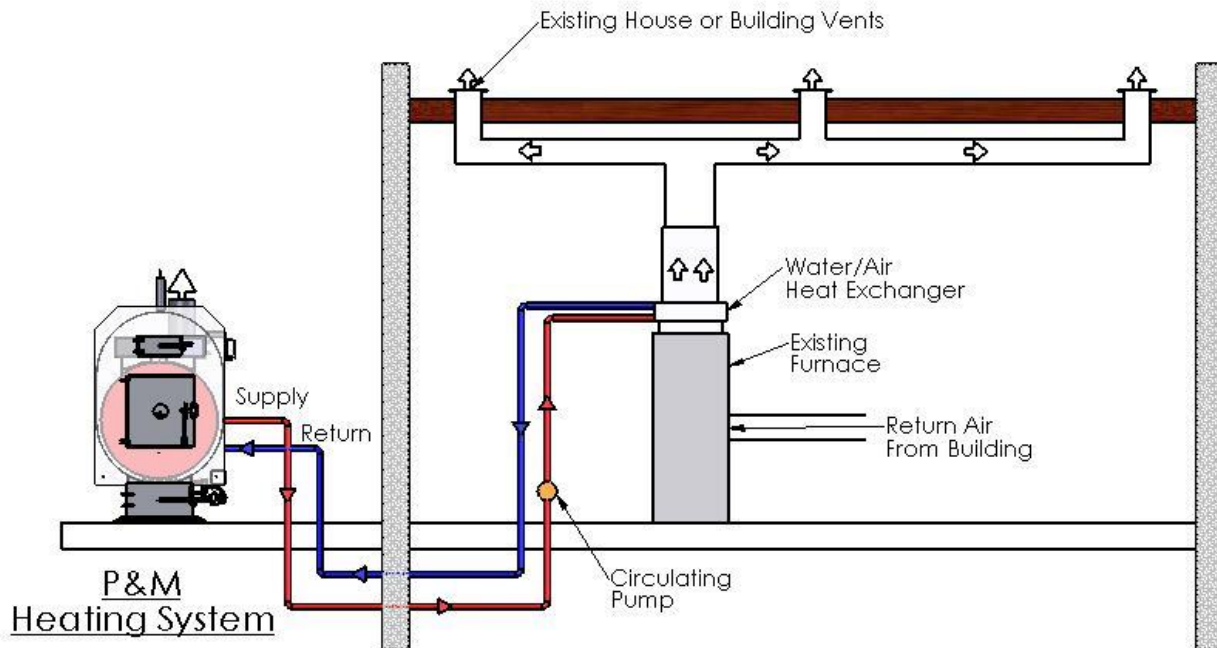
## Side view WaterJacket & FirePot (no insulation shown)



## Rear View



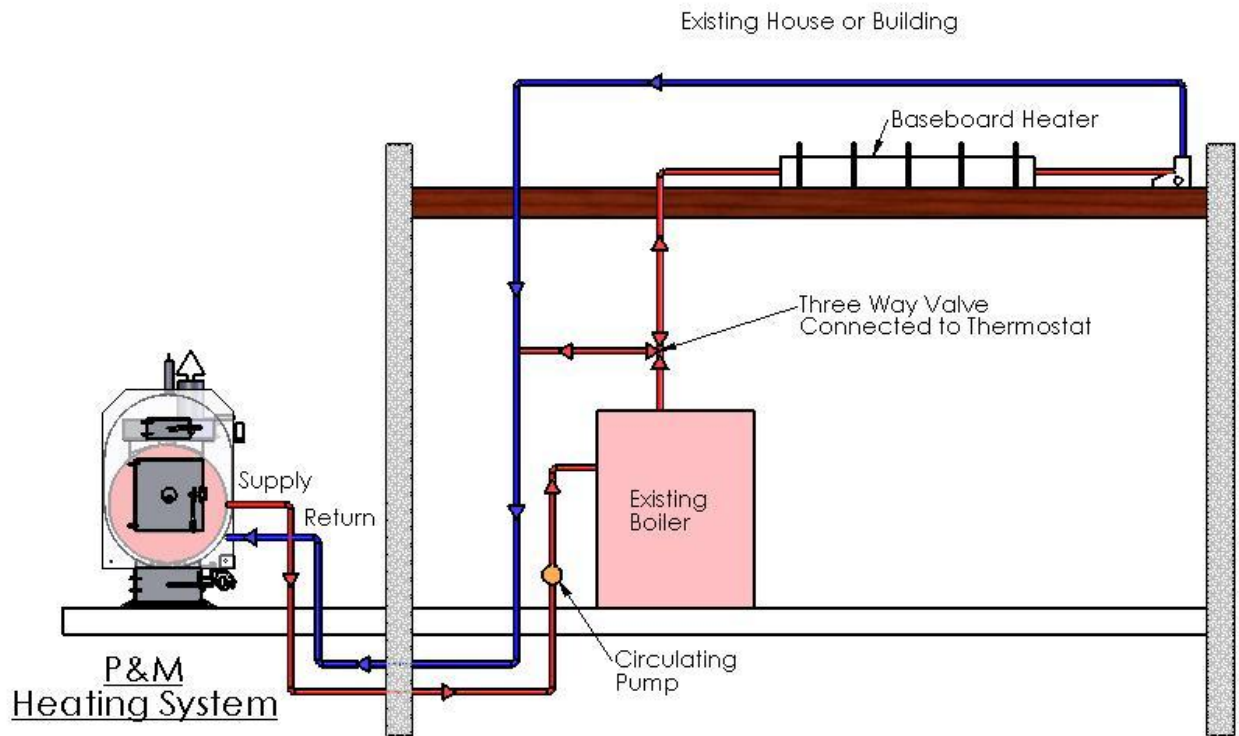
# CONNECTING THE P&M SYSTEM



CONNECTING TO AN EXISTING FORCED AIR SYSTEM

SCHEMATIC #1 - Schematic Drawing for Illustration Purposes Only

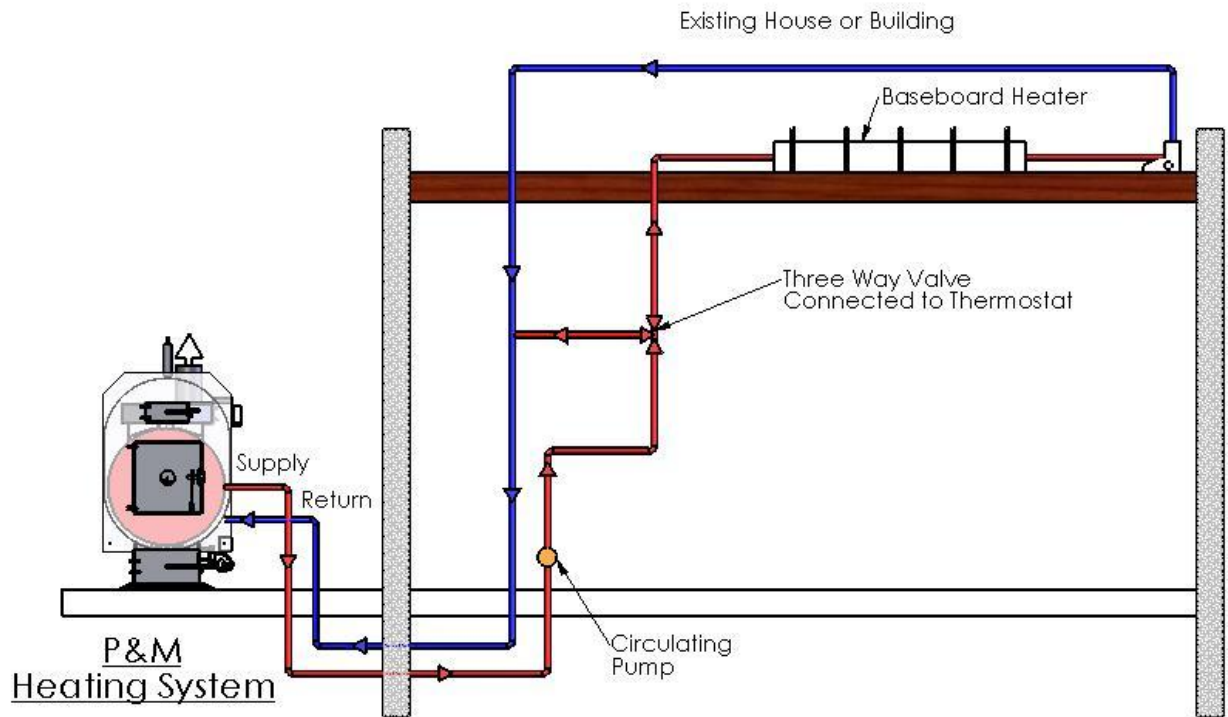
# CONNECTING THE P&M SYSTEM



CONNECTING TO AN EXISTING BOILER / BASEBOARD SYSTEM

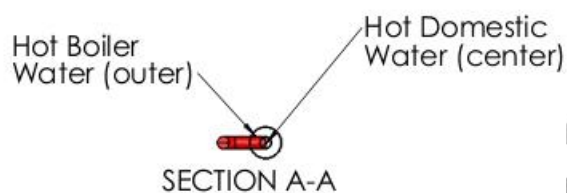
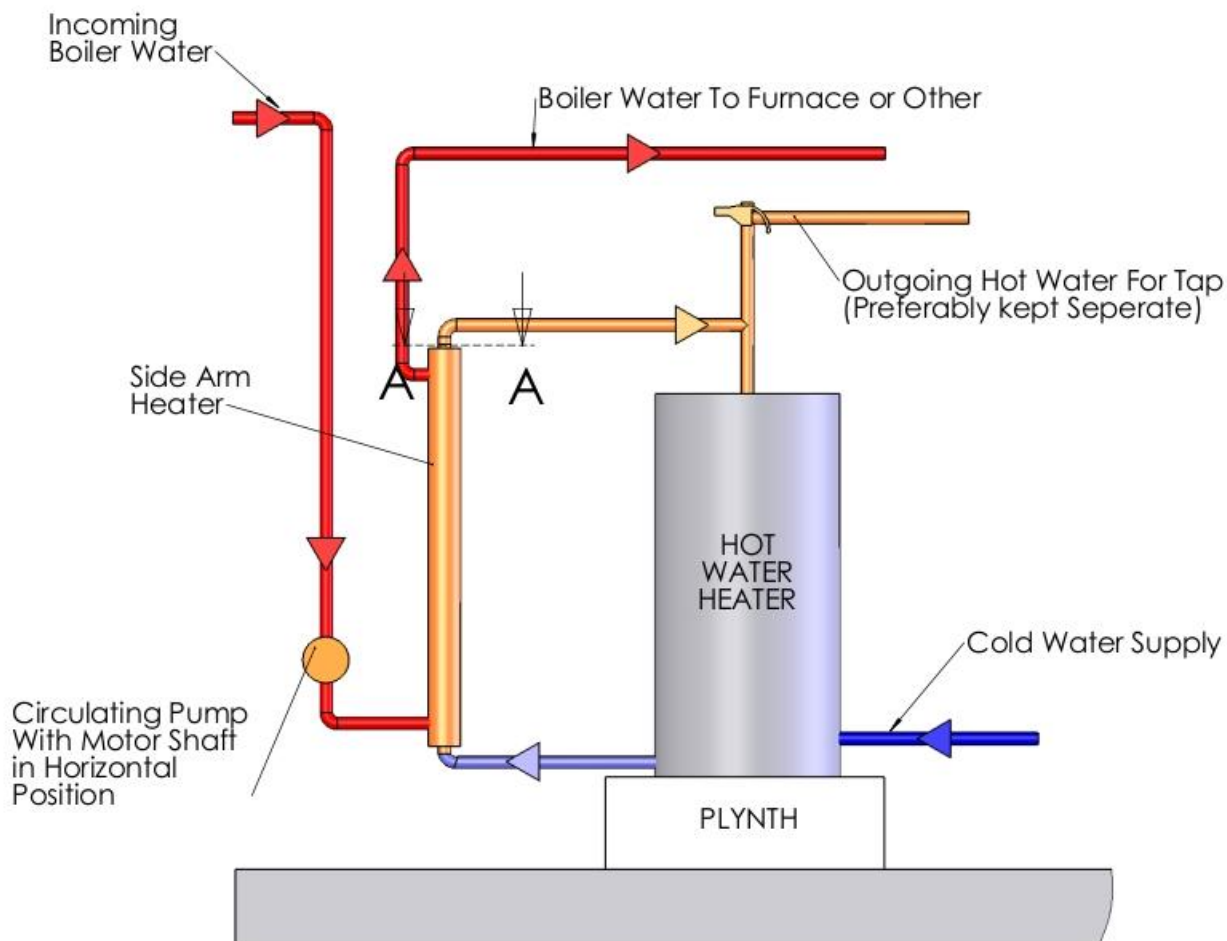
SCHEMATIC #2 - Schematic Drawing for Illustration Purposes Only

# CONNECTING THE P&M SYSTEM



CONNECTING TO A NEW BASEBOARD SYSTEM

SCHEMATIC #3 - Schematic Drawing for Illustration Purposes Only

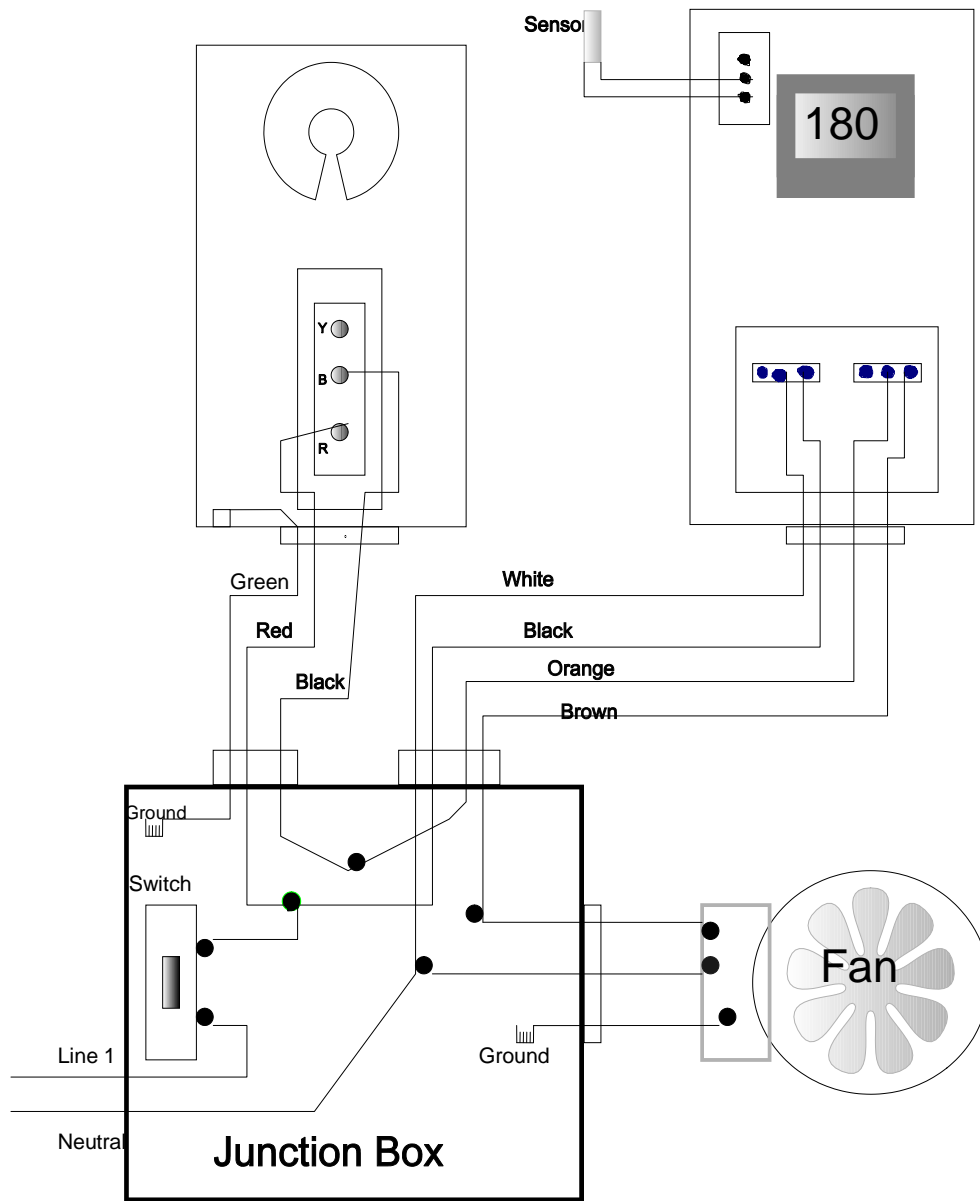


#### NOTE!

It is suggested that the hot water heater be raised on a plynth as shown, to give max. length of side arm heater. (5 feet long if possible)  
Top outlet should be as close as possible to the top of the water heater

SCHEMATIC #4 - CONNECTING SIDE ARM HEATER TO DOMESTIC WATER TANK





**Wiring Diagram**

## **The A419 control functions**

**Set point (SP)** establishes the temperature value at which the equipment is switched on or off, depending on the user selected mode of operation. Set point range is -30 to 212°F or -34 to 100°C (in 1-degree increments).

If Set point mode is set to cut-in, set point is the temperature value at which the control closes the Normally Open (N.O.) contacts. If Set point mode is set to cutout, set point is the temperature at which the N.O. contacts open.

**Differential (DIF)** established the difference in temperature between the cut-in value and cutout value. The differential is set relative to Set point and may be set from 1 to 30 F° or C° (in 1 – degree increments).

**Anti-Short Cycle Delay (ASD)** established the minimum time that the outplay relay remains de-energized before the next on-cycle. The **ASD** does not allow the output relay to re-energize until the programmed time delay has elapsed. The delay is activated when the control is first turned on and every time an on-cycle ends. When the delay is activated, the LCD alternately flashed the sensor temperature and **ASD**. The anti-short Cycle Delay range is 0 to 12 minutes (in 1-minute increments).

**Sensor Failure Operation (SF)** establishes how the A419 control's output-relay operates the equipment in the event of a sensor or sensor wiring failure. The user may select to run the equipment continuously or to shut it down. When the control detects a sensor circuit failure, the LCD flashes SF alternately with OP (if the sensor circuit is open), or **SH** (If the sensor circuit is shorted). Before indicating a failure, the control implements a 1-minute delay, which allows verification of failure condition and avoids nuisance failure indications.

**Temperature Offset (OFS)** establishes a set secondary **Set Point** and **Differential** values that may be invoked to control an application when a circuit is closed between the binary input (**BIN**) and common (**COM**) terminals (and **BIN** appears on the display). See Figure 3. Offset range is 0 to 50F° or C° (in 1-degree increments). A typical application might use a switching time clock to invoke night-setback temperature settings.

**IMPORTANT:** Make sure the Touchpad Lock jumper is installed (unlocked) before attempting to adjust the A419 control functions.

## **Changing the A419 Control Temperature Units**

The A419 control is factory set to display Fahrenheit temperature. To change to Celsius, press **Up** and **Down** (arrows) simultaneously. Press them again to display Fahrenheit units. Verify that the control is displaying the desired temperature units before setting the Set Point.

## Setting the A419 Control Set point Value

To view and adjust Set point, follow these steps:

1. Press and hold MENU (about 2 seconds) until the display flashes SP.
2. Press MENU again to display the existing set point value.
3. Press Up or Down (arrows) to change the set point value.
4. Press MENU again to save the new value. The display returns to the sensed temperature.

**Note:** If no setup entry is made for 30 seconds, the control reverts to the (normal) temperature display.

**IMPORTANT:** If MENU is not pressed after changing the set point value, the control reverts the previously programmed set point value.

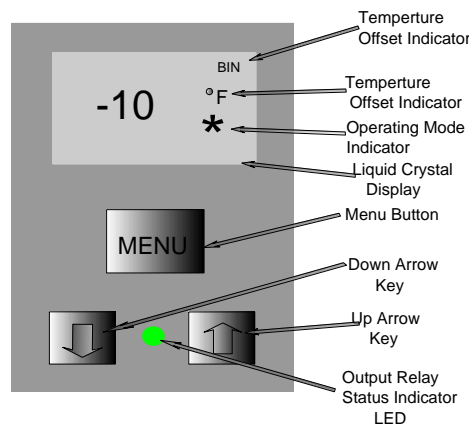


Figure 6: Liquid Crystal Display, Touchpad, and LED Indicator

## Settings on the Other A419 Control Functions

To set the Differential, Anti-short Cycle Delay, Temperature Offset, or Sensor failure operation, use the following method.

1. Press and hold Menu until the display changes to flashing SP. (This takes about 2 seconds.)
2. Press Up or Down (arrows) repeatedly until the desired function is displayed. (See Table 3.)
3. Press Menu to display the functions current value.
4. Press Up or Down (arrows) until the desired value is displayed.
5. Press MENU to save the new value. The display returns to the sensor temperature.

**IMPORTANT:** If MENU is not pressed after changing the settings, the new settings are not saved and the control reverts to the previously programmed setting values.

**NOTE:** If no setup entry is made for 30 seconds, the control reverts to the (normal) temperature display.

**NOTE:** Any saved A419 control settings are non-volatile and remain in the control's memory during power interruptions.

**IMPORTANT:** Do not set the Set Point and Differential values which (when totaled) fall out of A419 control's Set point range (-30 to 212 °F [-34 to 100°C]). The control will not function properly if Cut-in or Cutout values are outside of the control's Set point range.

### Checkout

Before applying power, make sure installation and wire connections are corrects for your application. Then power, operate and observe the system and A419 control for at least three complete operating cycles before leaving the installation.

Table 3: Display Symbols, control Function, Ranges, Unites, Values, and Factory Settings

Display Symbol	Control Function	Range – Units/Value	Factory Set Value
<b>SP</b>	Setpoint*	-30 to 212 - °F (-34 to 100 - °C)	30
<b>dIF</b>	Differential*	1 to 30 – (F° or C° in 1-degree increments)	5
<b>ASD</b>	Anti-short cycle Delay	0 to 12 – (in 1-minute increments)	1
<b>OFS</b>	Temperature Offset	0 to 50 (F° or C° in 1-degree increments)	0
<b>SF</b>	Sensor Failure Operation	(No range) – 0 = output relay de-energized 1= output relay energized	1
<b>F or C</b>	Temperature Units	(No range) - F° or C°	F°
<b>BIN</b>	Temperature Offset Indicator	(No range) – BIN is displayed and the A419 control operates on the secondary setpoints when the circuit between the BIN and COM terminals is closed.	N/A
<b>Snowflake or flame picture</b>	Cooling or Heating Mode of Operation	(No range) – A Snowflake (Cooling Mode) is displayed when the Jump1 jumper is removed. A Flame (Heating Mode) is displayed when the Jump1 jumper is installed.	Snowflake (Cooling Mode)

\*The sum of the Set Point and Differential values must be within the Set Point range, or the control may not function properly.

# TROUBESHOOTING

TROUBLE	POSSIBLE CAUSE	SOLUTION
TOO LITTLE HEAT	<ul style="list-style-type: none"> <li>- Fire is out</li> <li>- Low water level or water leaks</li> <li>- Power failure</li> <li>- Circulating pump failure</li> <li>- Air traps in system</li> <li>- Fan is not running</li> </ul>	<ul style="list-style-type: none"> <li>- Add wood/build fire</li> <li>- Check leaks then add water</li> <li>- Check electrical circuits</li> <li>- Check pump</li> <li>- Vent system</li> <li>- Inspect fan/replace</li> </ul>
TOO MUCH HEAT	<ul style="list-style-type: none"> <li>- Draft damper stuck in open position</li> <li>- Air leaking through wood door</li> <li>- Aquastat malfunction</li> <li>- Thermostat inside house malfunction</li> <li>- Ash door not shut tight</li> </ul>	<ul style="list-style-type: none"> <li>- Clean, lube and reinstall</li> <li>- Clean metal to metal surfaces</li> <li>- Check aquastat</li> <li>- Check thermostat</li> <li>- Check gasket on ash door</li> </ul>
WATER BOILING	<ul style="list-style-type: none"> <li>- Fan running constantly</li> <li>- Aquastat malfunction</li> <li>- Wood door open</li> <li>- Damper lid stuck open</li> </ul>	<ul style="list-style-type: none"> <li>- Aquastat malfunction</li> <li>- Check aquastat</li> <li>- Close door tightly</li> <li>- Clean, lube and reinstall</li> </ul>
CREOSOTE BUILDUP	<ul style="list-style-type: none"> <li>- Air leaking through wood door</li> <li>- Chimney not insulated or damaged</li> <li>- Burning high pitch bearing wood (Pine, Balsam)</li> </ul>	<ul style="list-style-type: none"> <li>- Clean metal to metal surfaces</li> <li>- Insulate or repair chimney insulation</li> <li>- Use mix of dry and harder wood (Poplar, Birch, Tamarack)</li> </ul>

## Portage & Main Outdoor Water Furnace Seasonal Shut Down Procedure



- 1) Clean any ash or creosote that is left in the multi-pass exchanger. The easiest way to do this is to open the front access door, and use the supplied cleaning tool to pull all of the ashes ahead on the right-hand of the exchanger, and push them down the left-hand side, back down into the fire chamber. Coat the inside of the heat exchanger with light oil (Transmission Oil & Diesel Fuel mixed 50/50) to prevent rust or corrosion.
  - 2) Clean all ash and unburned wood or coal from fire chamber. Clean any creosote that may have formed in the fire chamber—scraping it over the grates where the intense fire will burn it. Clean the ledge just under the door. The 5-in-1 “Wonder Tool”, available at most hardware stores, (or a scrapper of your choice) is a great tool to keep at the furnace for cleaning under the door. Ash will draw moisture, become acidic, and cause corrosion in a short time. The fire chamber can now be coated with the light oil mixture, as well. Be careful NOT to coat the firebrick with the oil mixture.
  - 3) Remove the ash pan and empty it. Clean any ash from the ash pan compartment
  - 4) An annual sample of furnace fluid **must** be sent for testing.
    - a) Your dealer will advise on the correct procedure for submitting furnace fluid for testing.
    - b) It is recommended that fluid be sent for testing early enough to have results back before furnace shut down.
    - c) You will be advised on the correct amount of boiler treatment to add. Add certified boiler treatment and top-off the reservoir so there is no air space. In the fall, or next heating season, the addition water/glycol mixture shall be drained off and used for make-up fluid as required.
    - d) It is advisable to keep certified boiler treatment on hand.
    - e) The testing information will be recorded by the tester with a copy of the information send to the P&M dealer and distributor. This information will be necessary should any warranty claim arise.
- (Nitrate is one of the active ingredients that are a key to helping protect the boilers from corrosion. A certified boiler treatment also helps adjust the pH to be in an alkaline range which also helps protect the boiler. An alkaline pH is not enough by itself to properly protect metal from corrosion in water contact applications.)
- 5) It is highly recommended that all Portage & Main Outdoor Water Furnaces be electrically grounded to prevent electrolyses. Check conductivity.
  - 6) A side stream filter is required as it cleans the water/glycol mixture, to reduce/prevent scaling, which cause deposits which in-turn cause pitting. Check filter and change if necessary.
  - 7) Make sure that the chimney stack is covered. (A five gallon pail will work well.) Every effort must be taken to ensure a dry burn chamber and heat exchanger at all times. If you require to heat during the rainy season or are using your furnace to heat your domestic water (during off heating seasons), a chimney cap is recommended.
  - 8) Remove fan and air box assembly. Clean and lube flapper assembly. Inspect and clean flex hose and replace if necessary. Check door gaskets replace if necessary.
  - 9) Check all fittings for leaks after water has cooled down and repair/replace if necessary. Check fittings at least once a month for possible leaks.
  - 10) Keep water chemical circulation, and pumps lubricated by turning on circulation pumps at least once a month. Some leave pump circulators on continuously (in the non heating season) for longer pump life.

**We trust that you have already secured your next heating seasons wood supply. Wood should be harvested in late winter-very early spring before the moisture/sap starts returning to the tree trunk. Burning dry seasoned wood reduces acidity that in-turn can cause corrosion. Now is an excellent time to size and stack you wood supply for good air flow so wood can be seasoning all spring/summer. Some wood such as oak require more than one season to season.**

## Operation of Your Portage & Main Hydronic Furnace to Prevent Corrosion for the Fireside

The single most important thing is to **never** have moisture accumulating and staying in the burn chamber, heat exchanger or ash pan. Moisture is a by-product of combustion, just watch the tail pipe of a car. Moisture when mixed with ashes becomes very corrosive.

Prevent condensation in your furnace by:

- 1) Burn only properly seasoned wood to reduce moisture level in the furnace.
- 2) Fill the furnace regularly to match heat load. Do not overfill your furnace. Put in just enough wood to maintain temperature until the next fill time usually 12 hours
- 3) A hot intense fire will burn hotter and drier. If you are experiencing moisture in your furnace, consider the following causes.
  - a) Is the wood too high in moisture?
  - b) Are you putting in more wood than required, causing a smoldering, cooler fire rather than a hot fire?
  - c) When recharging the furnace, rake ashes and coals so ashes fall into the ashpan, (keeping the grates free of ashes enables the air to circulate freely) before placing wood in firepot.
  - d) Is the fire starved for oxygen? Check air inlets and hoses for blockage.
  - e) Is the heat load too small for the furnace? If you have purchased a furnace for future larger loads, be extra careful with all of the above.
- 4) Keep a constant temperature. Always above 175 degrees. Set aquastat at 180 – 185 degrees with a no more than 10 degrees differential. Furnace is designed to run best within a 5 degree difference. Pay special attention to the sizing of your pumps to insure circulation is adequate for the heat load. Returning water/fluid should be no less than 20 degrees F. lower than the set point temperature. Returning water/fluid definitely must not reach a low of 140 degrees F to prevent the risk of condensate. If returning water/fluid temperature is lower than 140 degrees when you are recharging your furnace, you can reduce the risk of condensation by maintaining a proper timely re-charging schedule; however, you may need to install a diverting valve. The diverting valve prevents the heat delivery system from extracting heat once the water temperature is below a set temperature (usually 150 degrees).
- 5) Do not shut down furnace and start up again in fringe season. Either keep it burning or shut it off. Each time water is re-warmed it will reach dew point and cause condensation which causes corrosion.
- 6) Do a hot burn daily (or at least weekly) to help maintain dry clean burner. This can be done by opening the ash pan door while **attending** the furnace. **Never** leave furnace with ash pan open or furnace will boil.
- 7) Keep ashes removed from each end of the burn chamber on regular bases. Clean the ledge just under the door. The 5-in-1 "Wonder Tool", available at most hardware stores (or a scrapper of your choice) is a great tool to keep at the furnace for cleaning under the door. Ideally ashes should be removed, at least weekly. This prevents ashes from absorbing moisture to form wet ash, thus keeping wet ash from accumulating to cause an ash line and corrosion pitting below the ash line.
- 8) Please burn smart. Check out [www.epa.gov/burnwise/bestburn.html](http://www.epa.gov/burnwise/bestburn.html)

Corrosion in the burn chamber, heat exchanger and water side is preventable and is usually not a warranty issue. Please do not neglect your furnace maintenance and ask for warranty. Warranty covers workmanship and materials (i.e. welds that fail are usually repaired with no cost to the furnace owner.) Corrosion below the ash line is neglect and will not be covered. A hole in the side wall above the ash line would be consider material defect and would be covered under warranty. Keep current with water chemical and testing to ensure that the water side remains corrosion free.

**Of Special Note  
To Portage & Main  
Outdoor Water Furnace  
Owners:**



You may have heard it before and now you read it again—only because it is noteworthy for the success and long-term relationship in heating with an outdoor wood hydronic furnace. Keep it clean and dry to protect your investment.

When cleaning your furnace, pay extra attention to each end of the fire pot at ash level and below ash level where ashes can build up. If the ashes have been allowed to build up and get moist, they become acidic and corrosive, causing pitting of the steel.

Clean regularly and burn dry seasoned wood. (For example: properly seasoned firewood with a moisture content of 25% or less can produce 40% more useable heating energy that firewood that has a moisture content of 40%.) Burning dry seasoned wood is especially important, in an efficiently designed furnace such as the Portage & Main.

Wood is a type of hydrocarbon. Common properties of hydrocarbons are the facts that they produce steam, carbon dioxide, and heat during combustion and that oxygen is required for combustion to take place. It is important to remember, burning hydro carbon makes moisture, which wets the ashes, which in turn causes corrosion. The heat-exchanger and fire-pot tend to be an area of neglect. They must be cleaned. You may require a wire brush, wire wheel, or a wire wheel on a grinder to clean totally to satisfactory inspection. Access the heat-exchanger and fire-pot to see if a repair is required before the next heating season.

We highly recommend that a **very thorough cleaning be performed before** the furnace is shut down for the season. The cleaning process is easier while the furnace is hot; otherwise creosote hardens becoming very difficult to remove. Apply a protective coating of 50/50 transmission oil/diesel fuel mixture.

As a reminder, when or if you are concerned about your furnace's operation, we invite you to call your dealer or distributor. We want your heating with wood to be a pleasant experience. Any concerns you have, we appreciate the opportunity to troubleshoot and correct, before they become a problem.



## **Portage & Main Outdoor Water Furnace—20 Year Limited Warranty Wood Burning -- Ultimizer Series -- BL2840 & BL 3444**

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Thank you for making the choice to purchase your new Portage and Main Outdoor Furnace. We are certain that you will find great satisfaction with your furnace's ongoing reliability and performance.

Piney Manufacturing Ltd warrants this outdoor water furnace to the original owner, to be free of defects in material and workmanship on the date of purchase.

### **One Year Warranty**

- On Electrical Components – Parts Only – aquastats, thermostats and fans are warranted by the manufacturer for a period of one (1) year from the date of purchase. Parts will be replaced on an even exchange, excluding shipping charges and labor.

### **Three Year Warranty**

- Shaker Grates (rocker grates) are warranted for three (3) years 100%. This warranty excludes any warping or deterioration from ash corrosion.

If there is a leak in the fire chamber of your Portage & Main Outdoor Furnace during the:

- First (1<sup>st</sup>) or second (2<sup>nd</sup>) year, Piney Manufacturing Ltd will replace the firepot/water jacket at no cost to the original owner. The owner is liable for the un-install of the old unit and the installations of the replacement furnace. (Meaning of Leak: a leak in the firepot or water jacket)
- Third (3<sup>rd</sup>) to fifth (5<sup>th</sup>) year--if the firepot/water jacket is to be replaced, Piney Manufacturing Ltd will pay 80 % (percentage) of the total cost of the firepot/water jacket: the owner will pay the balance plus freight and installation.
- Sixth (6<sup>th</sup>) to the tenth (10<sup>th</sup>)-- if the firepot/water jacket is to be replaced, Piney Manufacturing Ltd will pay percentages as: sixth (6<sup>th</sup>) year 60%; seventh (7<sup>th</sup>) year 50%; eighth (8<sup>th</sup>) year 40%; ninth (9<sup>th</sup>) year 30%; tenth (10<sup>th</sup>) year 20% of the total cost of the firepot/water jacket: the owner will pay the balance plus freight and installation
- Eleventh (11<sup>th</sup>) to twentieth (20<sup>th</sup>) year-- if the firepot/water jacket is to be replaced, Piney Manufacturing Ltd will pay 10% (percentage) of the total cost of the Piney Manufacturing Ltd will pay 10 percentage of the total cost of the fire pott/water jacket: the owner will pay the balance plus freight and installation. After the twentieth (20<sup>th</sup>) year, Piney Manufacturing Ltd assumes no liability. Subject to change.

### **Not Warranted**

- Piney Manufacturing Ltd does not warranty parts damaged by freezing, overheating, pressurizations, warping, and /or the use of unauthorized fuels or abuse.
- Piney Manufacturing Ltd is not responsible for the cost of plumbing, replacement of antifreeze, shipping labor or any other cost other than the replacement of the part of furnace. (Unless otherwise noted)
- Piney Manufacturing Ltd is not liable for any damage or cost which may occur from or during the operation of the furnace or damage incurred due to any heating system failure. Outdoor water furnaces are not intended to be the only source of heat; therefore it is recommended that a backup system be in place to prevent damages caused by lack of heat.
- No unauthorized adjustments or repairs will be covered by warranty.
- Piney Manufacturing Ltd does not warrant exterior paint or finish, any damage caused by negligence and deterioration due to lack of proper ongoing maintenance, over-heating, physical damaged caused by abuse or freeze-up, unauthorized work/or modification to the furnace, damage to the fire-chamber due to power surges or damage caused by burning fuels other than natural wood, coal, wood pellets.
- Ash corrosion on the inside fire drum. To prevent ash corrosion, rotating or raking ashes forward must be done as described in the manual. Portage & Main Outdoor Water Furnaces are designed to be least susceptible to corrosion.
- The loading door, ash pan, door gaskets and firebricks are consumables; therefore not covered under warranty.

The chimney must be covered when the furnace is not in use. If an onsite repair is made, the customer is responsible for the transportation costs and labor. If the furnace needs to be repaired at the factory, it is the responsibility of the consumer to pay all shipping charges to and from the factory. Piney Manufacturing Ltd disavows any other representation, warranty or liability related to the condition or use of this product.

The purchaser assumes all responsibility for the care, maintenance and safe operation of the furnace including the monitoring and adding of an approved boiler treatment. All instructions must be followed in the operator's manual, Certified Chemical utilized and water samples tested annually and the warranty registration must be filed to qualify for warranty. Piney Manufacturing Ltd always has the sole right to decide if a part of the furnace will be repaired or replaced. To validate this warranty, registration MUST be completed within thirty (30) days of the purchase date with dealers invoice and sent to Heat Smart Plus RR#5 Site 6 Comp 114, Prince Albert, SK. S6V 5R3.

<b>Failure to use Certified Chemical as recommended by Piney Manufacturing in your Portage &amp; Main Outdoor Water Furnace will VOID this warranty—No Exception!</b>
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This warranty is subject to change. It has no cash value.

**Portage & Main Outdoor Water Furnace—20 Year Limited Warranty  
Wood Burning -- Ultimizer Series -- BL2840 & BL 3444**

Purchaser's Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Model: \_\_\_\_\_ Serial No. \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Dealer: \_\_\_\_\_

Address: \_\_\_\_\_

Dealer's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

This warranty card must be completed and returned to Heat Smart Plus by fax to  
1-306-922-1662 with a copy of the sales receipt within 30 days of sale date.

"I have read, understood and accept the conditions of this Warranty."

Customers Signature: \_\_\_\_\_

Date: \_\_\_\_\_

This warranty is non-transferable. It has no cash value. Warranty valid in Canada and United States of America for indicated Portage & Main Outdoor Water Furnaces.

**NOTES & RECORDS**

