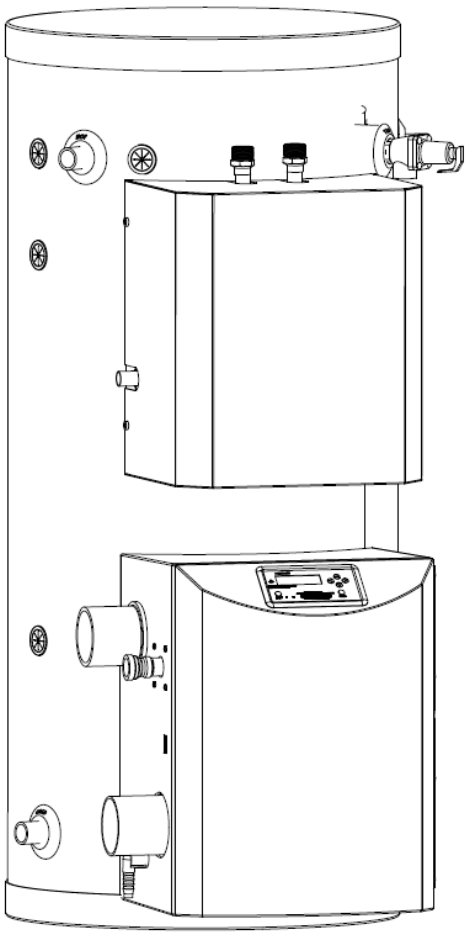
Versa-Hydro



INSTALLATION

START-UP

MAINTENANCE

PARTS

Versa-Hydro Water Heater Models*
PHE130-55 / 199-55
PHE130-80 / 199-80
PHE130-119 / 199-119

***A suffix of "LP" denotes propane gas**
"S" indicates solar models
"SNHX" indicates solar models without heat exchanger

⚠ WARNING

This manual must be used by a qualified installer/service technician. Read all instructions in this manual before installing. Perform steps in the given order. Failure to comply could result in substantial property damage, severe personal injury, or death.

NOTICE: *HTP reserves the right to make product changes or updates without notice and will not be held liable for typographical errors in literature.*

120 Braley Rd. P.O. Box 429 East Freetown, MA 02717-0429 www.htproducts.com

⚠ WARNING

IF THE INFORMATION IN THIS MANUAL IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT, CAUSING PROPERTY DAMAGE, PERSONAL INJURY, OR LOSS OF LIFE. DO NOT STORE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department. Installation and service must be provided by a qualified installer, service agency, or the gas supplier.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result, causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- **Do not try to light any appliance**
- **Do not touch any electric switch; do not use any phone in your building**
- **Immediately call your gas supplier from a neighbor's phone. Follow the gas suppliers' instructions.**
- **If you cannot reach your gas supplier, call the fire department.**

C. Use only your hand to turn the gas control knob. Never use tools. If the handle will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

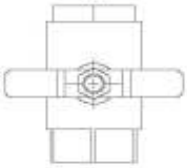
D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. **STOP! Read the safety information above.**
2. **Set the thermostat to lowest setting.**
3. **Turn off all electric power to the appliance.**
4. **This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.**

GAS VALVE ON

GAS VALVE OFF



5. **Remove front cover.**
6. **Turn gas shutoff valve to "off". Handle will be across the piping, do not force.**
7. **Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.**
8. **Turn gas shutoff valve to "on". Handle will be in line with piping.**
9. **Install Front Cover.**
10. **Turn on all electric power to appliance.**
11. **Set thermostat to desired setting.**
12. **If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.**

TO TURN OFF GAS TO APPLIANCE

1. **Set the thermostat to lowest setting.**
2. **Turn off all electric power to the appliance if service is to be performed.**
3. **Remove Front Cover.**
4. **Turn gas shutoff valve to "off". Handle will be across the piping. Do not force.**
5. **Install Front Cover.**

LP-175 Rev. 4 3-11-08

SPECIAL ATTENTION BOXES

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels or to important product information.

⚠ DANGER

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

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

FOREWORD

This manual is intended to be used in conjunction with other literature provided with the heater. This includes all related control information. It is important that this manual, all other documents included with this system, and additional publications including the National Fuel Gas Code, ANSI Z223.1-2002, be reviewed in their entirety before beginning any work.

Installation should be made in accordance with the regulations of the local code authorities and utility companies which pertain to this type of heating equipment.

NOTE TO CONSUMER: PLEASE KEEP ALL INSTRUCTIONS FOR FUTURE REFERENCE.

FOR THE INSTALLER

⚠ WARNING

This manual must only be used by a qualified heating installer/service technician. Read all instructions in this manual before installing. Perform steps in the order given. Failure to comply could result in severe personal injury, death or substantial property damage.

This appliance must be installed by qualified and licensed personnel. The installer should be guided by the instructions furnished with the boiler, and with local codes and utility company requirements. In the absence of local codes, preference should be given to the National Fuel Gas Code, ANSI Z223.1-2002.

INSTALLATIONS MUST COMPLY WITH:

Local, state, provincial, and national codes, laws, regulations and ordinances.

The latest version of the National Fuel Gas Code, ANSI Z223.1, from American Gas Association Laboratories, 8501 East Pleasant Valley Road, Cleveland, OH 44131.

In Canada – CGA No. B149 (latest version), from Canadian Gas Association Laboratories, 55 Scarsdale Road, Don Mills, Ontario, Canada M3B 2R3. Also, Canadian Electrical Code C 22.1, from Canadian Standards Association, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6.

Code for the installation of Heat Producing Appliances (latest version), from American Insurance Association, 85 John Street, New York, NY 11038.

The latest version of the National Electrical Code, NFPA No. 70.

NOTE: The gas manifold and controls met safe lighting and other performance criteria when undergoing tests specified in ANSI Z21.10.3 – latest edition.

TABLE OF CONTENTS

PART 1 – GENERAL SAFETY INFORMATION

A. PRECAUTIONS

This appliance is for indoor installations only. Clearance to combustible materials: 0" top, bottom, sides and back. Unit must have room for service: 24" front and 12" sides are minimum recommended service clearances. (A combustible door or removable panel is acceptable front clearance.) This appliance has been approved for closet installation. Do not install this appliance directly on carpeting. For installation on combustible flooring. Use only Category IV vent systems.

⚠ WARNING
INSTALLER – Read all instructions in this manual before installing. Perform steps in the order given.
USER – This manual is for use only by a qualified heating installer/service technician. Refer to user's information manual for your reference. Have this heater serviced/inspected by a qualified service technician annually.
FAILURE TO ADHERE TO THE GUIDELINES ON THIS PAGE CAN RESULT IN SUBSTANTIAL PROPERTY DAMAGE, SEVERE PERSONAL INJURY, OR DEATH.

⚠ WARNING

NOTE: If the heater is exposed to the following, do not operate until all corrective steps have been made by a qualified serviceman:

1. FIRE
2. DAMAGE
3. WATER

Any claims for damage or shortage in shipment must be filed immediately against the transportation company by the consignee.

DO NOT USE THIS APPLIANCE IF ANY PART HAS BEEN UNDERWATER. Immediately call a qualified service technician. Replace any part of the control unit that has been under water.

B. IMPROPER COMBUSTION

CAUTION

NOTE: Do not obstruct the flow of combustion and ventilating air. Adequate air must be provided for safe operation.

C. GAS

Should overheating or gas supply fail to shut off, do not turn off or disconnect electrical supply to circulator. Instead, shut off the gas supply at a location external to the appliance.

D. WHEN SERVICING THE HEATER

- To avoid electric shock, disconnect electrical supply before performing maintenance.
- To avoid severe burns, allow heater to cool.

E. HEATER WATER

- Do not use petroleum-based cleaning or sealing compounds in a heater system. Gaskets and seals in the system may be damaged. This can result in substantial property damage.
- Do not use “homemade cures” or “heater patent medicines”. Substantial property damage, damage to heater, and/or serious personal injury may result.

PART 2 – HOW THE HEATER OPERATES

The **Versa Hydro with Total System Control** is truly revolutionary, providing high efficiency central heating and domestic hot water from one appliance. Total System Control manages system needs, assuring maximum comfort and efficient operation. Some features of the heater are:

Stainless Steel Water Storage Tank
The storage tank is constructed of 316L stainless steel to provide maximum corrosion resistance. Water blown foam insulation and a plastic jacket provide superior insulation, allowing no more than a ½ degree heat loss per hour.

High Efficiency Heat Exchanger
The highly efficient 90/10 copper nickel heat exchanger provides direct energy transfer from the combustion gases into domestic water. Hot gases travel from the primary circuit to heat the combustion walls, which then transfer heat directly into the water. The secondary circuit then transfers the last bit of

energy to the bottom of the tank, where the hot gases are converted to water vapor, giving the heater a combustion efficiency of 98% and thermal efficiency of up to 96%.

Modulating Combustion System
The modulating combustion system is designed to regulate firing rate based on heat demand. Total System Control monitors tank operation, system parameters, and controls the firing rate of the burner, providing only the energy required to satisfy both the domestic hot water and central heating needs.

Total System Control
Total System Control automatically manages the needs of both the central heating and domestic hot water systems through the use of sensors. These sensors monitor inputs (such as outdoor temperature, tank temperature, and heating module outlet temperature) providing data that allows accurate control of the entire system. You may choose to use the control's factory default settings or reprogram the system parameters to provide design flexibility.

Hydronic Heating Module
The hydronic heating module connects to the storage tank through two dip tubes. The first dip tube draws heated water from the top of the storage tank and circulates it through a brazed plate heat exchanger that transfers the water's stored energy to the hydronic side of the plate. Once the energy is transferred, the water returns through the second dip tube to a lower section of the storage tank to continue circulating. A stainless steel circulator pump modulates output, varying flow through the brazed plate heat exchanger to meet domestic hot water and central heating demand. An outlet sensor provides feedback to the control to assure accurate temperature control.

Venting System
This appliance vents in plastic pipe. Use only the approved venting material outlined in the venting section (Part 8) of this manual. Vent size can vary from 2" to 3" depending on the appliance input rate. The venting system requires an intake and exhaust vent. Special attention should be taken when selecting vent location. Vents can run horizontally or vertically, depending on system design. Support the vents as shown in the Venting Details Part 8.

Burner
The burner is constructed of high grade stainless steel and uses pre-mixed air and gas to provide a wide range of firing rates.

Condensate Drain Connection
This is a condensing high efficiency appliance, and therefore has a condensate removal system. Condensate is nothing more than water vapor derived from combustion products. Heater condensate is similar to that of an automobile when it is initially started.

It is very important that the condensate line slopes away from the heater, down to a suitable drain. If the condensate outlet is lower than the drain, you must use a condensate removal pump (kit p/n 554200, available from HTP).

A condensate filter, if required by local authorities, will neutralize the condensate, and can be made up of lime crystals, marble or phosphate chips. This filter can be purchased from HTP (p/n 7450P-212) and installed in the field.

It is also very important that the condensate line not be exposed to freezing temperatures or any other type of blockage. Plastic pipe must be the only material used for condensate line. Steel, brass, copper, or other materials will be subject to corrosion or deterioration.

In a long, horizontal condensate line, a second vent may be necessary to prevent vacuum lock. Also, an increase in pipe size and support of the condensation line may be necessary to allow condensate to drain properly.

Spark Ignition
The burner flame is ignited by applying high voltage to the system spark electrode. This causes a spark from electrode to ground.

Outdoor Sensor
The outdoor sensor monitors outdoor temperature and adjusts the set point to provide greater efficiency.

⚠ DANGER

Water temperature over 125°F can instantly cause severe burns, or death, from scalds. Children, disabled, and elderly are at the highest risk of being scalded. See instruction manual before setting temperature at water heater. Feel water before bathing or showering! Temperature limiting valves are available.

PART 3 – PREPARE WATER HEATER LOCATION

Before considering location, many factors need to be addressed. Piping, Venting, and Condensation Removal are just a few of the issues that need attention prior to the installation of the heater. Please read the entire manual, as it could save time and money.

A. BEFORE LOCATING THE HEATER

Check for nearby connections to:
- System water piping
- Venting connections
- Gas supply piping
- Electrical power
- Condensate drain

Check area around heater. Remove any combustible materials, gasoline, and other flammable liquids.

⚠ WARNING

Failure to keep heater area clear and free of combustible materials, liquids, and vapors can result in substantial property damage, severe personal injury, or death.

The heater gas control system components must be protected from dripping or spraying water during operation and service.

If replacing an existing heater, check for and correct any existing system problems, such as:
- System leaks
- Heater is located in a condition that could cause the system to freeze and leak.
- Incorrectly-sized expansion tank
- Clean and flush existing system when reinstalling a heater.

B. LEVELING

⚠ CAUTION

In order for the condensate to properly flow out of the collection system, the area where you locate the heater must be level. Location must also fully support the weight of the filled water heater.

C. CLEARANCES FOR SERVICE ACCESS

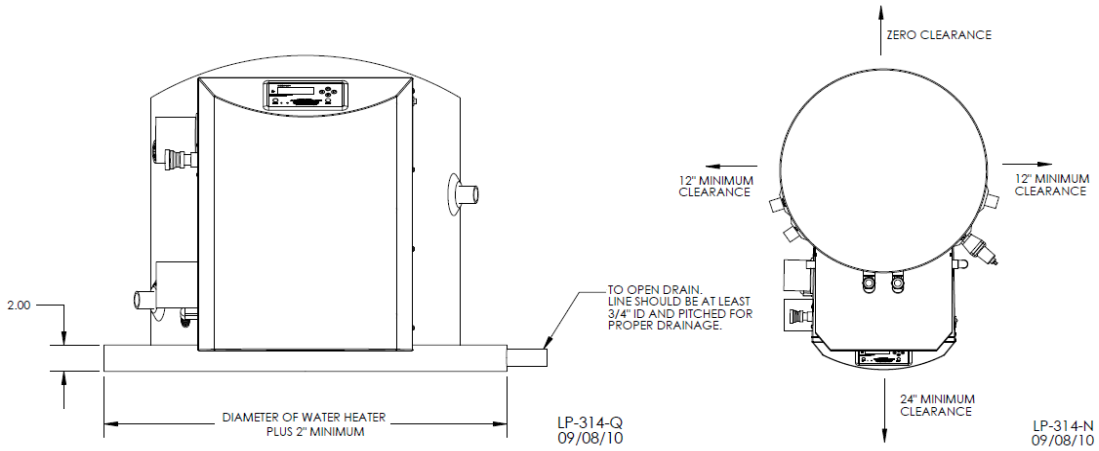


Figure 1 - If you do not provide the minimum clearances shown above, it might not be possible to service the heater without removing it from the space.

CAUTION

A water heater pan must be installed to protect the surrounding area from damage caused by leaking water.

⚠ WARNING

The space must be provided with combustion/ventilation air openings correctly sized for all other appliances located in the same space as the heater. Failure to comply with the above warnings could result in substantial property damage, severe personal injury, or death.

D. RESIDENTIAL GARAGE INSTALLATION

PRECAUTIONS

If the heater is located in a residential garage, per ANSI Z223.1:

- Mount the bottom of the heater a minimum of 18" above the floor of the garage, to ensure the burner and ignition devices are well off the floor.
- When raising the heater, be certain to fully support its entire filled weight.
- Locate or protect the heater so it cannot be damaged by a moving vehicle.

E. EXHAUST VENT AND INTAKE AIR VENT

The heater is rated ANSI Z21.10.3 Category IV (pressurized vent, likely to form condensate in the vent) and requires a special vent system designed for pressurized venting.

NOTE: The venting options described here (and further detailed in Venting, Part 8 in this manual) are the lone venting options approved for this water heater. Failure to vent the water heater in accordance with the provided venting instructions will void the warranty.

⚠ DANGER

Failure to vent the water heater properly will result in serious personal injury or death.

⚠ WARNING

Vents must be properly supported. Heater intake and exhaust connections are not designed to carry heavy weight. Vent support brackets must be within 1' of the heater and the balance at 4' intervals. Heater must be readily accessible for visual inspection for the first 3' from the heater.

1. DIRECT VENT INSTALLATION OF EXHAUST AND INTAKE

If installing a direct vent option, combustion air must be drawn from the outdoors directly into the appliance intake, and exhaust must terminate outside. There are three basic direct vent options detailed in this manual: 1. Side Wall Venting, 2. Roof Venting, and 3. Unbalanced Venting.

Be sure to locate the heater such that the air intake and exhaust vent piping can be routed through the building and properly terminated. Different vent terminals can be used to simplify and eliminate multiple penetrations in the building structure (see Optional Equipment in Venting Section). The air intake and exhaust vent piping lengths, routing and termination methods must all comply with the methods and limits given in the Venting section, Part 8 of this manual.

When installing a combustion air intake from outdoors, care must be taken to utilize uncontaminated combustion air. **NOTE: To prevent combustion air contamination, see Table 1.**

2. INDOOR COMBUSTION AIR INSTALLATION IN CONFINED OR UNCONFINED SPACE

This heater requires fresh, uncontaminated air for safe operation and must be installed in a mechanical room where there is adequate combustion and ventilating air. **NOTE: To prevent combustion air contamination, see Table 1.**

Combustion air from the indoor space can be used if the space has adequate area or when air is provided through a duct or louver to supply sufficient combustion air based on the appliance input. **Never obstruct the supply of combustion air to the appliance.** If the appliance is installed in areas where indoor air is contaminated (see Table 1) it is imperative that the appliance be installed as direct vent so that all combustion air is taken directly from the outdoors into the appliance intake connection.

Unconfined space is space with volume greater than 50 cubic feet per 1,000 Btu/hour (4.8 cubic meters per kW) of the total input rating of all fuel-burning appliances installed in that space. Rooms connected directly to this space, through openings not furnished with doors, are considered part of the space. See Figure 25, p. 48 for details.

Confined space is space with volume less than 50 cubic feet per 1,000 Btu/hour (4.8 cubic meters per kW) of the total input rating of all fuel-burning appliances installed in that space. Rooms connected directly to this space, through openings not furnished with doors, are considered part of the space.

When drawing combustion air from inside a conventionally constructed building to a confined space, such space should be provided with two permanent openings: one located 6” (15 cm) below the space ceiling, the other 6” (15cm) above the space floor. Each opening should have a free area of one square inch per 1,000 Btu/hr (22cm^2/kW) of the total input of all appliances in the space, but not less than 100 square inches (645cm^2).

If the confined space is within a building of tight construction, air for combustion must be obtained from the outdoors as outlined in the Venting section, Part 8 of this manual.

CAUTION

When drawing combustion air from the outside into the mechanical room, care must be taken to provide adequate freeze protection.

⚠ WARNING

Do not attempt to vent this appliance by any means other than those described in this manual. Doing so will void the warranty, and may result in severe personal injury or death.

⚠ WARNING

Failure to provide an adequate supply of fresh combustion air can cause poisonous flue gases to enter living space, which could result in severe personal injury or death. **NOTE: To prevent combustion air contamination, see Table 1.**

F. PREVENT COMBUSTION AIR CONTAMINATION

Install intake air piping for the heater as described in the Venting section. Do not terminate exhaust in locations that can allow contamination of intake air.

⚠ WARNING

You must pipe outside air to the heater air intake. Ensure that the intake air will not contain any of the contaminants below. Contaminated air will damage the heater, resulting in possible substantial property damage, severe personal injury, or death. For example, do not pipe intake air vent near a swimming pool. Also, avoid areas subject to exhaust fumes from laundry facilities. These areas always contain contaminants.

NOTE: DAMAGE TO THE HEATER CAUSED BY EXPOSURE TO CORROSIVE VAPORS IS NOT COVERED BY WARRANTY. (Refer to the limited warranty for complete terms and conditions).

PRODUCTS TO AVOID	AREAS LIKELY TO HAVE CONTAMINANTS
Spray cans containing fluorocarbons	Dry cleaning/laundry areas and establishments
Permanent wave solutions	Swimming pools
Chlorinated waxes/cleaners	Metal fabrication plants
Chlorine-based swimming pool chemicals	Beauty shops
Calcium chloride used for thawing	Refrigeration repair shops
Sodium chloride used for water softening	Photo processing plants
Refrigerant leaks	Auto body shops
Paint or varnish removers	Plastic manufacturing plants
Hydrochloric or Muriatic acid	Furniture refinishing areas and establishments
Cements and glues	New building construction
Antistatic fabric softeners used in clothes dryers	Remodeling areas
Chlorine-type bleaches, laundry detergents, and cleaning solvents	Garages and workshops
Adhesives used to fasten building products	

Table 1 – Contaminant Table

G. REMOVING A HEATER FROM A COMMON VENT SYSTEM

⚠ DANGER

Do not install the heater into a common vent with any other appliance. This will cause flue gas spillage or appliance malfunction, resulting in possible substantial property damage, severe personal injury, or death.

⚠ WARNING

Failure to follow all instructions can result in flue gas spillage and carbon monoxide emissions, causing severe personal injury or death.

When removing an existing heater, follow the steps below.

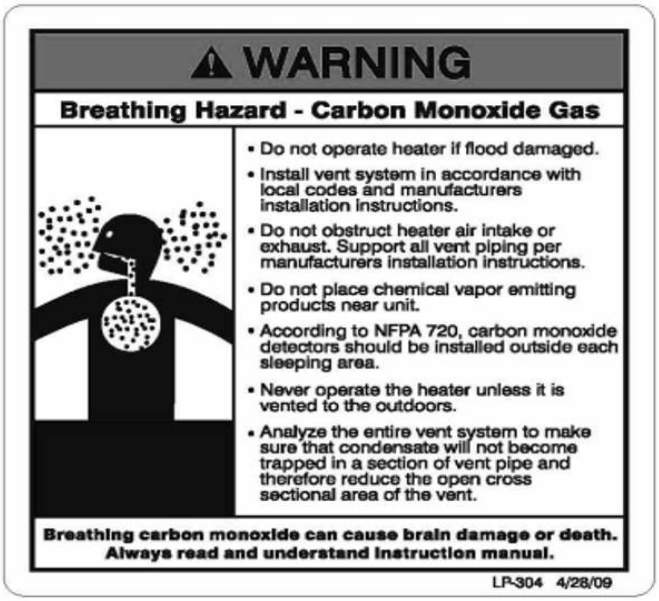


Figure 2

1. Seal any unused openings in the common venting system.

2. Visually inspect the venting system for proper size and horizontal pitch to determine if there is blockage, leakage, corrosion or other deficiencies that could cause an unsafe condition.

3. If practical, close all building doors, windows and doors between the space in which the appliance remains connected to the common venting system and other spaces in the building. Turn on clothes dryers and any appliances not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, at maximum speed. Do not operate a summer exhaust fan. Close all fireplace dampers.

4. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust the thermostat so the appliance will operate continuously.

5. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle or smoke from a cigarette.

6. After it has been determined that each appliance remaining connected to common venting system properly vents when tested as outlined, return doors, windows, exhaust fans, fireplace dampers and any other gas burning appliance to their previous condition of use.

7. Any improper operation of the common venting system should be corrected to conform to the National Fuel Gas Code, ANSI Z223.1. When resizing any portion of the common venting system, the system should approach the minimum size as determined using the appropriate tables in Appendix G in the National Fuel Gas Code, ANSI Z 223.1.

H. WATER CHEMISTRY

CAUTION

Chemical imbalance of your water can cause severe damage to your water heater and associated equipment, and may also affect efficiency. You may have to have your water quality professionally analyzed to determine whether you need to install a water softener. It is important that the water chemistry on both the domestic hot water and central heating sides are checked before installing the heater, as water quality will affect the reliability of the system.

Outlined below are those water quality parameters which need to be met in order for the system to operate efficiently for many years. **Failure of a heat exchanger due to lime scale build-up on the heating surface, low pH or other imbalance IS NOT covered by the warranty.**

Water Hardness

Water hardness is mainly due to the presence of calcium and magnesium salts dissolved in the water. The concentration of these salts is expressed in mg/L, ppm or grains per gallon, as a measure of relative hardness of water. Grains per gallon is the common reference measurement used in the U.S. water

heater industry. Hardness expressed as mg/L or ppm may be divided by 17.1 to convert to grains per gallon. Water may be classified as very soft, slightly hard, moderately hard, or hard based on its hardness number. The minerals in the water precipitate out when the water is heated and cause accelerated lime and scale accumulation on a heat transfer surface.

If the hardness of the water exceeds the maximum level of 7 grains per gallon, water should be softened to a hardness level no lower than 5 grains per gallon. Water softened as low as 0 to 1 grain per gallon may be under-saturated with respect to calcium carbonate, resulting in water that is aggressive and corrosive.

pH of Water
pH is a measure of relative acidity, neutrality or alkalinity. Dissolved minerals and gases affect water pH. The pH scale ranges from 0 to 14. Water with a pH of 7.0 is considered neutral. Water with a pH lower than 7 is considered acidic. Water pH higher than 7 is considered alkaline. A neutral pH (around 7) is desirable for most potable water applications. **Corrosion damage and heater failures resulting from water pH levels of lower than 6 or higher than 8 ARE NOT covered by the warranty.** The ideal pH range for water used in a storage tank or a water heater system is 7.2 to 7.8.

Total Dissolved Solids
Total Dissolved Solids (TDS) is a measurement of all minerals and solids dissolved in a water sample. The concentration of total dissolved solids is usually expressed in parts per million (ppm).

Water with a high TDS concentration will greatly accelerate lime and scale formation in the hot water system. Most high TDS concentrations precipitate out of the water when heated. This can generate a scale accumulation on the heat transfer surface that will greatly reduce the service life of a water heater. This scale accumulation can also impede the ability of the heat exchanger to transfer heat into the water. A heat exchanger damaged or blocked by lime/scale accumulation must be replaced.

The manufacturer of the water heater has no control of water quality, especially TDS levels in your system. Total dissolved solids in excess of 2,000 ppm will accelerate lime and scale formation in the heat exchanger. Heat exchanger failure due to total dissolved solids in excess of 2,000 ppm is a non-warrantable condition. **Failure of a water heater due to lime scale build up on the heating surface IS NOT covered by the warranty.**

Hardness: 7 grains
Chloride levels: 100
pH levels: 6-8
TDS: 2000

PART 4: DOMESTIC WATER PIPING

A. TEMPERATURE AND PRESSURE RELIEF VALVE FOR DHW

Install a temperature and pressure relief valve into the marked port (upper right). We recommend a WATTS 40XL5 valve or equivalent for 130,000 BTU models or above input. The valve must meet the ANSI Z21.22B requirements for relief valves for hot water heaters as per a nationally recognized lab that maintains a periodic inspection of production of such listed safety device. The pressure rating of the valve must not exceed the listed working pressure of this appliance, and must be rated to the proper BTU/hr capacity of the water heater.

⚠ WARNING

To avoid water damage or scalding due to relief valve operation:

- Discharge line must be connected to relief valve outlet and run to a safe place of disposal. Terminate the discharge line in a manner that will prevent possibility of severe burns or property damage should the relief valve discharge.
- Discharge line must be as short as possible and the same size as the valve discharge connection throughout its entire length.
- Discharge line must pitch downward from the valve and terminate at least 6" above the floor drain, making discharge clearly visible.
- The discharge line shall terminate plain, not threaded, with a material serviceable for temperatures of 375^{o}F or greater.
- Do not pipe discharge to any location where freezing could occur.
- No shutoff valve may be installed between the relief valve and heater or in the discharge line. Do not plug or place any obstruction in the discharge line.
- Test the operation of the relief valve after filling and pressurizing the system by lifting the lever. Make sure the valve discharges freely. If the valve fails to operate correctly, immediately replace with a new properly rated relief valve.
- Test T&P valve at least once annually to ensure the waterway is clear. If valve does not operate, turn the heater "off" **and call a plumber immediately.**
- Take care whenever operating relief valve to avoid scalding injury or property damage.

FAILURE TO COMPLY WITH THE ABOVE GUIDELINES COULD RESULT IN FAILURE OF RELIEF VALVE OPERATION, RESULTING IN POSSIBILITY OF SUBSTANTIAL PROPERTY DAMAGE, SEVERE PERSONAL INJURY, OR DEATH.

⚠ WARNING

Do not, under any circumstances, thread a cap or plug into the relief valve! Explosion, serious injury or death may result. Relief valve piping must be directed to the floor or an open drain, but not connected.

There must be a 6" space between the outlet of relief valve piping and drain or floor. Do not hook up to drain system directly without an air space. The relief valve must be checked periodically for proper operation.

B. DOMESTIC HOT WATER EXPANSION TANK

A potable hot water expansion tank is required to offset the expansion as the water is heated. In most city plumbing systems, the water meter has a no return or back flow device built into the system to prevent water flowing back into city mains. Some local codes require back flow preventers on all incoming water supplies. The hot water expansion tank must be listed for potable water use. The expansion tank should be located on the cold inlet piping close to the water heater.

⚠ CAUTION

The expansion tank must be suitable for hot potable water.

CAUTION

Never use dielectric unions or galvanized steel fittings on any domestic water or auxiliary connections. Use only copper or brass fittings. Thread sealant must be used on all connections.

C. DOMESTIC WATER PIPING

Domestic water connections must be installed in accordance with all local and national plumbing codes or any applicable prevailing standards. The appliance is supplied with a rated mixing valve certified to ASSE 1017. You must completely follow the instructions included with the mixing valve for proper installation. This mixing valve must be installed on the domestic outlet to assure that hot water temperature does not vary more than +/– 5°F, as the unit adjusts its stored water automatic set point to meet the requirements of the hydronic heating module. The valve MUST NOT be allowed to freeze. If the mixing valve is installed in a potentially freezing situation, suitable insulation must be fitted to prevent damage. DO NOT use excess thread sealant (in liquid, tape or other form) as this may cause the mixing valve to fail. Toxic chemicals shall not be introduced into the mixing valve system.

Recommend to the user that the mixing valve be checked annually to ensure its continued function.

D. HEATER PIPING

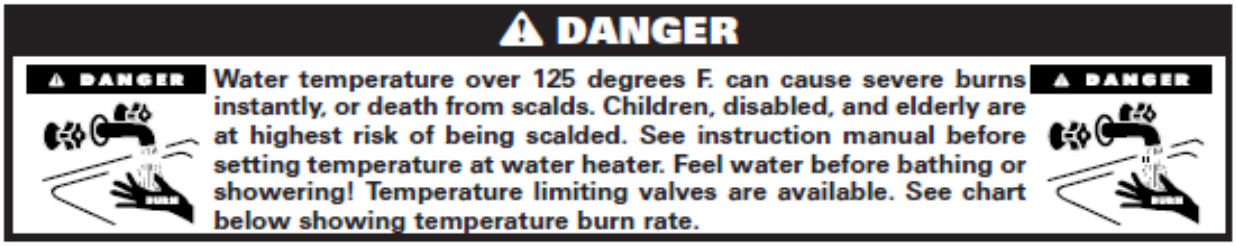
The domestic inlet and outlet ports on the heater are 1" NPT connections. We recommend the installation of shut-off valves and unions on both the inlet and outlet ports to isolate the appliance for future service.

It is important that the connections on the inlet and outlet are brass or copper. Never use dielectric unions or galvanized steel fittings. Teflon thread sealant must be used to seal all tank connections. An approved ASSE 1017 mixing valve is provided with every appliance and must be installed on the outlet to protect the user from scalding temperatures. This valve reduces the point of discharge temperature by mixing the hot and cold water from the discharge outlet or mixed outlet port. This device alone will not protect the user from scalding temperature. To install and set up the mixing valve, follow the pre-installation steps in this manual and also follow the enclosed instructions included with the mixing valve.

E. MIXING VALVE INSTALLATION

⚠ WARNING

The mixing valve provided with this appliance must be installed on the hot water outlet connection to reduce the risk of scalding. This mixing valve only reduces the risk of scalding injury.



1. All installations must be carried out by licensed professionals.

2. The installer must ensure compatibility of all installations. Example: Temperature of hot water – marked "H", cold water inlet – marked "C", and mixed outlet – marked with directional arrow.

3. The mixing valve may be installed in any position.

APPROXIMATE TIME / TEMPERATURE RELATIONSHIPS IN SCALDS	
120°F	More than 5 minutes
125°F	1 ½ to 2 minutes
130°F	About 30 seconds
135°F	About 10 seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1 ½ seconds
155°F	About 1 second

Table 2

4. Local codes shall take priority over any inconsistency in these instructions.

5. During startup, you must ensure that the valve is set to the desired temperature (the mixing valve preset is 120°F). If the valve temperature needs to be adjusted, please refer to the mixing valve instructions and/or the following settings.

⚠ DANGER

Hotter water increases the risk of scald injury. Scalding may occur within 5 seconds at a setting of 140°F (60°C). Water temperature over 125°F can instantly cause severe burns, or death, from scalds. Children, disabled, and elderly are at the highest risk of being scalded. See instruction manual before setting temperature at water heater. Feel water before bathing or showering!

⚠ WARNING

This water heater can deliver scalding temperature water at any faucet in the system. Be careful whenever using hot water to avoid scalding injury. By setting the thermostat on this water heater to obtain increased water temperature, you may create a higher potential for scald injury. To protect against injury, you should install an ASSE approved thermostatic mixing valve (a device to limit the temperature of water to protect against scaled injury by mixing hot and cold water supply) in the system. This valve will reduce point of discharge temperature in branch supply lines. This water heater was shipped with an ASSE approved thermostatic mixing valve. Install this valve according to the directions in the mixing device container. DO NOT OPERATE THIS WATER HEATER WITHOUT AN ASSE APPROVED THERMOSTATIC MIXING DEVICE. If this water heater was shipped without an ASSE approved thermostatic mixing valve, contact the manufacturer.

Mixing Valve Specification

Max. Hot Water Inlet Temperature	210°F
Min. Cold Water Inlet Temperature	39°F
Inlet Pressure	200 PSI
Outlet Water Temperature Range	85°F – 150°F
Min. Temperature Differential (Between Hot Supply and Outlet)	20°F
Performance –	
CV – ½”	3.3
Max Flow – 1”	24 gpm

The mixing valve maintains a constant outlet temperature of +/– 5˚ F given limited variation of water inlet temperature and pressure.

NOTE: At low flow operation, the outlet temperature may vary slightly more.

Differential pressure at the valve inlet should be within a 5 to 1 ratio under normal flow conditions. Inline fittings, pipe work, layout and sizing must be taken into consideration. In installations where the valve is supplied with unbalanced hot cold pressures greater than a 5 to 1 ratio, please call HTP Technical Support Department.

CAUTION

The mixing valve is certified to ASSE 1017. It is not to be used to provide anti-scald service resulting from system pressure fluctuations, and should not be used where more sophisticated compensating temperature controls are required.

Installation of the Mixing Valve

1. Flush all pipe work thoroughly (with water only) before installing the mixing valve.

2. The mixing valve comes complete with union type connections for ease of installation and service.

3. The mixing valve must be removed from the pipe work prior to soldering the end connections. It is recommended to use a spacer piece while soldering.

⚠ DANGER

Do not solder unions while attached to the valve body. Solder connections prior to connecting unions to the valve body to avoid damaging the valve and its function.

Setting the Mixing Valve Outlet Temperature

1. Remove the green knob by inserting a small screw driver in the notch and gently prying up as shown in Fig. 3-1.

2. Set the mixing valve after the tank has heated to its set point. To set the valve, disconnect the outdoor sensor from the control so the domestic hot water will reach its set point temperature (default setting is 160°F). Once domestic hot water has reached its set point, turn both the hot and cold water supplies on. Open an outlet, preferably a sink or basin faucet rather than a shower. To calibrate, let water run for 2 minutes and measure the outlet temperature with a thermometer. Using the groove on the top of the cover provided to fit over adjustment nut, adjust the knob counter clockwise to increase temperature and clockwise to decrease temperature, as shown in Fig. 3-2.

Fig. 3-1

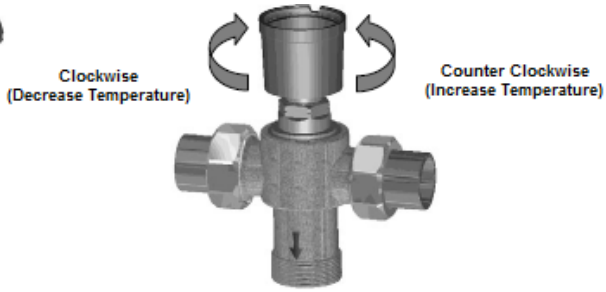


Fig. 3-2

Figure 3 – 1 and 2

3. Once the desired outlet temperature has been achieved, refit the green top so that it snaps onto the body of the mixing valve.

4. Re-connect the outdoor sensor.

MIXING VALVE MAINTENANCE AND SERVICE

- It is recommended to check the mixing valve annually to ensure proper system capabilities. More frequent checks are recommended in adverse water conditions.

- When checking the mixed water supply temperature, use the same faucet used in the initial installation temperature adjustment.
- There may be some variation in the water temperature from the mixing valve due to seasonal temperature variations in the cold water supply.

If the water supply is of poor quality, the internal components may jam, requiring an additional filter or strainer to be fitted to the system. Contact a plumbing professional for appropriate materials and installation.

F. AUXILIARY PIPING

Auxiliary connections are provided to connect to an air handler, plate exchanger or other additional devices. Auxiliary ports can also be used for recirculation line connections. These connections must be installed in accordance with all local and national codes or any applicable prevailing standards. Auxiliary connections are 1" on all models. Never use dielectric unions or galvanized steel fittings. Use only copper or brass fittings. Teflon sealant must be used on all connections. The top port has a dip tube that draws hot water from the dome of the unit and the bottom port dip tube returns the water to bottom of the unit.

⚠ WARNING

Never connect auxiliary connections to any system that uses glycol or other solutions formulated for hydronic systems. These auxiliary connections are to be used only in a potable water system. Failure to follow this warning could result in death or serious injury.

PART 5: HYDRONIC PIPING

A. HYDRONIC HEATING MODULE PIPING

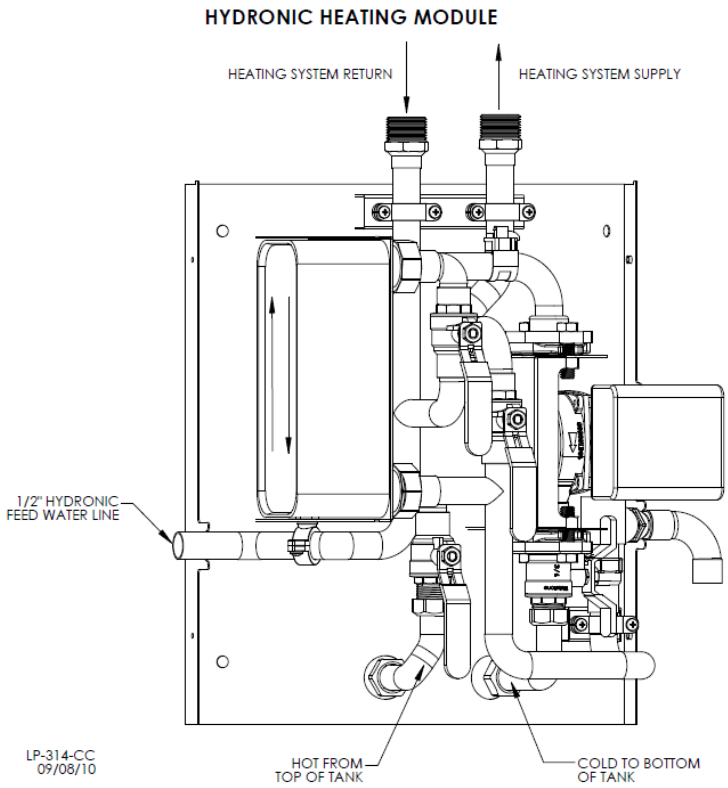


Figure 4

The hydronic heating module comes pre-plumbed and connected directly to the storage tank. The heated water inside the tank will be circulated through one side of the brazed plate heat exchanger while the heating system water flows through the other side. The heating system piping is connected to the return and supply pipes located on the top of the hydronic heating module (see Figure 4). Piping of the module to the system is not complex and does not require any of the primary or secondary piping normally used on high efficiency low mass boilers.

B. PRESSURE RELIEF VALVE FOR THE HYDRONIC SYSTEM

The pressure relief valve supplied with the heater is designed to relieve pressure greater than 30 psi. The hydronic heating module is designed to withstand pressure up to 150 psi. If you are changing the pressure relief valve for a higher pressure rating, you must make sure that the system components are designed for the higher pressure. The relief valve must be rated for the 135,000 Btu maximum capacity of the brazed plate heat exchanger. Pipe the discharge line in copper piping to a drain. Provide 6" clearance from the floor drain.

C. HYDRONIC EXPANSION TANK AND MAKE UP WATER

Ensure that the expansion tank is sized to the system volume, brazed plate capacity, and related piping for the hydronic heating module. The capacity of the module and brazed plate is ½ gallon. Most chilled water systems are piped using a closed type expansion tank.

Connect the expansion tank to the air separator only if the separator is on the suction side of the circulator. The hydronic heating module has a water line connection of ½" NPT to connect into the pressure reducing valve and back flow preventer. Normal system pressure is 15 psi.

D. HYDRONIC HEATING MODULE SYSTEM PIPING

The hydronic heating module is designed to function in a closed loop hydronic system. The included temperature and pressure gauge allows the user to monitor the system pressure and temperature from the hydronic heating module. The gauge should be installed on the supply outlet piping from the heating module. The installation of an air elimination device will remove air from the system which is necessary to avoid an air lock in the central heating circulator. It is recommended that all the piping is insulated to improve on the system's overall efficiency. In the system piping, heating coils in air handler, flow control valves, or other devices must be installed to prevent gravity circulation of heated water from the heating module.

Freeze protection for new or existing systems must be composed of glycol that is specifically formulated to include inhibitors that will prevent the glycol from attacking the metallic system components. Make certain that the system fluid is checked for the correct glycol concentration and inhibitor level. The system should be tested at least once a year or as recommended by the producer of the glycol solution. Allowance should be made for the expansion of the glycol solution in the system piping. Example: 50% by volume glycol solution expands 4.8% in volume for the temperature increase from 32oF to 180oF, while water expands 3% with the same temperature rise.

Listed below are the basic steps that will help guide you through the installation of the hydronic heating module to the system piping.

1. Connect the system return marked "Return".

2. Connect the system supply marked "Supply".

3. Install a balance and purge valve (or shut off drain valve) on the system return to purge air out of the zone at start-up.

4. Install a back flow preventer on the cold feed make–up water line.

5. Install a pressure reducing valve on the cold feed make up water line (15 psi operating pressure). Check temperature and pressure gauge when operating. It should read minimum pressure of 15 psi.

6. Install the system circulator as shown in the piping details in this section. Make sure the circulator is properly sized for the system and friction loss.

7. Install an expansion tank on the system supply. Consult the expansion tank manufacturer's instructions for specific information related to expansion for the required system volume and capacity.

8. Install an air elimination device on the system supply.

9. Install a drain valve at the lowest point of system to blow out the system if needed. NOTE: The hydronic heating module cannot be drained completely of water without purging the unit with an air pressure greater than 15 psi but not exceeding 40 psi. If winterizing the unit it is recommended, use glycol on the closed loop hydronic side only.

10. The relief valve is installed at the factory. A pipe discharge line should be installed to release 6" above a drain, so discharge will be visible when pressure is relieved. The pipe size must be the same size as the relief valve outlet.

⚠ WARNING

Never block the outlet of the safety relief valve.

E. HYDRONIC HEATING MODULE OUTPUT

Hydronic heating module output is based on the burner input and the flow rate supplied by the selected system circulator through the closed loop side of the brazed plate exchanger. Included in this section are graphs that will help you size the appropriate circulator and output needed to meet your system design requirements. Below is an example on the steps needed to determine the correct circulator for the system.

Example: System design requires 120,000 Btu at 20 Delta

Step 1
Using the graphs, select the input rate of the heater. In this example, we would have to select a minimum input of 199K (the 130K max. output is 100,000 Btu, which falls below our operating point).

Step 2
Next, go to the chart for the 199K burner input and select the point of operation where the Btu and Delta T line intersect. Mark the point on the chart and go to bottom of the chart to determine flow rate needed to achieve the rated output from the module. This example is 12 GPM.

Step 3
Select the correct circulator to meet the flow and resistance requirements for the system design. To calculate this, you must determine the flow and resistance through the system and heating module. The heating module requires 12 GPM at 10 feet of head. The system requires 12 GPM at 5 feet of head. To select a circulator, add the resistance 10 feet of head (module) + 5 feet of head (system) at 12 GPM. This system requires a circulator that operates at a resistance of 15 feet at 12 GPM (See examples in Figure 5, Figure 6, and Figure 7).

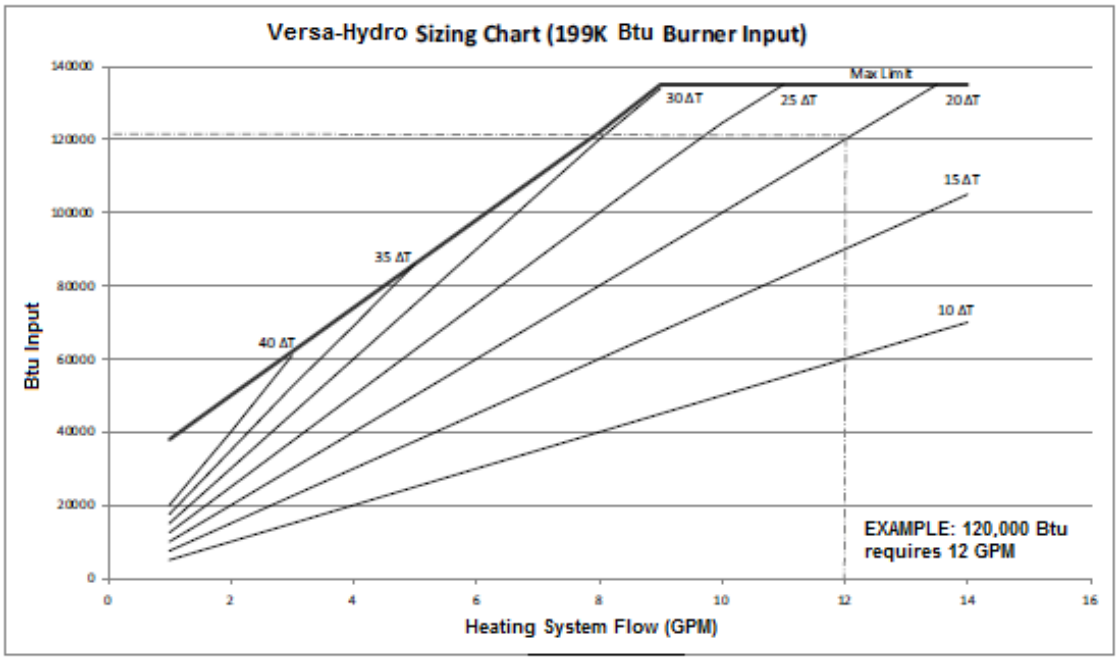


Figure 5

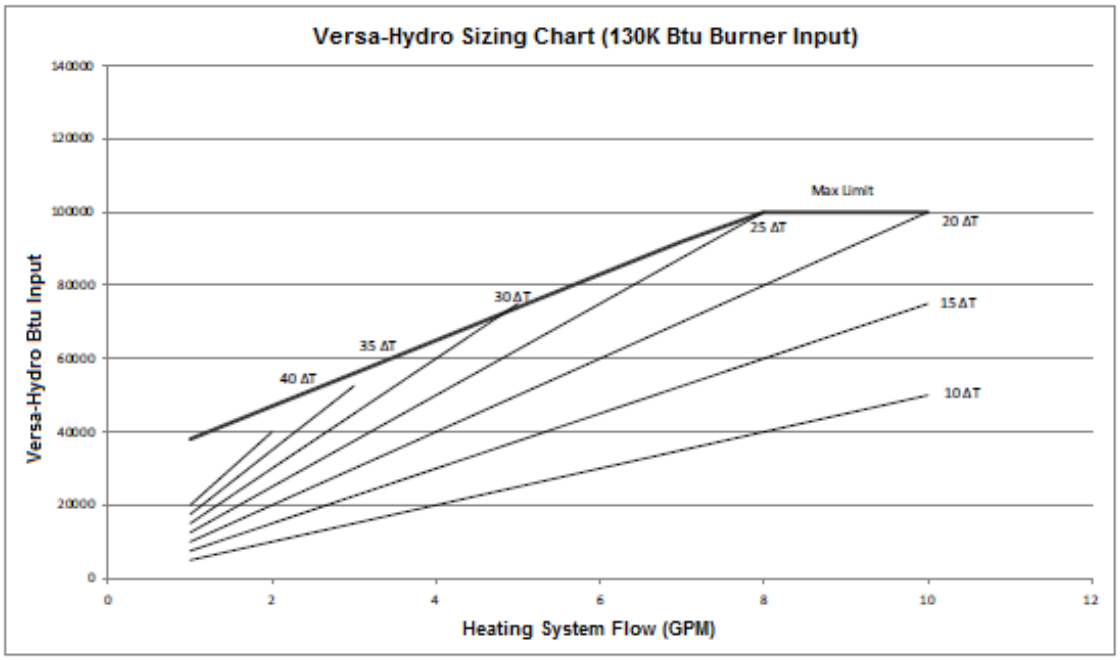


Figure 6

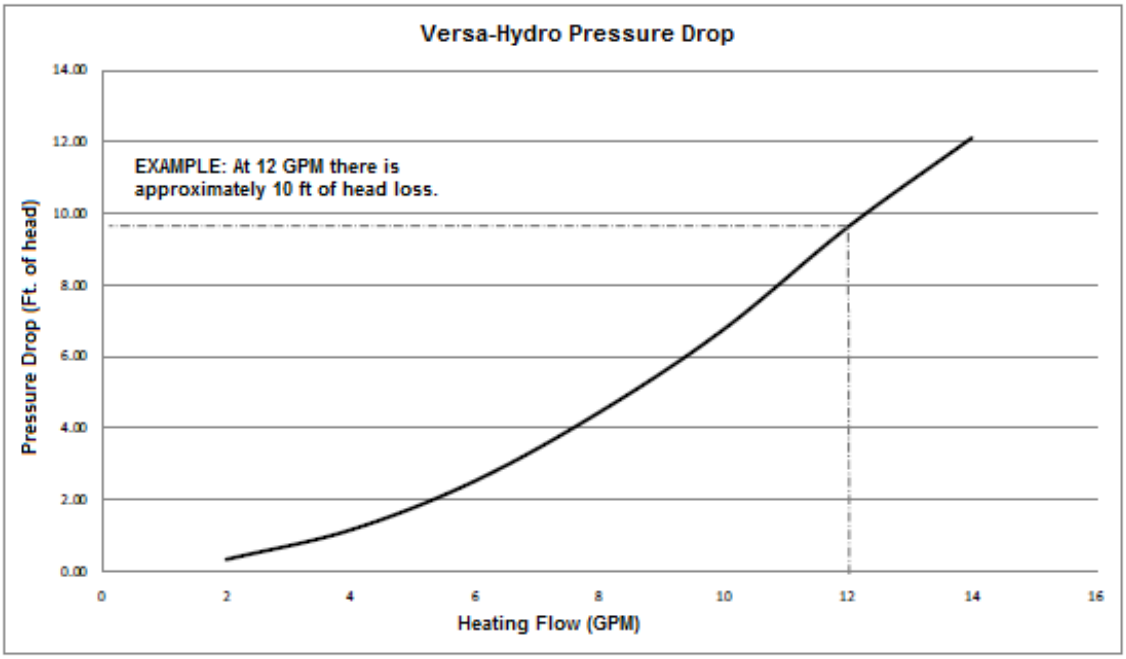
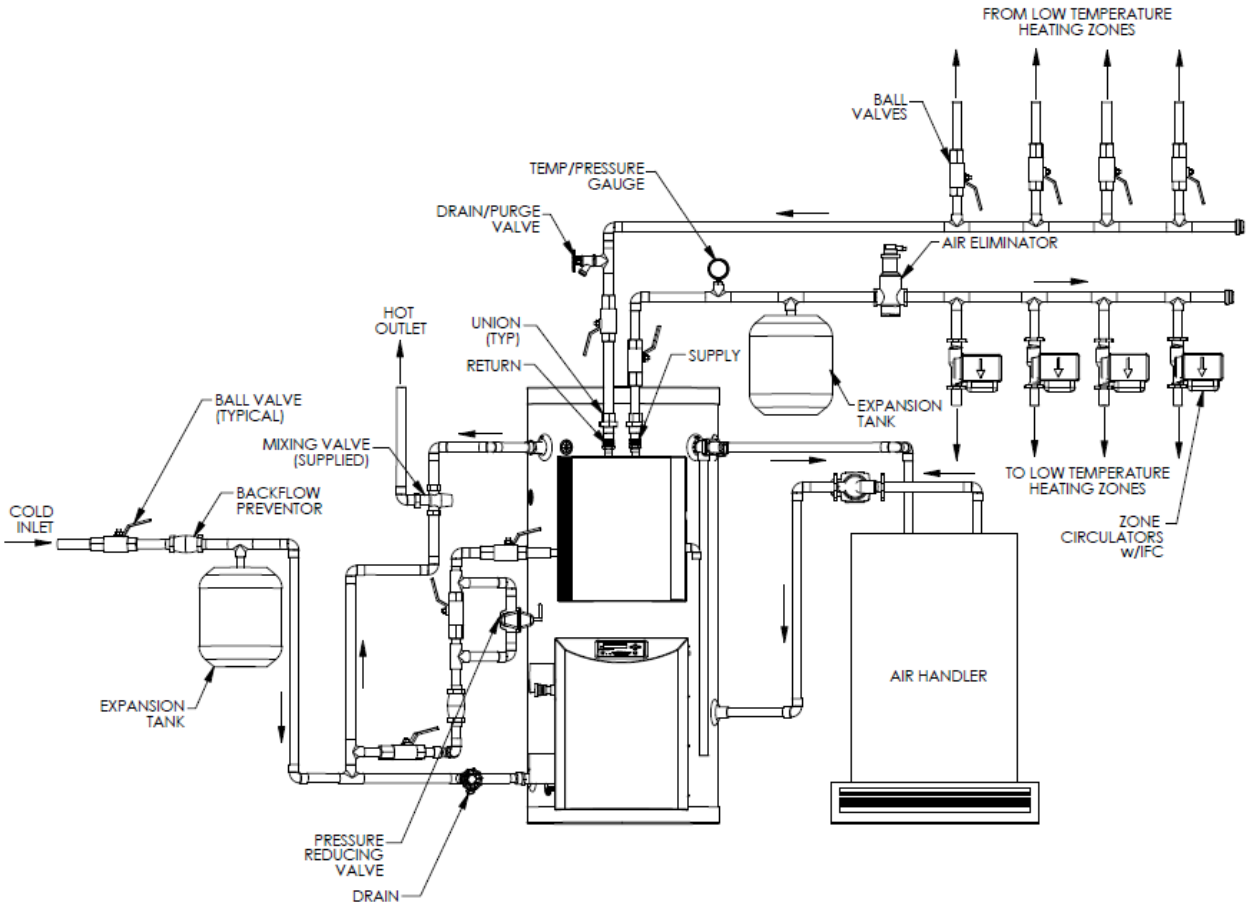

Versa-Hydro Pressure Drop
EXAMPLE: At 12 GPM there is approximately 10 ft of head loss.
Pressure Drop (Ft. of head)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0
2
4
6
8
10
12
14
16
Heating Flow (GPM)

Figure 7

F. HYDRONIC PIPING

VERSA-HYDRO AIR HANDLER APPLICATION



NOTES:

1. Minimum pipe size should match connection size on appliance. If you require greater flow, upsize the pipe accordingly.
2. A thermal expansion tank suitable for potable water must be sized and installed within the piping system between the check valve and cold water inlet of the appliance.
3. Gas line must be rated to the maximum capacity of the unit. Unit must have 10 feet of pipe after gas regulator.
4. All circulators shall have an integral flow check.

NOTES FOR AIR HANDLER APPLICATION:

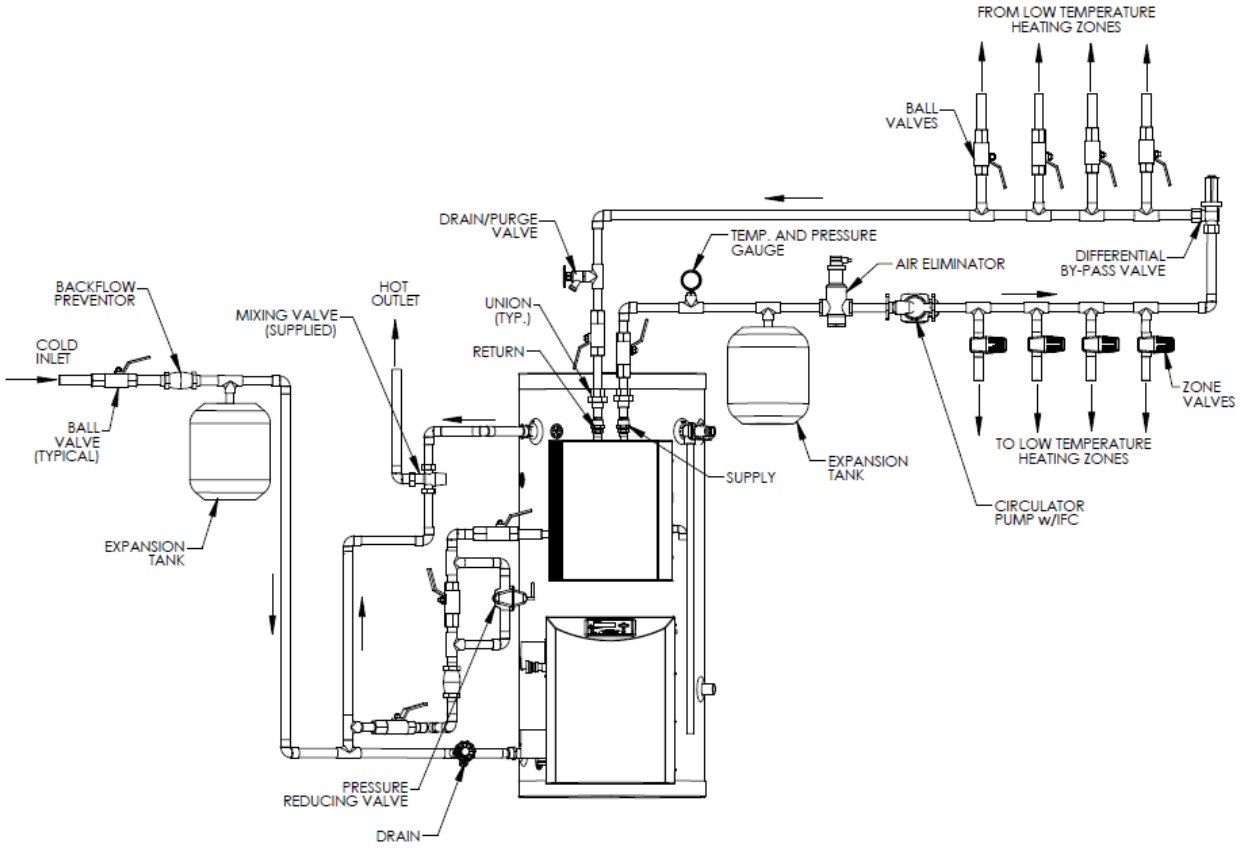
1. MASSACHUSETTS STATE PLUMBING CODE REQUIRES A DISTANCE NO GREATER THAN 50 FEET FROM THE WATER HEATER TO THE FAN COIL IN THE AIR HANDLER.
2. MASSACHUSETTS STATE PLUMBING CODE REQUIRES AN ELECTRONICALLY TIMED CIRCULATOR PUMP TO ACTIVATE EVERY SIX HOURS FOR 60 SECONDS. THIS CIRCULATOR IS REQUIRED TO BE BRONZE OR STAINLESS.
3. ALL WATER PIPING MUST BE INSULATED.
4. YOU MUST INSTALL A VACUUM RELIEF VALVE PER 248 CMR.

NOTE: THIS DRAWING IS MEANT TO SHOW SYSTEM PIPING CONCEPT ONLY. THE INSTALLER IS RESPONSIBLE FOR ALL EQUIPMENT AND DETAILING REQUIRED BY LOCAL CODES.

LP-314-3
09/07/10

Figure 8

VERSA-HYDRO PIPING USING ZONE VALVES



NOTES:

1. Minimum pipe size should match connection size on appliance. If you require greater flow, upsize the pipe accordingly.
2. A thermal expansion tank suitable for potable water must be sized and installed within the piping system between the check valve and cold water inlet of the appliance.
3. Gas line must be rated to the maximum capacity of the unit. Unit must have 10 feet of pipe after the gas regulator.
4. All circulators shall have an integral flow check.

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3. ALL WATER PIPING MUST BE INSULATED.
4. YOU MUST INSTALL A VACUUM RELIEF VALVE PER 248 CMR.

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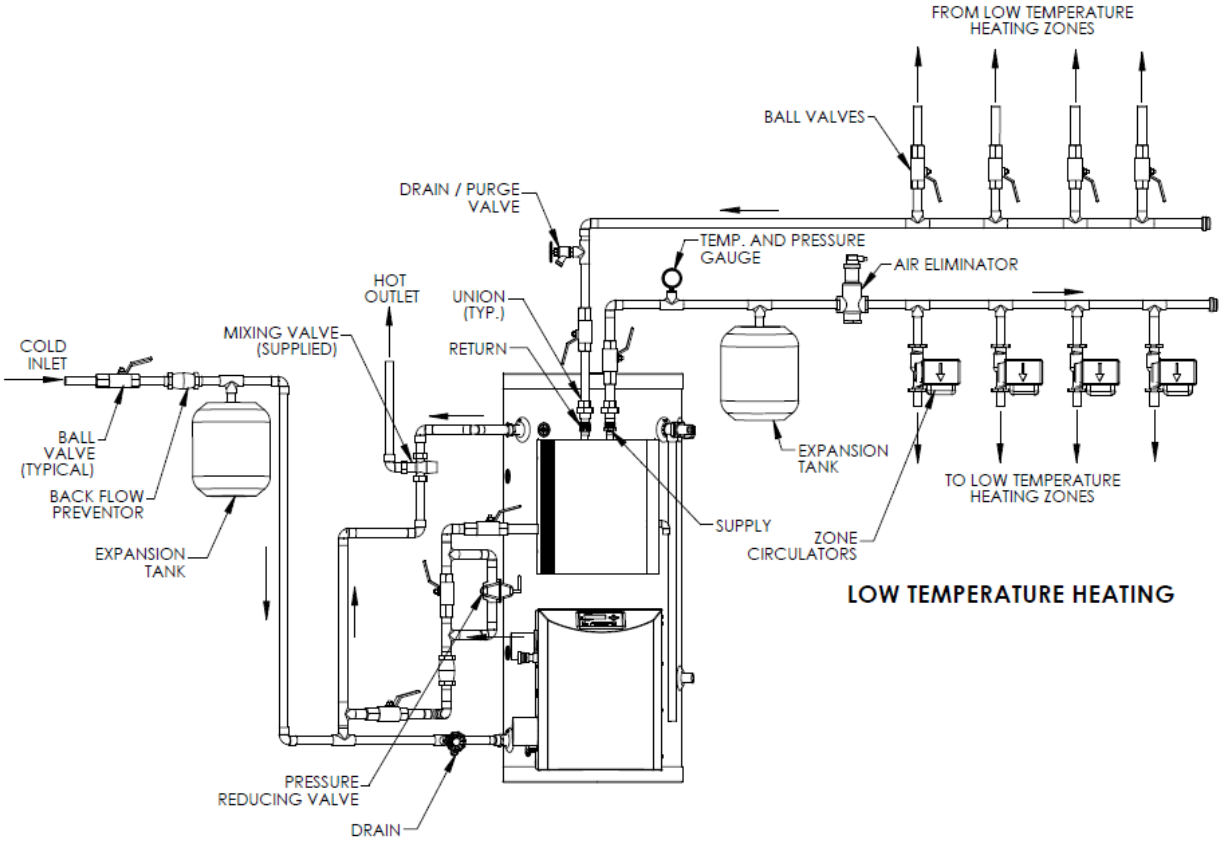
LP-314-PIPING-1
09/08/10

Figure 9

VERSA-HYDRO PIPING USING ZONE CIRCULATORS



NOTES:

1. Minimum pipe size should match connection size on appliance. If you require greater flow, upsize the pipe accordingly.
2. A thermal expansion tank suitable for potable water must be sized and installed within the piping system between the check valve and cold water inlet of the appliance.
3. Gas line must be rated to the maximum capacity of the unit. Unit must have 10 feet of pipe after gas regulator.
4. All circulators shall have an integral flow check.

NOTES FOR AIR HANDLER APPLICATION:

1. MASSACHUSETTS STATE PLUMBING CODE REQUIRES A DISTANCE NO GREATER THAN 50 FEET FROM THE WATER HEATER TO THE FAN COIL IN THE AIR HANDLER.
2. MASSACHUSETTS STATE PLUMBING CODE REQUIRES AN ELECTRONICALLY TIMED CIRCULATOR PUMP TO ACTIVATE EVERY SIX HOURS FOR 60 SECONDS. THIS CIRCULATOR IS REQUIRED TO BE BRONZE OR STAINLESS.
3. ALL WATER PIPING MUST BE INSULATED.
4. YOU MUST INSTALL A VACUUM RELIEF VALVE PER 248 CMR.

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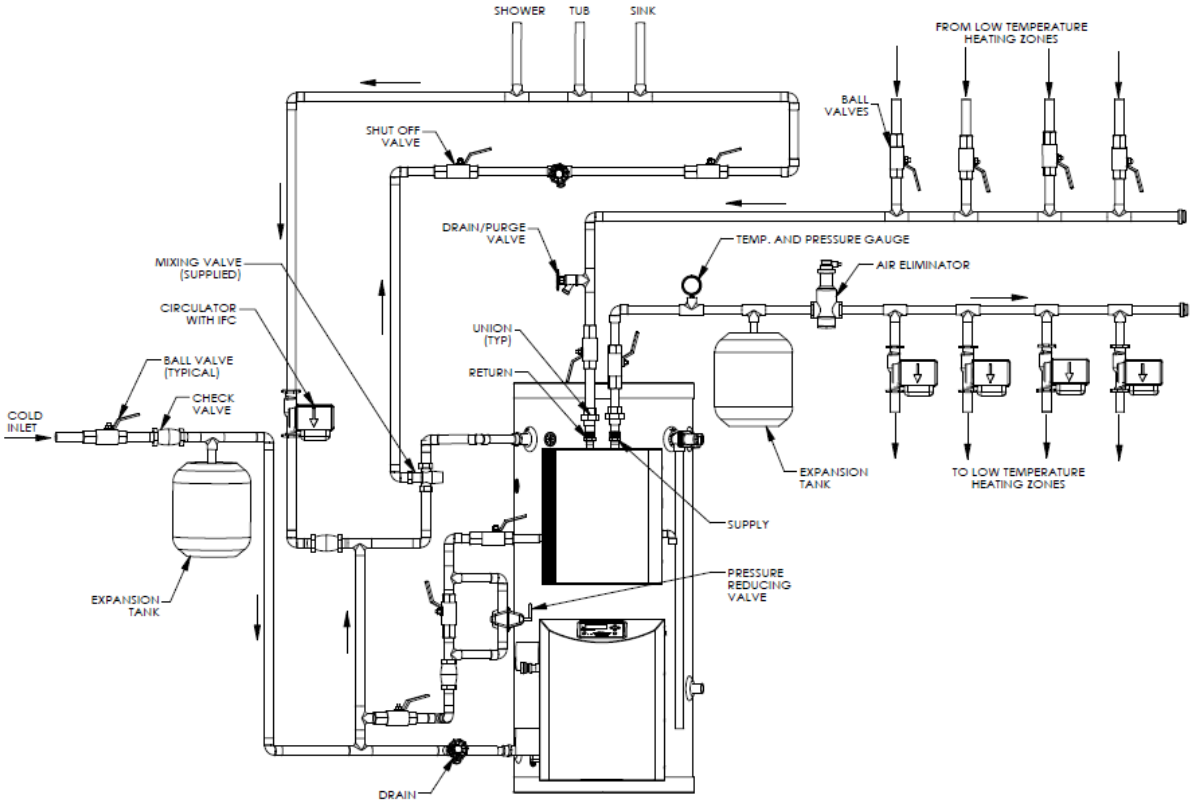
LP-314-PIPING 2
09/08/10

Figure 10

VERSA-HYDRO WITH RECIRCULATION PIPING



NOTES:

1. Minimum pipe size should match connection size on appliance. If you require greater flow, upsize the pipe accordingly.
2. A thermal expansion tank suitable for potable water must be sized and installed within the piping system between the check valve and cold water inlet of the appliance.
3. Gas line must be rated to the maximum capacity of the unit. Unit must have 10 feet of pipe after gas regulator.
4. All circulators shall have an integral flow check.

NOTES FOR AIR HANDLER APPLICATION:

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4. YOU MUST INSTALL A VACUUM RELIEF VALVE PER 248 CMR.

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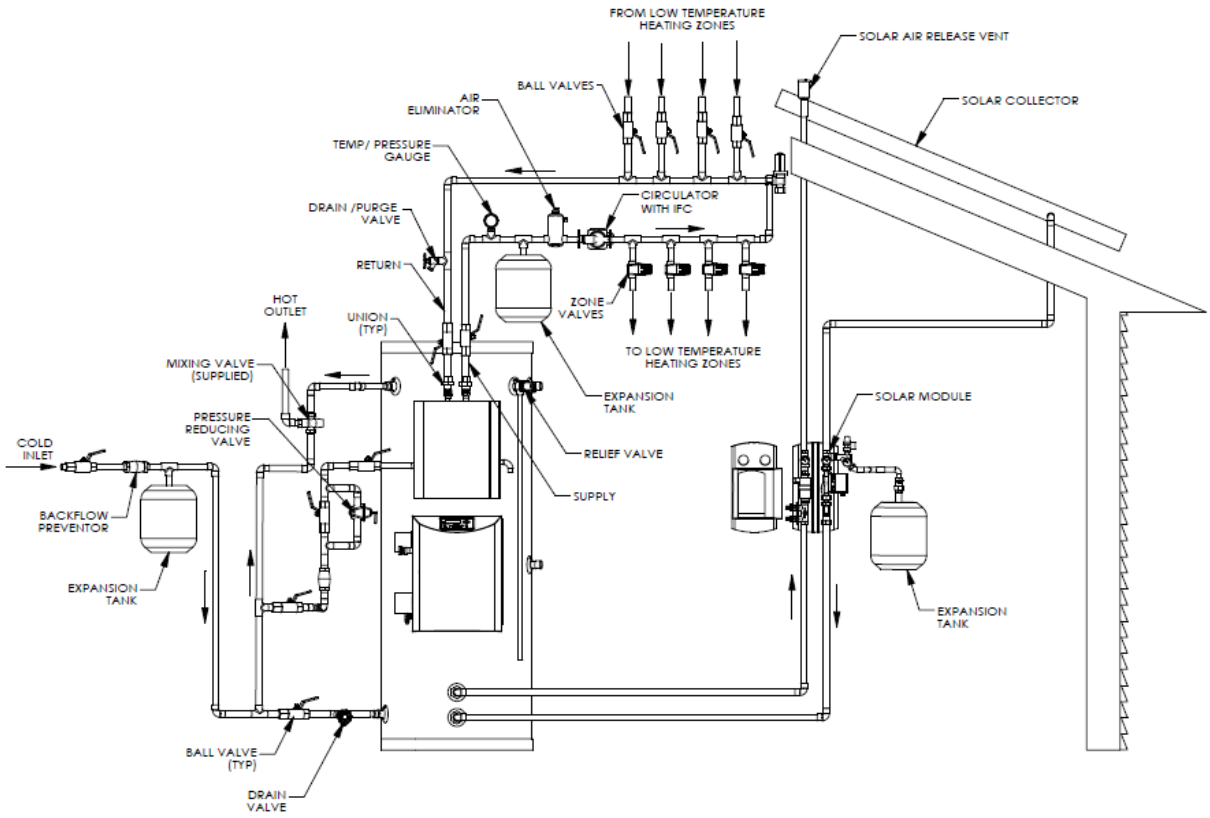
09/01/10

Figure 11

VERSA-HYDRO SOLAR



NOTES:

1. Minimum pipe size should match connection size on appliance. If you require greater flow, upsize the pipe accordingly.
2. A thermal expansion tank suitable for potable water must be sized and installed within the piping system between the check valve and cold water inlet of the appliance.
3. Gas line must be rated to the maximum capacity of the unit. Unit must have 10 feet of pipe after gas regulator.
4. All circulators shall have an integral flow check.

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LP-314 Piping 5
09/01/10

Figure 12

PART 6: FIELD WIRING

A. FIELD WIRING COMPLIANCE REQUIREMENTS

⚠ WARNING

ELECTRICAL SHOCK HAZARD – For your safety, to avoid possible electrical shock hazard, turn off electrical power supply at service entrance panel before making any electrical connections. Failure to do so can result in severe personal injury or death.

NOTE: Wiring must be N.E.C. Class 1.

If original wiring as supplied with boiler must be replaced, use only TEW 105 ^{o}C wire or equivalent.

Boiler must be electrically grounded as required by National Electrical Code ANSI/NFPA 70 – latest edition.

INSTALLATION MUST COMPLY WITH:

1. National Electrical Code and any other national, state, provincial or local codes or regulations.

2. In Canada, CSA C22.1 Canadian Electrical Code Part 1, and any local codes.

B. FIELD WIRING

All the wiring connections made to the heater in the field are done on the field connection board located on the right side of the cabinet. The cabinet has multiple knockouts available to route field wiring into and out of the field connection board. The control provides a pump output thermostat and outdoor sensor inputs to operate the central heating system.

C. LINE VOLTAGE WIRING

1. Connect the normal **incoming power** to the terminals marked as shown in Figure 14. A line voltage fused disconnect switch may be required to be externally mounted and connected according to local codes and standards.

2. Connect the **central heating pump** as shown in the terminals marked CH/DHW PUMP (see Figure 14). The connections shown are suitable for a maximum continuous pump draw of 3 amps at 120 volts. If the pump requires more current or voltage than the 120 volts supplied, an external motor starter will be required.

3. Please not that the solar pump connectors on the field connection board are not functional at this time.

D. LOW VOLTAGE WIRING

1. Make all low voltage connections to the terminal strip located on the field connection board (shown in Figure 13) as outlined below.

2. The **room thermostat** should be connected to the terminals marked T STAT (shown in Figure 13). Alternately, any dry contact closure across these terminals will cause the unit to operate the hydronic heating module. NOTE: Caution must be used to ensure neither of the terminals becomes connected to ground. Mount the thermostat on an inside wall as central as possible to the area being heated, away from drafts or heat producing devices such as a television, which could influence the ability of the thermostat to measure room temperature accurately. NOTE: If the thermostat is equipped with a directly connected anticipator, the anticipator should be set at .1 amps. If the thermostat is connected to other

devices, the anticipator should be set to match the power requirements of those connected devices. Refer to the instruction manuals of the connected devices for further information.

3. The **outdoor sensor** must be connected for the unit to operate at optimum efficiency. Use a minimum 22 AWG wire for runs of 100 feet or less and minimum 18 AWG wire for runs up to 150 feet. Instructions are included with the outdoor sensor to correctly mount the sensor on the exterior surface of the building. It is preferable to mount the sensor on the north side in an area that will not be affected by direct sunlight but will be exposed to varying weather conditions. Connect the outdoor sensor to terminals marked "Outdoor" in Figure 13.

E. FIELD CONNECTION BOARD

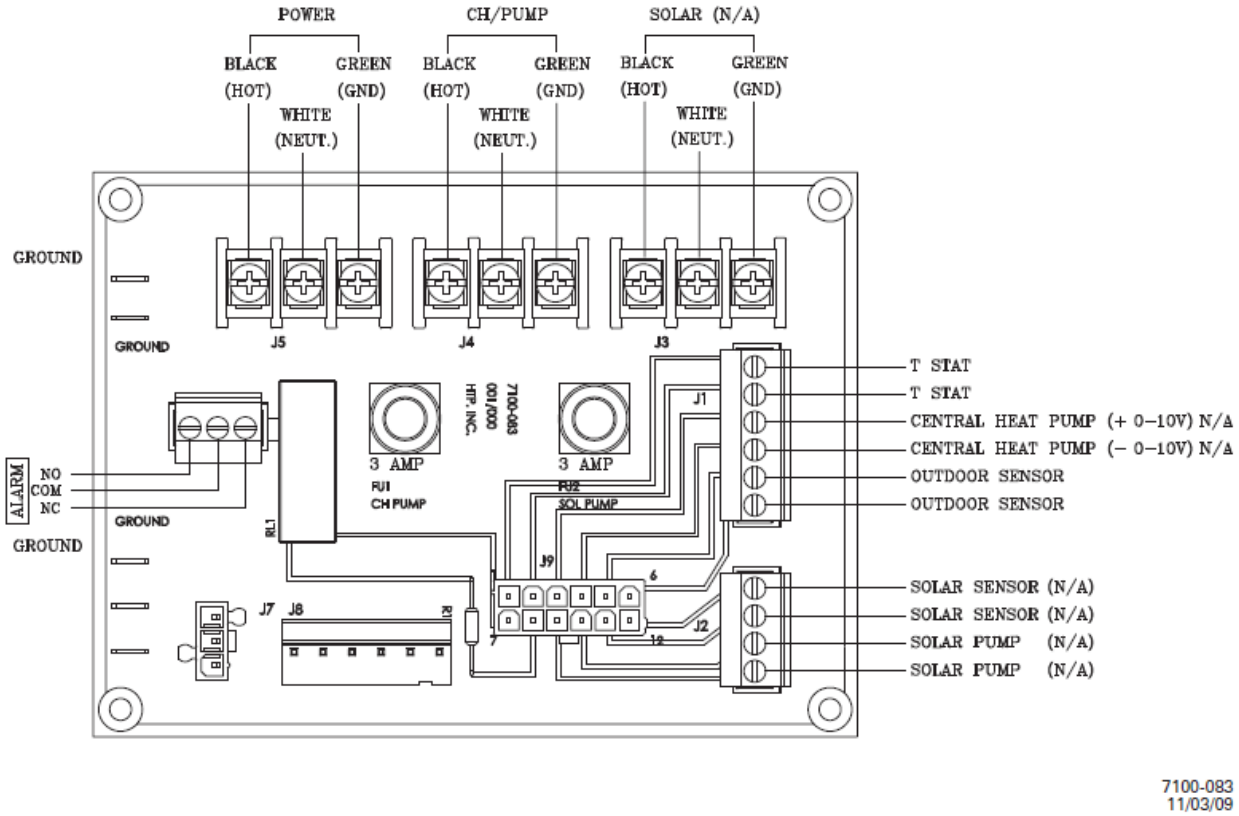


Figure 13 – Hydronic heating module

F. INTERNAL WIRING

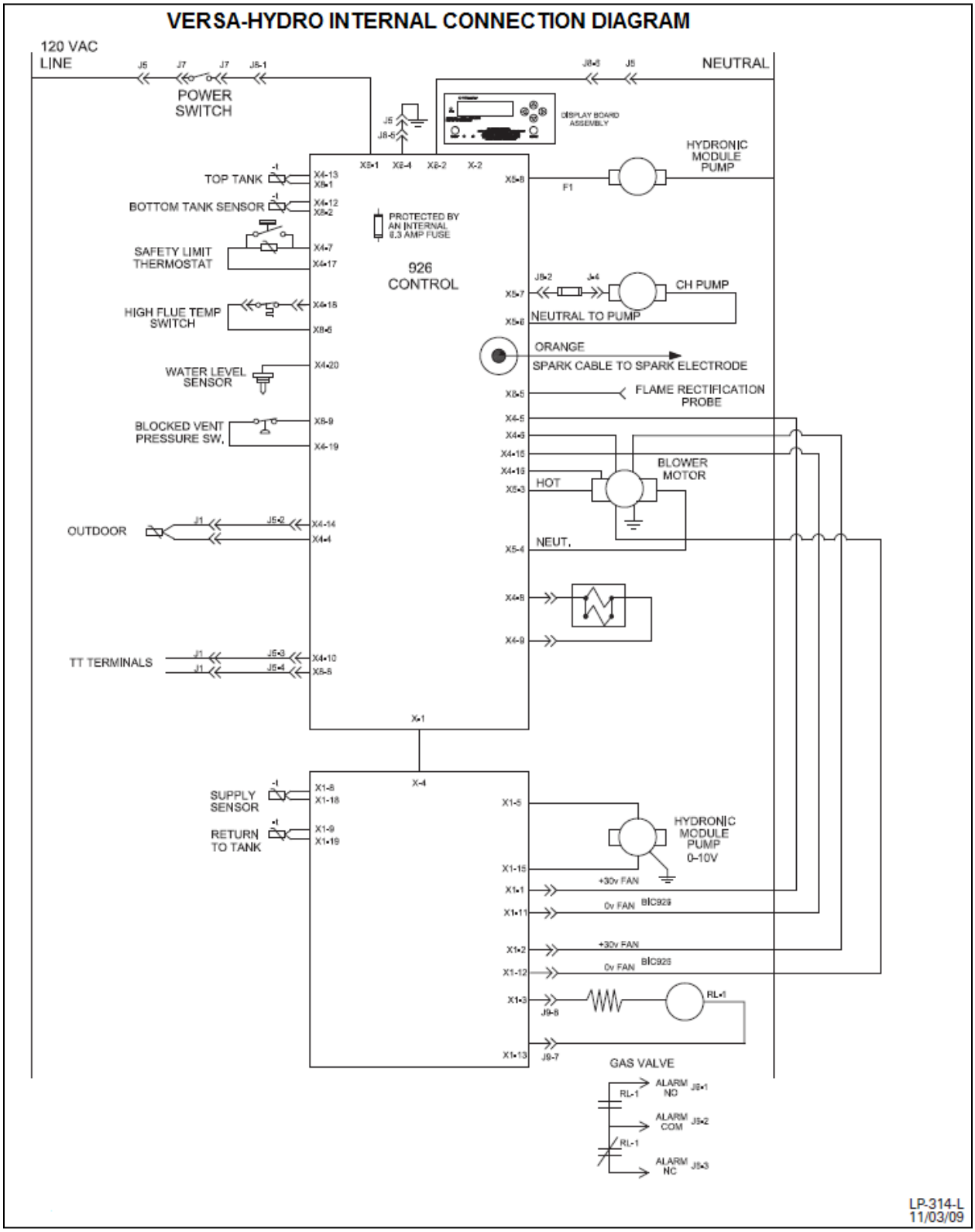


Figure 14 – Internal connection diagram

⚠ WARNING

It is of extreme importance that this unit be properly grounded. Prior to making any electrical connections, It is very important that the building system ground is inspected by a qualified electrician. Make certain that electrical power is only turned on when the unit is completely filled with cold water.

PART 7: GAS CONNECTION

⚠ WARNING

Failure to follow all precautions in this section could result in fire, explosion, or death!

A. GAS SUPPLY

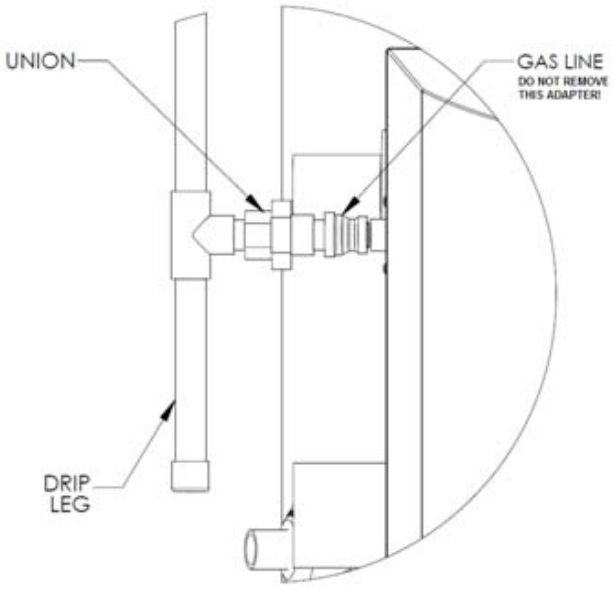


Figure 15

The gas supply shall have a maximum inlet pressure of less than 14" water column (350 mm), ½ pound pressure (3.5 k{a), and a minimum of 3.5" water column (WC). As stated in the National Fuel Gas Code, the entire piping system, gas meter, and regulator must be sized properly to prevent pressure drop greater than .5" WC. This information is listed on the unit rating plate.

It is very important that you are connected to the type of gas noted on the rating plate: "LP" for liquefied petroleum, propane gas, or "Nat" for natural or city gas. Prior to turning the gas supply on, all gas connections must be approved by the local gas supplier or utility in addition to the governing authority. **Do not remove the reducing coupling attached to the gas valve! Per the National Fuel Gas Code, it is mandatory that this fitting be used for connection to a field fabricated drip leg as shown in the illustration at left.**

Ensure that the entire gas line to the connection at the heater is no smaller than ¾". Once all inspections have been performed, the piping must be leak tested. If the leak test requirement is a higher test pressure than the maximum gas inlet pressure, you must isolate the heater from the gas line to continue leak testing. In order to do this, you must turn off the factory and field-installed gas cocks. This will minimize the possibility of damaging the heater gas valve.

⚠ WARNING

Failure to isolate gas line while leak testing may damage the gas valve. In the event the gas valve is exposed to a pressure greater than ½ psi, 14" water column, the gas valve must be replaced. Never use an open flame (match, lighter, etc.) to check gas connections.

B. GAS PIPING

1. Run the gas supply line in accordance with all applicable codes.

2. Locate and install manual shutoff valves in accordance with state and local requirements.

C. GAS TABLE

Refer to the following table to size the supply piping to minimize pressure drop between meter or regulator and unit.

Maximum capacity of pipe in cubic feet of gas per hour for gas pressures of .5 psi or less and a pressure drop of .3" water column:

Gas Table

Nominal Iron Pipe Size (inches)	Internal Diameter (inches)	Length of Pipe (Feet)														
		10	20	30	40	50	60	70	80	90	100	125	150	175	200	
3/4	.824	278	190	152	130	115	105	96	90	84	79	72	64	59	55	BTU'S
1	1.049	520	350	285	245	215	195	180	170	160	150	130	120	110	100	PER
1 1/4	1.380	1,050	730	590	500	440	400	370	350	320	305	275	250	225	210	HOUR
1 1/2	1.610	1,600	1,100	890	760	670	610	560	530	490	460	410	380	350	320	x1,000

Table 3

It is recommended that a soapy solution be used to detect leaks. Bubbles will appear on the pipe to indicate a leak is present. To avoid excessive pressure drop, the gas piping must be sized for the proper flow and length of pipe. Both the gas meter and regulator must be properly sized for the total gas load. If you experience a pressure drop greater than 1" WC, the meter, regulator, and/or gas line is undersized or needs service. By removing the cap, you can attach a manometer to the incoming gas drip leg. The gas pressure must remain between 3.5" WC and 14" WC during stand-by (static) mode and while in operating (dynamic) mode at full output. **If an in-line regulator is used, it must be installed a minimum of 10 feet from the heater.**

It is very important that the gas line is properly purged by the gas supplier or utility. Failure to properly purge or size the lines will result in ignition failure. This problem is especially noticeable in NEW LP installations and empty tank situations. This can also occur when a utility company shuts off service to an area to provide maintenance to their lines. The gas valve must not be replaced with a conventional gas valve under any circumstances. As an additional service feature, the gas valve in this appliance has a flanged connection to the swirl plate and blower.

D. GAS VALVE

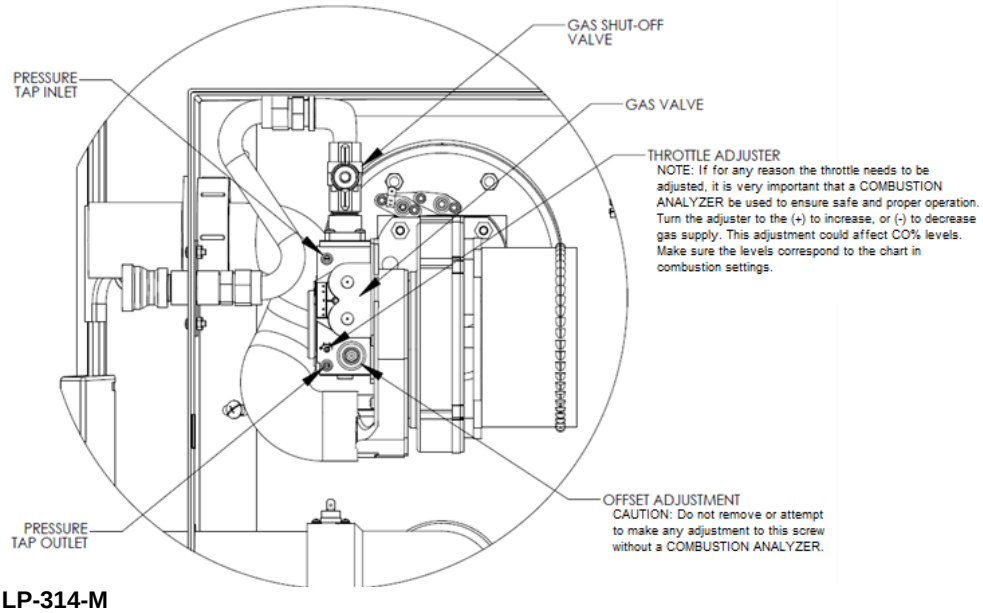


Figure 16 – LP-314-M

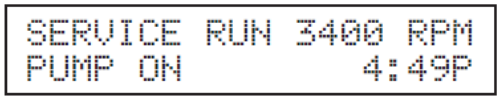
⚠ WARNING

Do not do a gas conversion on this unit without an officially approved conversion kit and instructions supplied by HTP. Failure to do so could result in serious injury or death.

E. HOW TO VERIFY COMBUSTION

To activate service mode, press the up arrow ▲ and ENTER key together for 1 second. The unit will go through the ignition sequence. Press ▲ to increase, or ▼ to decrease fan speed.

To leave service mode, press ▲ and ▼ simultaneously.



COMBUSTION SETTINGS HIGH FIRING RATES and LOW FIRING RATES ON ALL MODELS				
	Natural Gas		Propane LP	
	low	high	low	high
Carbon Monoxide (CO%)	0-10 ppm	0-20 ppm	0-10 ppm	0-20 ppm
Carbon Dioxide (CO_2%)	8 ½ - 9 ½ %	8 ½ - 9 ½ %	9 ½ - 10 ½ %	9 ½ - 10 ½ %

Table 4

FAN SPEEDS			
BTU	**IGNITION**	**MIN**	**MAX**
130,000	3000	2000	6950
199,000	3000	2000	8500

Table 5

PART 8: VENTING, COMBUSTION AIR AND CONDENSATE REMOVAL

⚠ DANGER

The heater must be vented as detailed in this Venting Section. Ensure exhaust and intake piping complies with these instructions regarding vent system.

Inspect finished combustion air intake and exhaust piping thoroughly to ensure all joints are well secured, airtight, and comply with all applicable code requirements, as well as with the instructions provided in this manual.

Failure to provide a properly installed vent system will cause severe personal injury or death.

A. GENERAL

⚠ WARNING

This vent system will operate with a positive pressure in the pipe. Do not connect vent connectors serving appliances vented by natural draft into any portion of mechanical draft systems operating under positive pressure.

Follow the venting instructions below carefully. Failure to do so may result in substantial property damage, severe personal injury, or death.

1. Install the water heater venting system in accordance with these instructions and with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, CAN/CGA B149, and/or applicable provisions of local building codes.

2. This water heater is a direct vent appliance and is listed as a Category IV appliance with Underwriters Laboratories, Inc. VENT AND INTAKE AIR VENT.

B. APPROVED MATERIALS FOR EXHAUST AND INTAKE AIR VENTS

APPROVED VENTING MATERIAL			
Item	**Material**	**Standards for Installation in:**	
		United States	**Canada**
Vent or air pipe and fittings	PVC schedule 40/80	ANSI/ASTM D1785	CPVC and PVC venting must be ULC-S636 Certified. IPEX is an approved manufacturer in Canada, supplying vent material listed to ULC-S636.
	PVC-DWV	ANSI/ASTM D2665	
	CPVC schedule 40/80	ANSI/ASTM F441	
Pipe cement/primer	PVC	ANSI/ASTM D2564	IPEX System 636 Cements & Primers
	CPVC	ANSI/ASTM F493	

Table 6

⚠ WARNING

Do not use Foam Core Pipe in any portion of the exhaust piping from this water heater. Use of Foam Core Pipe may result in substantial property damage, severe personal injury, or death.

C. EXHAUST AND INTAKE AIR VENT PIPE LOCATION

1. DETERMINE EXHAUST VENT LOCATION

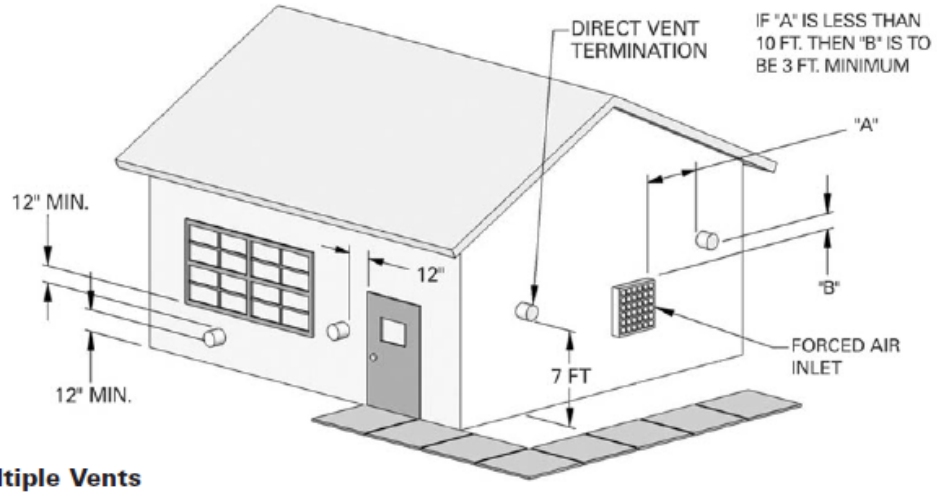
a. The vent piping for this water heater is approved for zero clearance to combustible construction.
b. See illustration within this section of clearances for location of exit terminals of direct-vent venting systems.
c. This water heater vent system shall terminate at least 3 feet (0.9 m) above any forced air intake located within 10 ft (3 m). Note: this does not apply to the combustion air intake of a direct-vent appliance.
d. Provide a minimum of 1 foot distance from any door, operable window, or gravity intake into any building.
e. Provide a minimum of 1 foot clearance from the bottom of the exhaust above the expected snow accumulation level. Snow removal may be necessary to maintain clearance.
f. Provide 4 feet horizontal clearance from electrical meters, gas meters, gas regulators, relief equipment, exhaust fans and inlets. In no case shall the exit terminal be above or below the aforementioned equipment unless the 4 foot horizontal distance is maintained.
g. When adjacent to a public walkway, locate exit terminal at least 7 feet above grade.

h. Do not locate the exhaust directly under roof overhangs to prevent icicles from forming.
i. Provide 4 feet clearance from the inside corner of vertical walls, chimneys, etc., as well as horizontal corners created by roof overhangs.

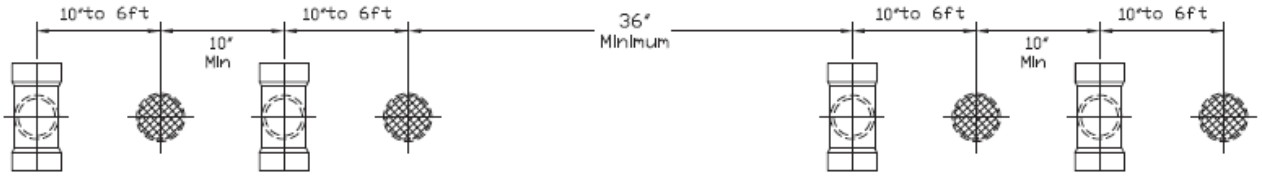
2. DETERMINE AIR INTAKE VENT LOCATION

a. Provide 1 foot clearance from the bottom of the intake air vent and the level of maximum snow accumulation. Snow removal may be necessary to maintain clearances.
b. Do not locate intake air vent in a parking area where machinery may damage the pipe.
c. When venting with a two pipe system, maximum distance between intake air vent and exhaust vent is 6 feet (1.8 m). Minimum distance between exhaust vent and intake air vent on single water heater is 10” (0.255 m) center-to-center. Minimum distance between exhaust vents and intake air vents on multiple water heaters is 10” (0.255 m) center-to-center.

Location of exit terminals of mechanical draft and direct-vent venting systems.
(Reference: National Fuel Gas Code ANSI Z223.1/NFPA 54 2002).



Multiple Vents

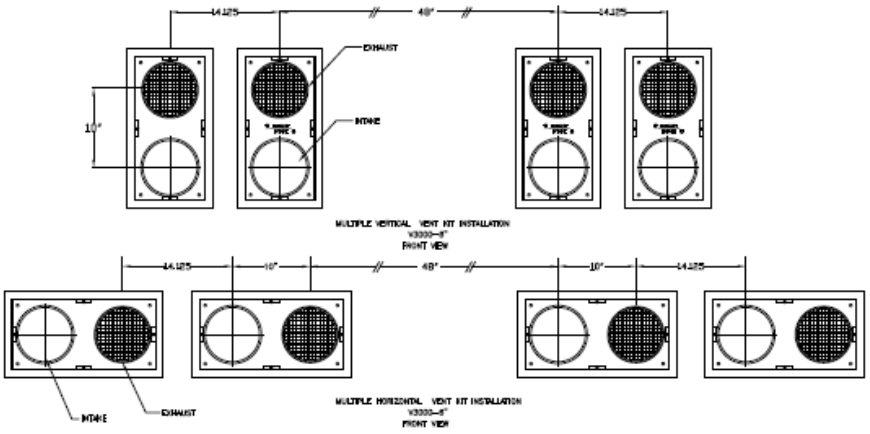


Multiple Vent Spacing*

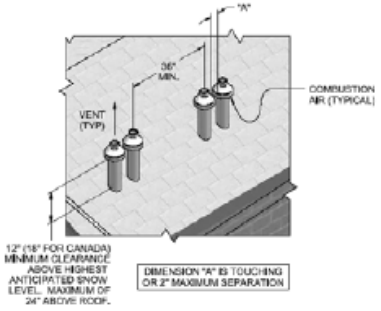
*Note: Exhaust must extend out 1 foot. There should be no more than 2 vents and 2 intakes then a space of 36" to the next set of vents.

*Note: There must be a minimum of 36" spacing between every 2 kit grouping.

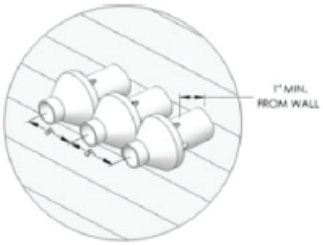
Multiple "V" Series Vents



Multiple Stainless Steel Horizontal Vent Kit Installation – Front View



Multiple Concentric Vent Spacing – Vertical



Multiple Concentric Vent Spacing – Horizontal

Figure 17

D. EXHAUST AND INTAKE AIR VENT SIZING

1. The exhaust and intake vent size is 2” for the PHE130 and 3” for the PHE199.

2. The total combined equivalent length of exhaust and intake air vents should not exceed 85 ft.
   a. The equivalent length of elbows, tees, and other fittings are listen in the Friction Loss Table below.

FRICTION LOSS EQUIVALENT IN PIPING AND FITTINGS			
FITTINGS OR PIPING	**EQUIVALENT FEET**		
	2”	**3”**	**4”**
90 DEGREE ELBOW*	5’	5’	3’
45 DEGREE ELBOW	3’	3’	1’
COUPLING	0’	0’	0’
AIR INLET TEE	0’	0’	0’
STRAIGHT PIPE	1’	1’	1’
CONCENTRIC VENT KIT	3’	3’	N/A
V500 2” VENT KIT	1’	N/A	N/A
V1000 3” VENT KIT	N/A	1’	1’
V2000 4” VENT KIT	N/A	1’	1’

Table 7 - *Friction loss for long radius elbow is 1’ less.

   b. For example: If the exhaust vent has two 90^{o} elbows and 10 ft of PVC pipe, we will calculate:
   Exhaust Vent Pipe Equivalent Length = (2x5) + 10 = 20 ft.
   Further, if the intake air vent pipe has two 90o elbows, one 45o elbow, and 10 ft of PVC pipe, the following calculation applies:
   Intake Air Vent Pipe Equivalent Length = (2x5) + 3 + 10 = 23 ft.
   Therefore, the total combined equivalent length is 46 ft, which is well below the maximum of 85 ft.
   c. The intake air and exhaust vents are intended to penetrate the same wall or roof of the building.
   d. Effort should be made to keep a minimum difference in equivalent length between the intake air and exhaust vents.

3. The minimum combined equivalent length is 16 equivalent feet.

E. LONGER VENT RUNS

1. The maximum combined equivalent length can be extended by increasing the diameter of both the exhaust and intake air vents equally. However, the transitions should begin a minimum of 15 equivalent feet from the water heater.
   a. The maximum equivalent length for the increased diameter vents is 125 ft.
   b. To prevent condensate from pooling in the vent pipe, transitions should always be made in vertical sections.

Vent Connection	Reducing Coupling	Vent Transition
2”	3” x 2”	3”
3”	4” x 3”	4”

Table 8

   c. If the transition occurs at a distance greater than 15 equivalent feet from the water heater, the maximum equivalent length will be reduced. See Table 7.

Transition Point (ft from water heater)	TEL of Standard 2" Vent Pipe (ft)	TEL of Oversized 2", 3", or 4" Vent Pipe (ft)	Maximum TEL of all Vent Pipe (ft)
15	30	95	125
20	40	77-1/2	117-1/2
25	50	60-1/2	110-1/2
30	60	43	103
35	70	26	96
40	80	8-1/2	88-1/2
None	85	0	85

Table 9 – TEL = Total Equivalent Length

F. EXHAUST AND INTAKE AIR VENT INSTALLATION

1. Use only solid PVC or CPVC pipe. FOAM CORE PIPING IS NOT APPROVED. Refer to Table 6 for approved materials.

2. Remove all burrs and debris from joints and fittings.

3. All joints must be properly cleaned, primed, and cemented. Use only cement and primer approved for use with the pipe material. Cement must conform to ASTM D2564 for PVC and ASTM F493 for CPVC pipe.

⚠ WARNING

All joints of positive pressure vent systems must be sealed completely to prevent leakage of flue products into the living space.

4. Horizontal lengths of exhaust vent must slope towards the water heater not less than ¼" per ft to allow condensate to drain from the vent pipe. If the exhaust pipe must be piped around an obstacle that results in the creation of a low point, condensate will collect and form a blockage. This condensate must be drained away using a field-installed condensate drain assembly (see Figure 26).

5. All piping must be fully supported. Use pipe hangers at a minimum of 4 ft intervals to prevent sagging of the pipe where condensate may form.

6. Do not use the unit to support any piping.

7. A screened straight coupling is provided with the unit for use as an outside exhaust termination.

8. A screened inlet air tee is provided with the water heater to be used as an outside intake termination.

9. The following table lists optional intake air/exhaust vent terminations available from HTP.

VENT TERMINATION KITS	
Description	**Stock Code**
2" PVC Concentric Vent Termination Kit	KGAVT0501CVT
3" PVC Concentric Vent Termination Kit	KGAVT0601CVT
2" Stainless Steel Vent Termination Kit	V500
3" Stainless Steel Vent Termination Kit	V1000
4" Stainless Steel Vent Termination Kit	V2000

Table 10

G. VENTING DRAWINGS

1. DIRECT VENT INSTALLATION OF EXHAUST AND INTAKE

If installing a direct vent option, combustion air must be drawn from the outdoors directly into the appliance intake, and exhaust must terminate outside. There are three basic direct vent options detailed in this manual: 1. Side Wall Venting, 2. Roof Venting, and 3. Unbalanced Venting.

Be sure to locate the heater such that the air intake and exhaust vent piping can be routed through the building and properly terminated. Different vent terminals can be used to simplify and eliminate multiple penetrations in the building structure (see Optional Equipment in Venting Section). The air intake and exhaust vent piping lengths, routing and termination methods must all comply with the methods and limits given in the Venting section, Part 8 of this manual.

When installing a combustion air intake from outdoors, care must be taken to utilize uncontaminated combustion air. **NOTE: To prevent combustion air contamination, see Table 1.**

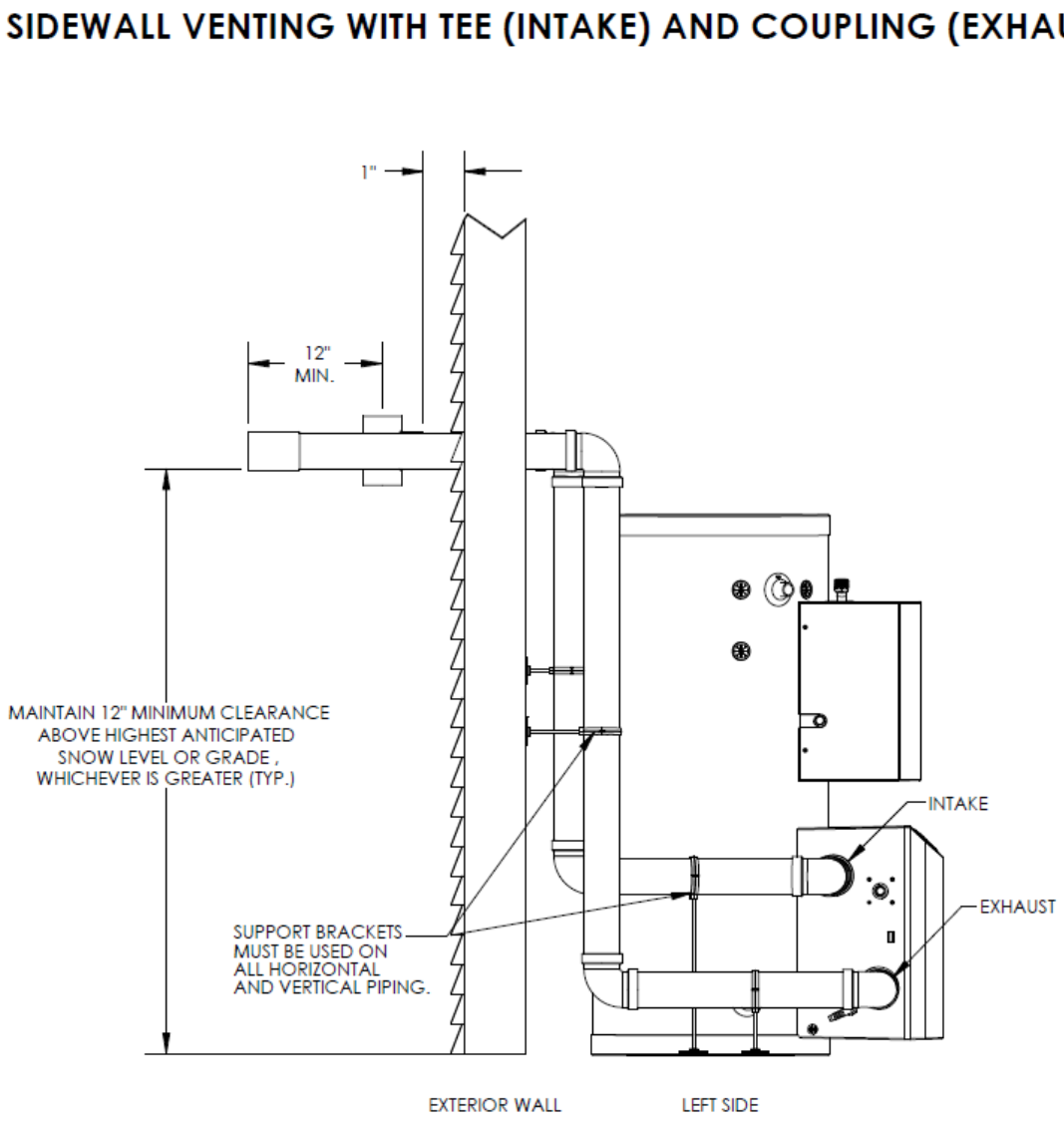


Figure 18 – LP-314-C - NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

SIDEWALL VENTING WITH KIT

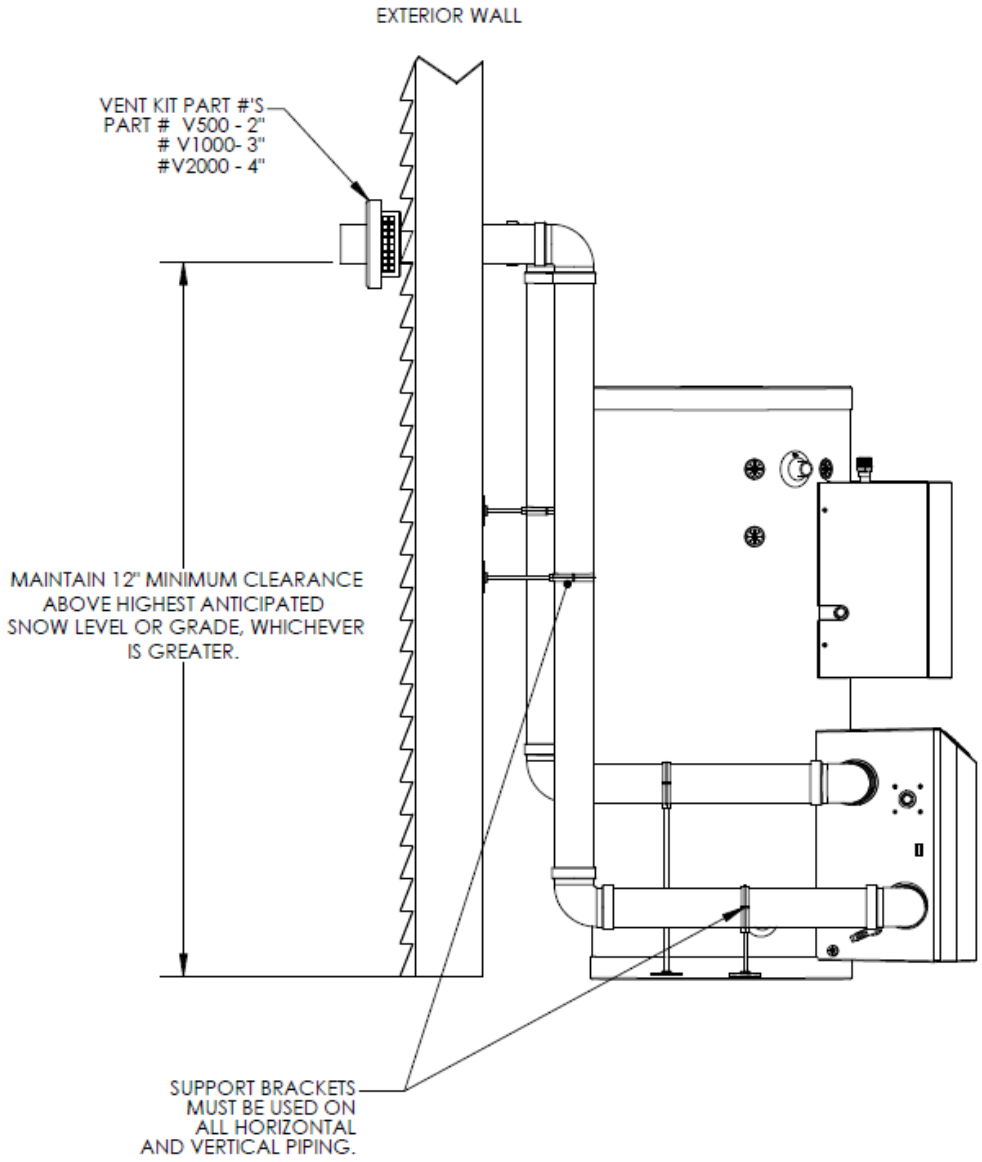


Figure 19 – LP-314-D

NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

SIDEWALL VENTING WITH CONCENTRIC VENT KIT

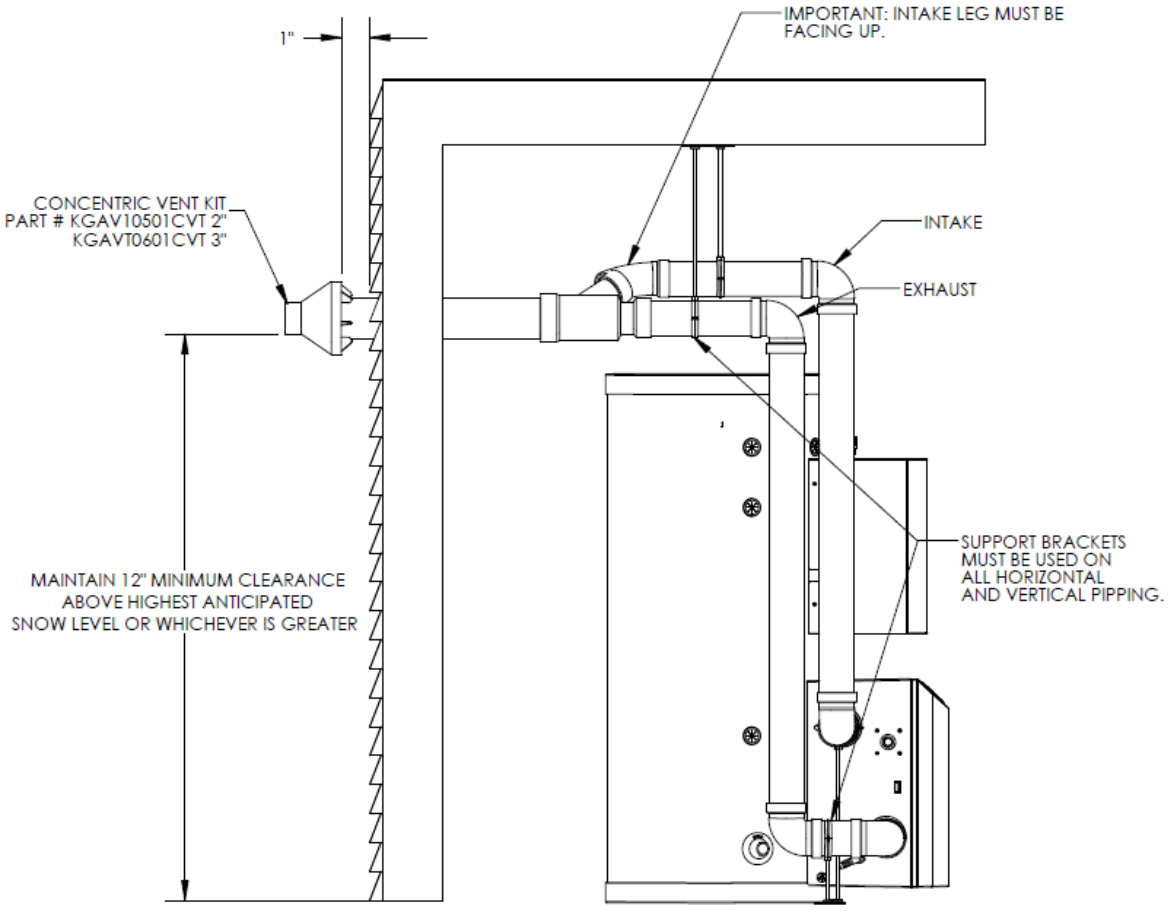


Figure 20 – LP-314-E

NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

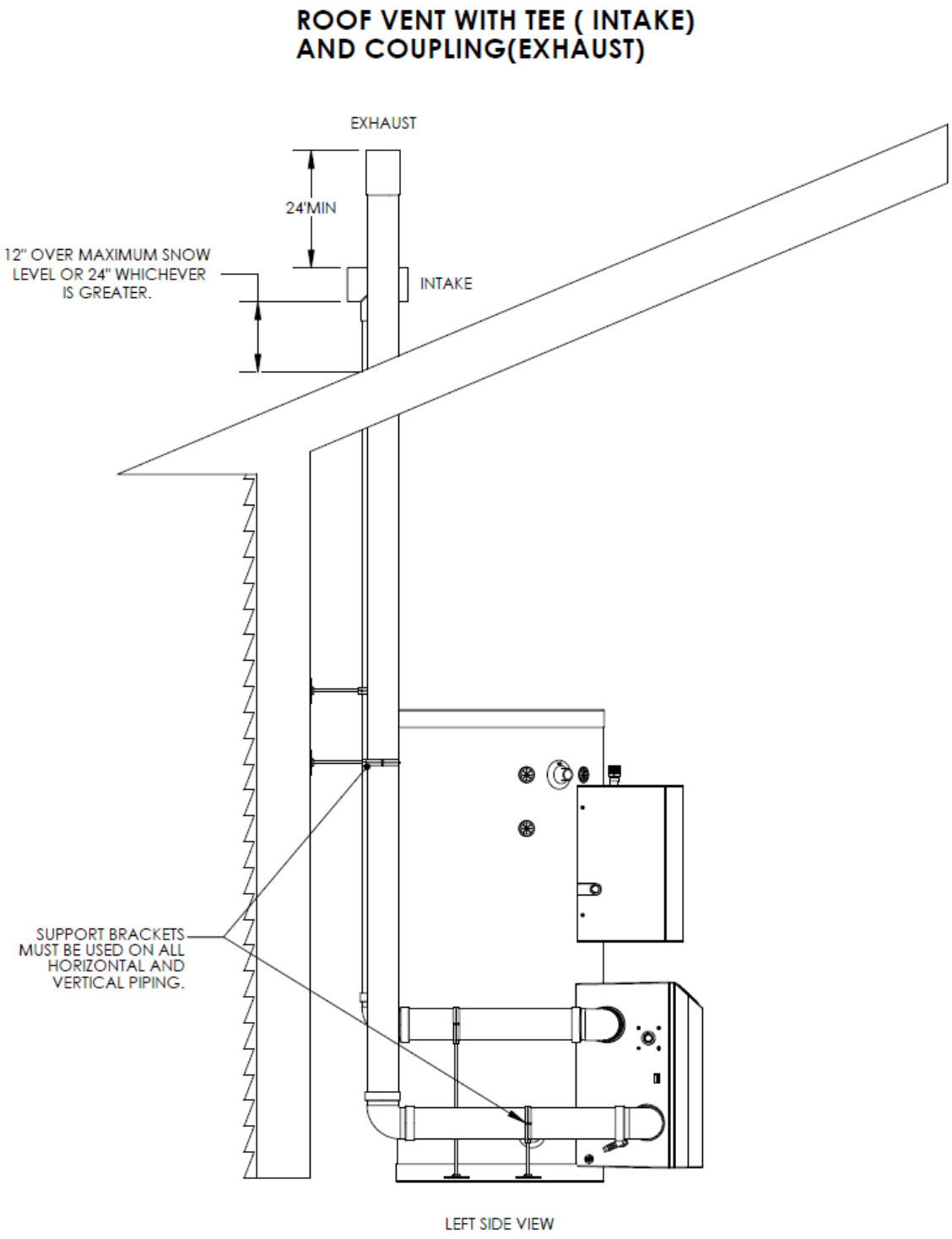


Figure 21 – LP-314-F

NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

ROOF VENT WITH CONCENTRIC VENT KIT

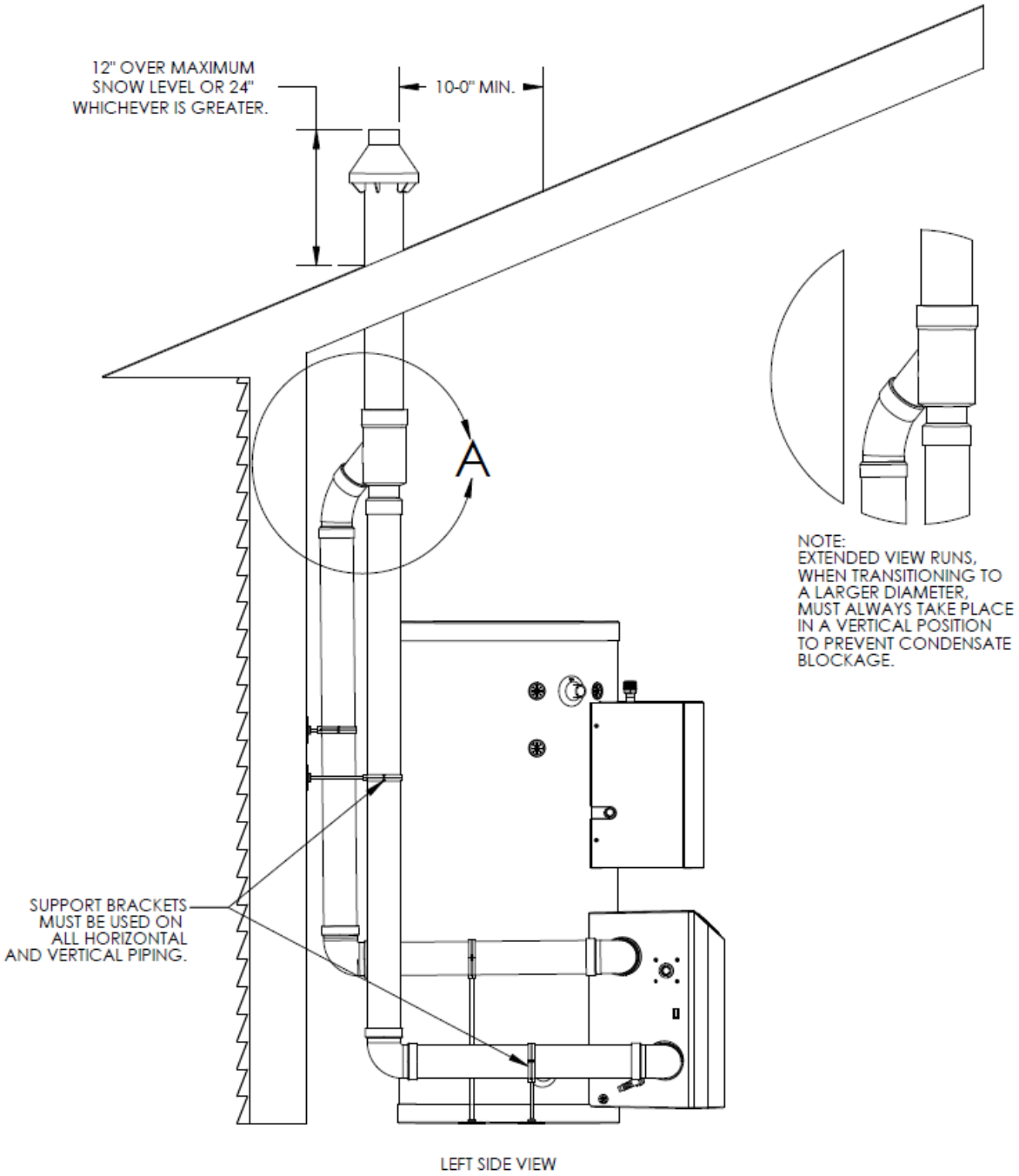


Figure 22 – LP-314-J

NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

UNBALANCED VENT WITH TEE (INTAKE) AND COUPLING (EXHAUST)

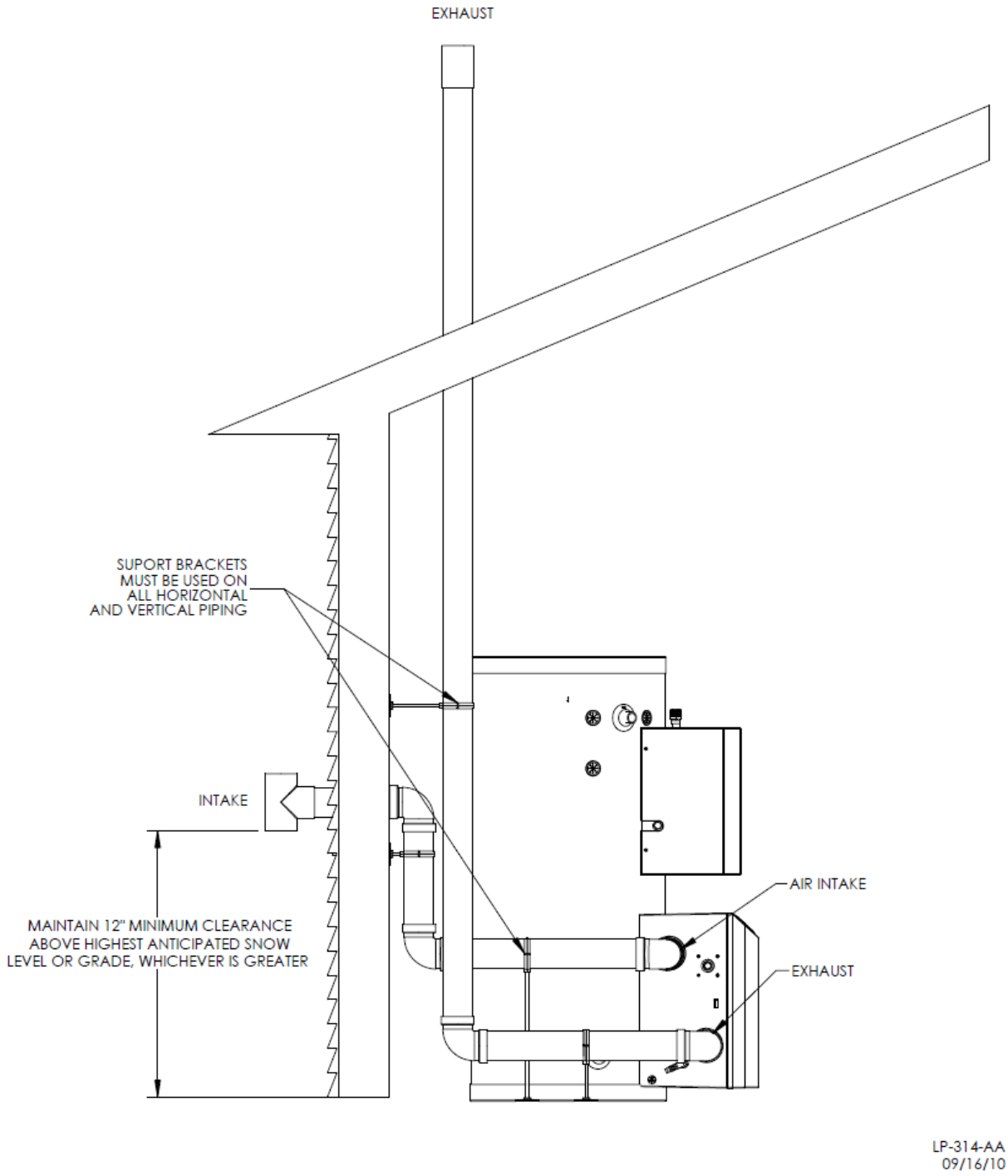


Figure 23 – LP-179-AA

NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.

2. INDOOR COMBUSTION AIR INSTALLATION IN CONFINED OR UNCONFINED SPACE

This heater requires fresh, uncontaminated air for safe operation and must be installed in a mechanical room where there is adequate combustion and ventilating air. **NOTE: To prevent combustion air contamination, see Table 1 on page** Error! Bookmark not defined..

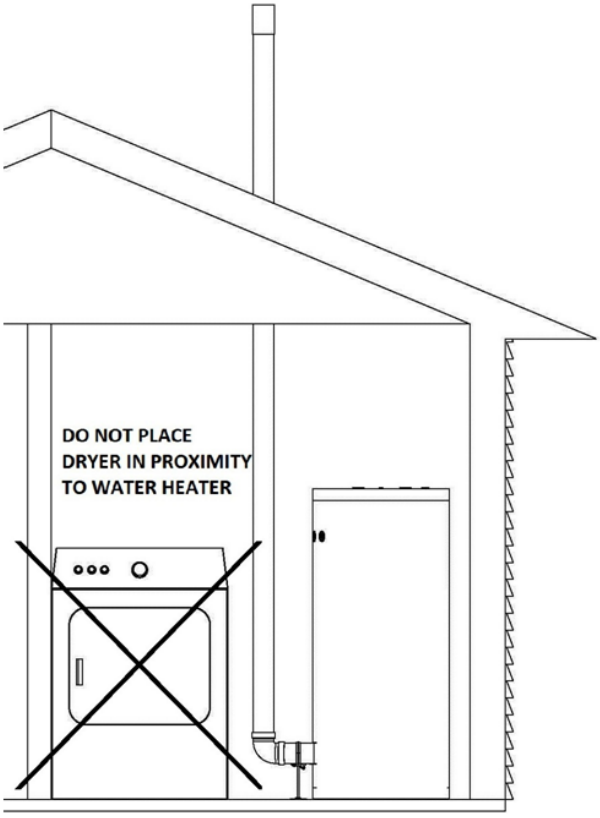


Figure 24 – LP-325-X

Combustion air from the indoor space can be used if the space has adequate area or when air is provided through a duct or louver to supply sufficient combustion air based on the appliance input. **Never obstruct the supply of combustion air to the appliance.** If the appliance is installed in areas where indoor air is contaminated (see Figure 24) it is imperative that the appliance be installed as direct vent so that all combustion air is taken directly from the outdoors into the appliance intake connection.

Unconfined space is space with volume greater than 50 cubic feet per 1,000 Btu/hour (4.8 cubic meters per kW) of the total input rating of all fuel-burning appliances installed in that space. Rooms connected directly to this space, through openings not furnished with doors, are considered part of the space.

Confined space is space with volume less than 50 cubic feet per 1,000 Btu/hour (4.8 cubic meters per kW) of the total input rating of all fuel-burning appliances installed in that space. Rooms connected directly to this space, through openings not furnished with doors, are considered part of the space.

When drawing combustion air from inside a conventionally constructed building to a confined space, such space should be provided with two permanent openings: one located 6” (15 cm) below the space ceiling, the other 6” (15cm) above the space floor. Each opening should have a free area of one square inch per 1,000 Btu/hr (22cm^2/kW) of the total input of all appliances in the space, but not less than 100 square inches (645cm^2).

If the confined space is within a building of tight construction, air for combustion must be obtained from the outdoors as outlined in the Venting section of this manual. See Figure 25

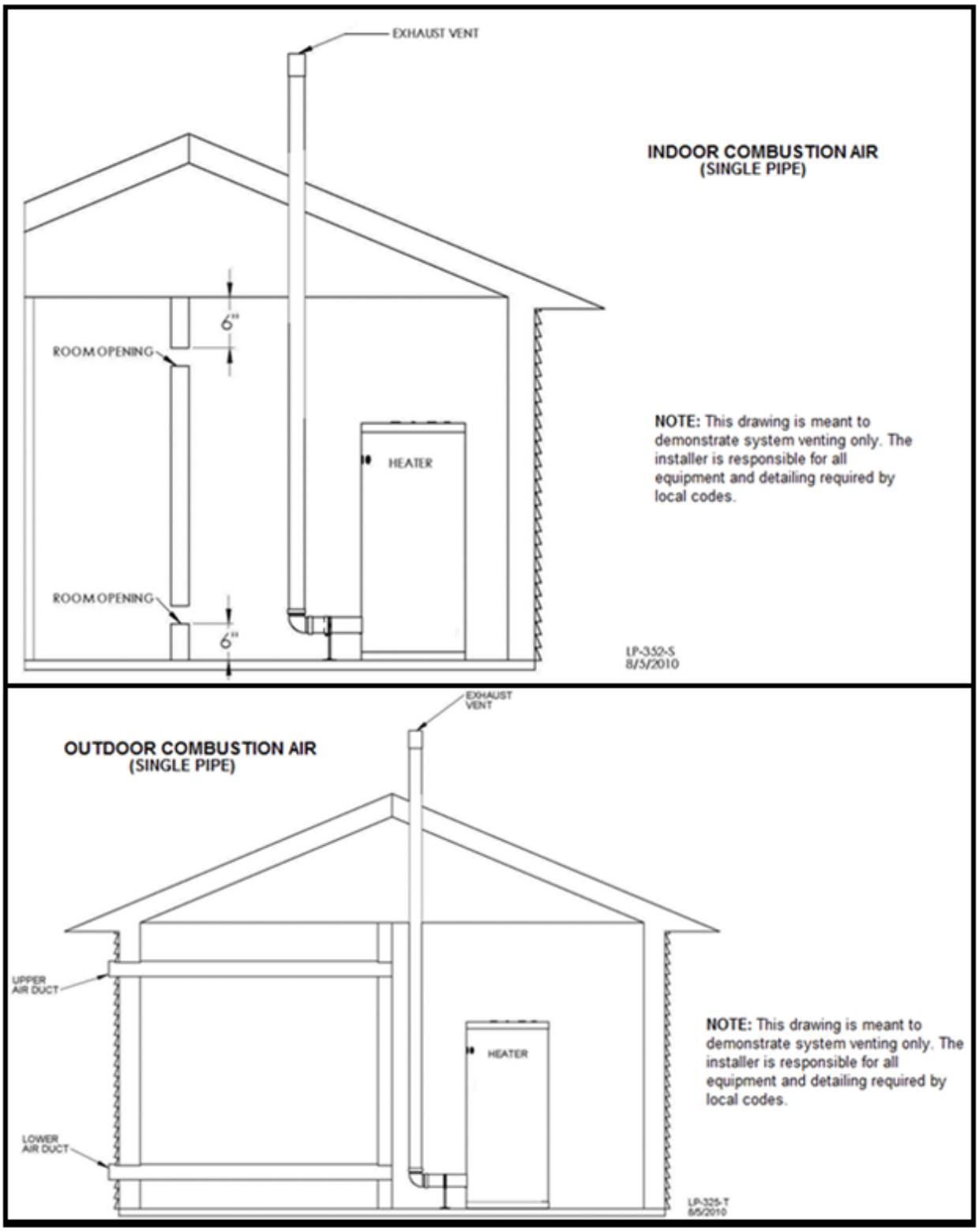

EXHAUST VENT
INDOOR COMBUSTION AIR
(SINGLE PIPE)
6"
ROOM OPENING
HEATER
NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.
ROOM OPENING
6"
LP-352-S
8/5/2010
EXHAUST VENT
OUTDOOR COMBUSTION AIR
(SINGLE PIPE)
UPPER AIR DUCT
HEATER
NOTE: This drawing is meant to demonstrate system venting only. The installer is responsible for all equipment and detailing required by local codes.
LOWER AIR DUCT
LP-325-T
8/5/2010

Figure 25

H. CONDENSATE REMOVAL SYSTEM

This condensing high efficiency appliance has a condensate removal system. Condensate is water vapor derived from combustion products, similar to an automobile when it is initially started. It is very important that the condensate line is sloped down away from the heater and to a suitable drain.

If the heater condensate outlet is lower than the drain, you must use a condensate removal pump (kit p/n 554200 available from HTP). If required by local authorities, a condensate filter of lime crystals, marble, or phosphate chips will neutralize slightly acidic condensate. This can be installed in the field and purchased from HTP (p/n 7450P-212).

Plastic pipe must be the only material used for the condensate line. Steel, brass, copper or other materials will be subject to corrosion or deterioration. A second vent may be necessary to prevent a condensate line vacuum lock if a long horizontal run is used. An increase in condensate line diameter may be necessary to allow condensate to drain properly. Support of the condensate line may be necessary to avoid blockage of the condensate flow.

CAUTION

The condensate line must remain unobstructed. If allowed to freeze in the line or obstructed in any other manner, condensate can exit from the water heater tee, resulting in potential water damage to property.

When installing a condensate pump, select one approved for use with condensing heaters and furnaces. The condensate pump should have an overflow switch to prevent property damage from spillage.

Condensate from the heater will be slightly acidic (pH from 3.2 to 4.5). Install a neutralizing filter if required by local codes.

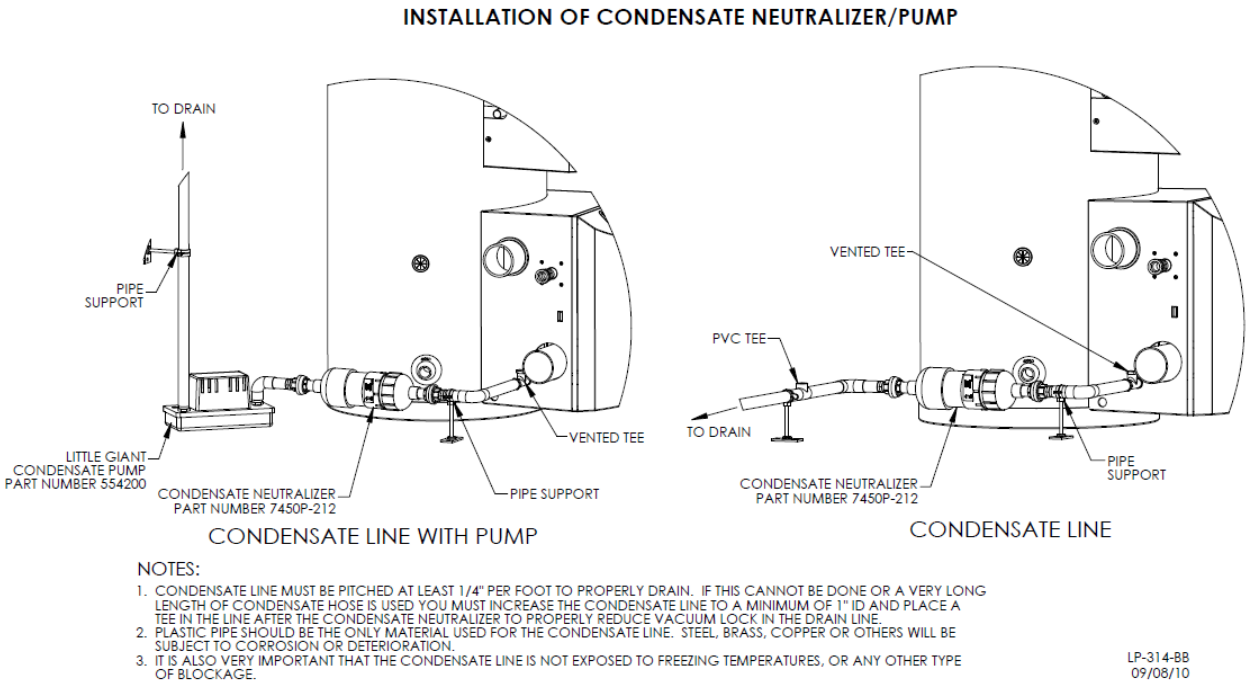


Figure 26

PART 9: CONTROL OVERVIEW

The control monitors the safety sensors of the heater to assure safe and efficient operation. It has many features to address configurations associated with hydronic design.

This section addresses the programming features of the control. It is important to fully understand its capabilities. This section addresses the adjustment of Heater Settings / System Settings / Maintenance Settings and System Diagnostics to help customize your control. However, the control is programmed with factory defaults that may already fit your hydronic design and may not require any adjustment at all.

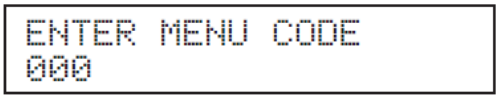
A. NAVIGATION OF THE DISPLAY

The display includes a two-line backlit LCD readout that provides informative messages about heater operation. Many operating parameters can be viewed and adjusted by using the six buttons on the display. The function of each button is described below.

RESET – The RESET button has two functions:

- Reset any lockout error code.
- Return the user to the default display screen.

ENTER – The ENTER key is used to enter the parameter programming mode. To enter this mode, hold down the ENTER key for more than 4 seconds. The readout will change to:



One of the zeroes will be blinking. Use the ▲▼ arrow keys to change the blinking digit to the correct value. Use the ◄ ► arrow keys to select the next digit to change and again use the ▲▼ keys to change the value. Repeat until the correct code is entered. Press the **ENTER** key to accept the code. If the code is correct, the readout will change to the appropriate screen. If the programming code is not accepted the readout will continue to display as shown above.

The **ENTER** key is also used to enable a parameter for editing. After navigating to the desired parameter, hold down the **ENTER** key for one second. When the **ENTER** key is released, the parameter value will begin to blink. The parameter can now be changed using the ▲▼ keys. After the new value is selected, presses the **ENTER** key for 1 second to lock in the new parameter value. The value will then stop blinking.

ARROW Keys – The right and left arrow keys (◄ ►) are used to navigate between the default Display and Status Display. The ◄ ► keys are also used in programming modes to change between programmable parameters. It is recommended you use the Menu Maps in the back of this manual and the detailed menu instructions printed in this section to help in menu navigation.

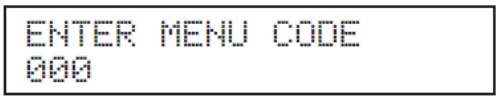
ARROW Keys – The up and down (▲▼) arrow keys are used to navigate between the various parameters displayed in the menu. After the parameter is enabled for editing by pushing the **ENTER** key, the ▲▼ keys are used to adjust the parameter upward or downward to the desired value.

B. PROGRAMMING THE CONTROL

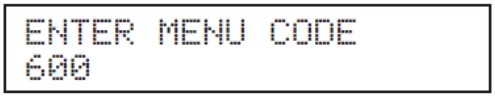
Program Access

Note: Programming the control is not possible when the heater is firing. Make sure any input (such as the thermostat) is turned off, so the heater will remain idle and allow programming.

To access the **Program**, the user will need to press the **ENTER** key for 4 seconds until the display shows the following:

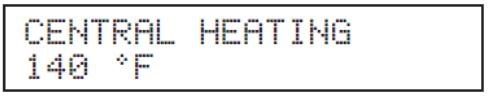


Use the arrow keys on the display to log in **Access Code "600"**. To confirm the code, press **ENTER** to access the **Program** navigation menu.

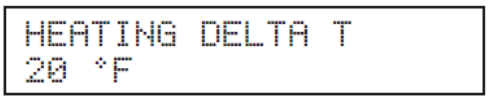


C. APPLIANCE SETTING PROGRAM NAVIGATION MENU

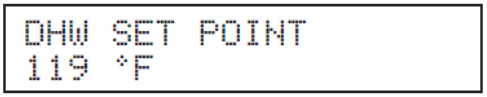
Once the code is confirmed, the user can now start to set the **Appliance Settings**. Use the arrow keys on the display to navigate through the **Appliance Setting Program**. To change a setting, press **ENTER**. Appliance settings can be increased by pressing ▲ and decreased by pressing ▼ on the display. Listed below are the appliance settings that can be programmed into the control. The first three are the most important to program correctly in order for the total system control to operate the appliance at optimum efficiency.



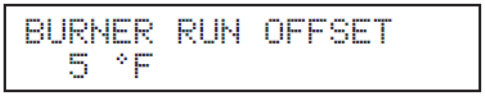
Function: Allows the user to adjust the central heating designed supply set point from 50^{o}F to 170^{o}F (Factory default 140^{o}F).



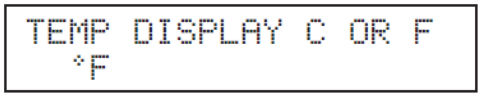
Function: Allows the user to adjust the heating system designed delta T set point from 5^{o}F to 30^{o}F (Factory default 20^{o}F).



Function: Allows the user to adjust the DHW set point from 95^{o}F to 180^{o}F (Factory default 119^{o}F). NOTE: The appliance is supplied with a thermostatic mixing valve that must be installed on to the domestic hot water system. Any changes in this set point will also require adjustment to the mixing valve. Please refer to the mixing valve section in Piping, Part 4, for further setup and operation details.



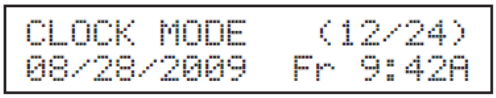
Function: Allows the user to adjust the degree offset from the current target tank temperature where the burner will ignite 1^{o}F to 18^{o}F (Factory default 5^{o}F).



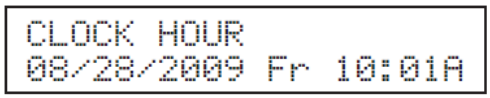
Function: Allows the user to adjust the temperature measurement to either Fahrenheit or Celsius (Factory default is F = Fahrenheit).

Clock Settings

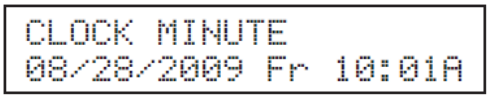
(Note: The clock will reset if the boiler is powered off for more than a week.)



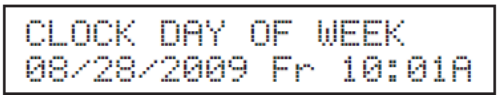
Function: Changes the clock from 12 hour mode (8:45 PM) to 24 hour mode (20:45). To change to 24 hour mode when this screen is displayed, press the **ENTER** key. The letter (A or P) after the time will blink. Press ▲ or ▼ once and the letter will disappear. Press the **ENTER** key to save the new setting.



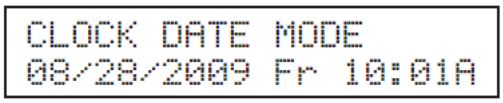
Function: Allows the user to adjust the hour setting.



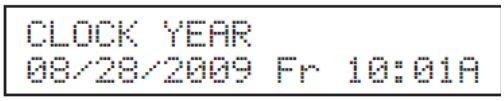
Function: Allows the user to adjust the minute setting.



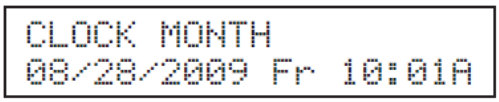
Function: Allows the user to adjust the day of week displayed.



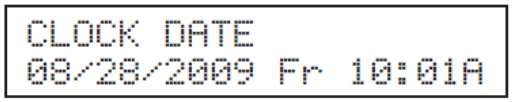
Function: Allows the user to switch to European date format (2009/08/28) from US format (08/28/2009).



Function: Allows the user to adjust the year setting.



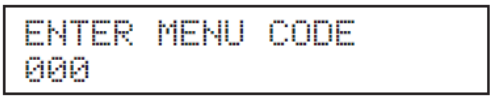
Function: Allows the user to adjust the month setting.



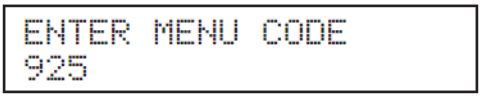
D. PROGRAMMING THE SYSTEM SETTING

NOTE: Programming the control is not possible when the unit is firing. Make sure any input (such as the thermostat) is turned off, so the boiler will remain idle to allow programming.

To access the **System Setting Program**, press the **ENTER** Key for 4 seconds until the display shows the following:



Next, use the arrow keys on the display to log in the **System Menu Access Code "925"**. To confirm code, press **ENTER** to access System Setting Program Navigation menu.

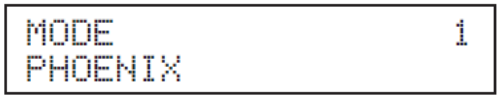


E. SYSTEM SETTING PROGRAM NAVIGATION

Once the **System Menu Access Code** is confirmed, the user can start to set the System Parameters Menu. Use the arrow keys on the display to navigate through the different program settings. To change an appliance setting, press **ENTER**. Increase system settings by pressing ▲ and decrease by pressing ▼ on the display.

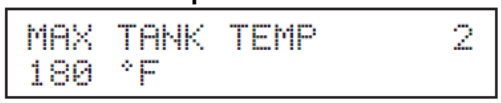
Listed below are the system settings that can be programmed into the control.

Function 1 **Factory Program Mode**



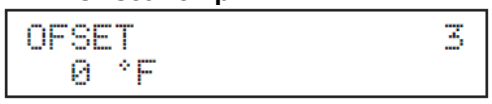
This screen indicates that the control is configured correctly. Do not change this screen.

Function 2 **Max Tank Temp**



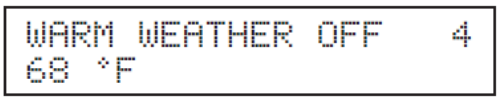
Description: Sets the overall tank temperature maximum limit. Factory default 180°F (Range 95°F to 185°F).

Function 3 **DHW Offset Temp**



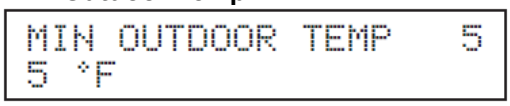
Description: Not Used.

Function 4 **Warm Weather Shutoff**



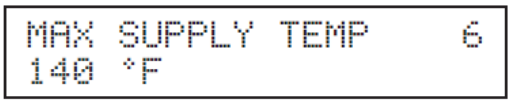
Description: Warm Weather Shutoff disables the heating module and the Total System Control will then optimize for domestic hot water only. Warm Weather Shutoff will occur if the programmed outdoor temperature is exceeded by the current outdoor sensor temperature. Factory default 68°F (Range 41°F to 122°F).

Function 5 **Min Outdoor Temp**



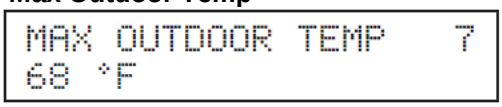
Description: Allows the user to set the minimum outdoor design temperature for the system. Factory default 5°F (Range -49°F to 122°F).

Function 6 **Max Supply Temp**



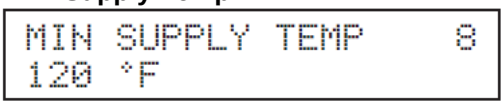
Description: Allows the user to set the maximum design supply temperature based on the minimum outdoor design temperature. Factory default 140°F (Range 77°F to 170°F).

Function 7 **Max Outdoor Temp**



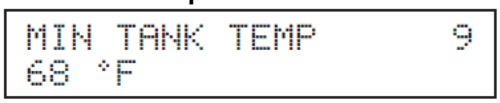
Description: Allows the user to set the maximum outdoor design temperature for the system. Factory default 68°F (Range 32°F to 95°F).

Function 8 **Min Supply Temp**



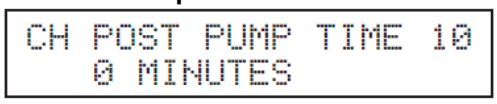
Description: Allows the user to set the design supply water temperature based on the maximum outdoor design temperature. Factory default 120°F (Range 32°F to 200°F).

Function 9 **Min Tank Temp**



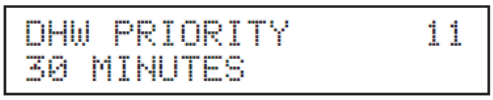
Description: Allows the user to set the minimum tank temperature. Factory default 68°F (Range 32°F to 200°F).

Function 10 **CH Post Pump Time**



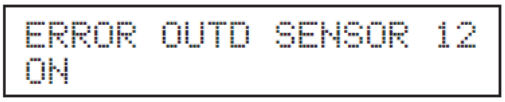
Description: Allows the user to set the central heating pump post purge time once the thermostat is satisfied. Factory default 0 minutes (Range 0 to 10 minutes).

Function 11 **DHW Priority**



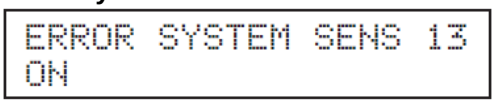
Description: Allows the user to set DHW priority time, which is the amount of time to shut down the hydronic heating module when the system control senses a large domestic hot water usage. Factory default 30 minutes (Range 0 to 60 minutes).

Function 12 **Error Outdoor Sensor**



Description: Allows the user to set the control to display an error message if an outdoor sensor is open or shorted. NOTE: This error does not stop the appliance from running. Factory default ON (Selection ON/OFF/PHOEN ON).

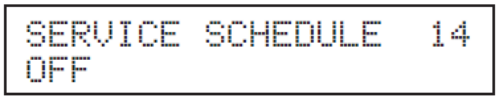
Function 13 **Error System Sensor**



Description: Allows the user to set the control to display an error message if the system sensor is open or shorted. NOTE: This error does not stop the appliance from running. Factory default ON (Selection ON/OFF).

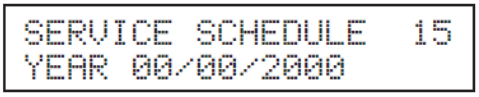
NOTE: Press ENTER to store system parameters.

Function 14 **Service Schedule**



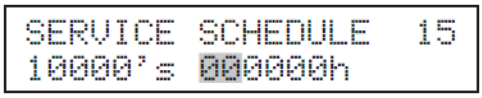
Description: Allows the user to program the heater maintenance schedule by selecting a service date or time based on the heater run hours. Factory default OFF (Selection - Date or Run Hours). NOTE: Without setting this function, Functions 33 through 36 will not display.

Function 15
Year



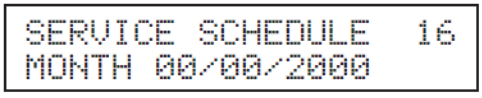
Description: This parameter sets the year of the next service reminder.

Hours

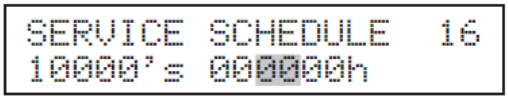


Description: This parameter sets the 2 left digits of the amount of run hours until the next service reminder. If you selected the run hour function, you will need to program 10,000 hours.

Function 16

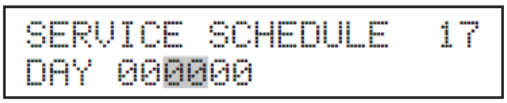


Description: If you selected the date function, you will need to program the month.

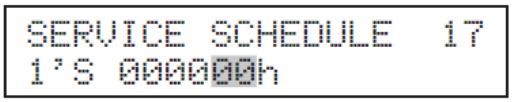


Description: This parameter sets the 2 middle digits of the amount of run hours until the next service reminder.

Function 17

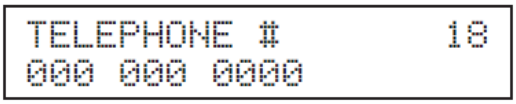


Description: Sets the day in the date function.



Description: Sets the 2 right digits of the amount of run hours until the next service reminder.

Function 18

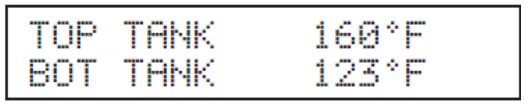


Description: Allows the user to input a telephone number that will be displayed when maintenance is required.

F. CONTROL STATUS MENU

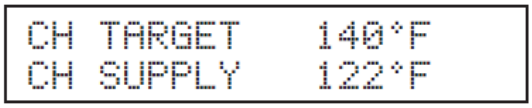
The controller also has the ability to review the status of the system. To access the status screens, simply press the ▶ key. Once the first value is displayed, press the ▲ or ▼ keys to access additional information. At any point you may press **RESET** to exit the Status screen.

Listed below are the Status screens.



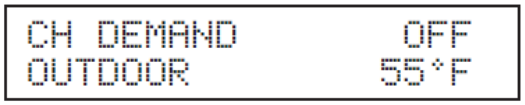
This screen is displayed after pressing the ▶ key as described above. This screen displays the actual temperature that the top and bottom tank sensors are measuring.

Press the ▼ key once.



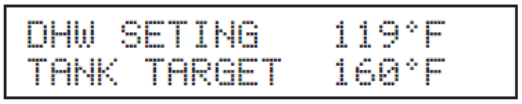
This screen displays the current central heating temperature set point on the top line. NOTE: If an outdoor sensor is used, this temperature set point may vary from what was set in the Appliance Settings Screen. The bottom line is the actual temperature measured by the hydronic heating module supply sensor.

Press the ▼ key once.



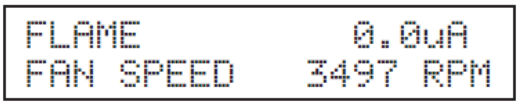
The top line of this screen displays the current status of the central heating demand. The bottom line displays the temperature measured by the outdoor sensor (when used). If there is no outdoor sensor connected to the appliance, the display will read “OFF” if the contacts are jumped. This line will display “ON” in place of the temperature. NOTE: To ensure a properly installed sensor, be sure that this temperature reading is similar to the current outdoor conditions.

Press the ▼ key once.



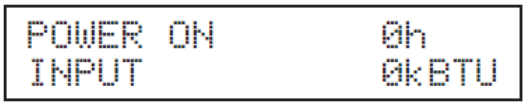
The top line of this screen displays the current domestic hot water temperature set point entered in the Appliance Settings. The bottom line displays the current tank target temperature. NOTE: This target tank temperature set point will vary due to the total system control that is based on environment and system conditions.

Press the ▼ key once.



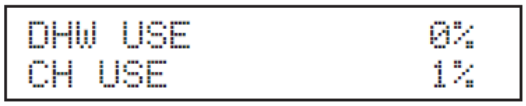
The top line displays the boiler flame current. The bottom line displays appliance fan speed.

Press the ▼ key once.



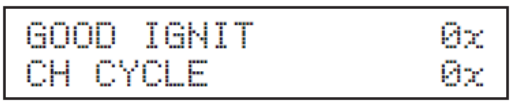
The top line indicates the amount of hours the appliance has power applied to its lifetime. The bottom line indicates how much energy input (in thousand BTU) from the burner into the storage tank.

Press the ▼ key once.



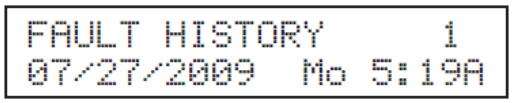
The top line of this display indicates the percentage of energy used for domestic hot water over the appliance lifetime. The bottom line indicates the percentage of energy used for central heating over the appliance lifetime.

Press the ▼ key once.



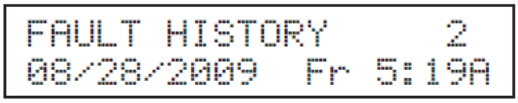
The top line of this display indicates the number of times the burner has turned on over the appliance lifetime. The bottom line indicates the number of times the heating module has cycled for central heating demand.

Press the ▼ key once.



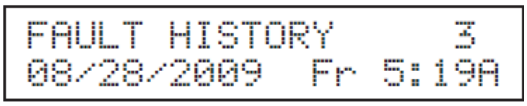
This screen displays the last lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

Press the ▼ key once.



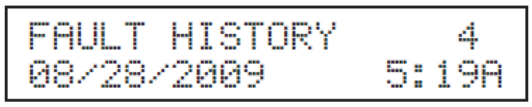
This screen displays the second oldest lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

Press the ▼ key once.



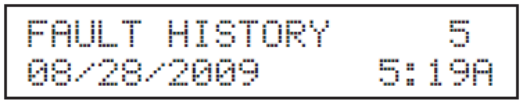
This screen displays the third oldest lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

Press the ▼ key once.



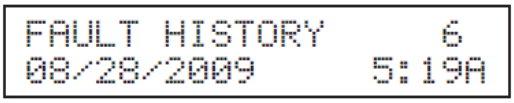
This screen displays the fourth oldest lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

Press the ▼ key once.



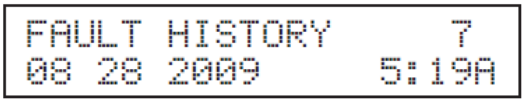
This screen displays the fifth oldest lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

Press the ▼ key once.



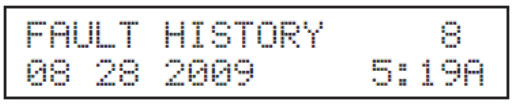
This screen displays the sixth oldest lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

Press the ▼ key once.



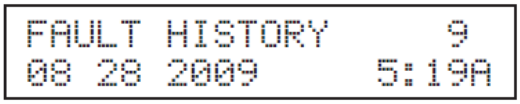
This screen displays the seventh oldest lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

Press the ▼ key once.



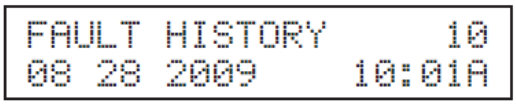
This screen displays the eighth oldest lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

Press the ▼ key once.



This screen displays the ninth oldest lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

Press the ▼ key once.



This screen displays the tenth oldest lockout fault the heater control had. The top line will alternate between the words “FAULT HISTORY” and the fault encountered. The bottom line will display the date and time the fault occurred.

PART 10: START-UP PROCEDURE

To assure that the system is properly installed and designed correctly, it is important that the installer follow the guidelines outline below before applying power to the unit.

FOR YOUR OWN SAFETY READ BEFORE OPERATING

This appliance does not have pilot. It is equipped with an ignition device that automatically lights the burner. Do not try to light the burner by hand.

BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas suppliers' instructions.
- If you cannot reach your gas supplier, call the fire department.

Turn off gas shutoff valve (located inside of the cabinet) so that the handle is aligned with the gas pipe. If the handle will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

The heater shall be installed so the gas ignition system components are protected from water (dripping, spraying, rain, etc.) during appliance operation and service (circulator replacement, condensate trap, control replacement, etc.).

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

A. FILL AND PURGE DHW

The power must remain off until the potable water side of the heater is fully purged of air. To purge the tank, turn on the cold water feed and open a faucet at the highest point of the system. Observe filling of the tank and inspect for any leaks in the system which may occur and need to be repaired. Shut off faucet once all evidence of air is purged from the water stream.

B. FILL AND PURGE HYDRONIC HEATING LOOP

Freeze Protection (When Used)

⚠ WARNING

Never use automotive or standard glycol antifreeze, or ethylene glycol made for hydronic systems. Use only freeze-prevention fluids certified by fluid manufacturer as specified for use with stainless steel hydronic heating module heat exchanger and verified in fluid manufacturer's literature.

Thoroughly clean and flush any system that has used glycol before connecting to the stainless steel hydronic heating module heat exchanger. Provide MSDS material data safety sheet on fluid used to owner.

1. Local codes may require back flow preventer or actual disconnect from city water supply.

2. The power must remain off until the hydronic heating loop is fully purged of air.

3. Determine freeze protection fluid quantity using total system water content of 1/2 gallon. Remember to include expansion tank water content and follow fluid manufacturer's instructions.

4. When using freeze protection fluid with automatic fill, install a water meter to monitor water make-up. Freeze protection fluid may leak before the water begins to leak, causing concentration to drop, reducing the freeze protection level.

5. Close manual any automatic air vents and any drain valves in the hydronic system loop.

6. Fill the system to correct pressure after ensuring the water quality meets the water quality standards outlined within this manual (See Part 3, Section H). The correct pressure will vary with each application.

a. Typical system pressure is 15 PSI.

b. Pressure will rise when the hydronic module starts to heat from the heated water from the domestic side of the system. Operating pressure must never exceed the relief valve pressure setting of 30 psi.

c. At initial fill and during start-up and testing, check system thoroughly for any leaks. Repair all leaks before proceeding further.

CAUTION

Eliminate all system leaks. Continual fresh make-up water will reduce the hydronic heating module heat exchanger ability to effectively transfer heat and reduce performance.

7. The system may have residual substances that could affect water chemistry. After the system has been filled and leak tested, verify that water pH and chlorine concentrations are acceptable by sample testing.

CAUTION

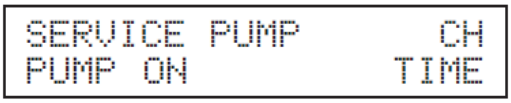
It is important that you purge the system of air to avoid damage to the modulating pump.

C. PURGE AIR FROM HYDRONIC HEATING MODULE

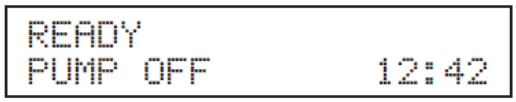
a. Connect to a purge and drain valve location (shown in piping details) and route hose to an area where water can drain and be seen.
b. Close the ball valves below the purge and drain valve.
c. Close zone isolation valves.
d. Open quick-fill valve on make-up water line.
e. Open purge valve.
f. Open the isolation valves one zone at a time. Allow water to run through the zone and push out air. Run until no noticeable air flow is present. Close the zone isolation valves and proceed with the next zone. Follow this procedure until all zones are purged.
g. Close the quick-fill valve and purge valve and remove the hose. Open all isolation valves. Watch the system pressure rise to correct cold-fill pressure. It is recommended that you put the pumps into manual operation to assist in purging the circuits.

D. HEATER PUMP CONTROL TO ASSIST IN PURGING AIR FROM SYSTEM LOOPS

Before powering up the control assure the thermostat connection is disconnected on the field connection board. Apply power to the appliance (Note: The appliance will fire the burner and heat the water inside the storage tank to the domestic hot water temperature set point). Press ▶. The display can show the temperature set point of the appliance. Press the ▼ and **ENTER** keys simultaneously and hold for 1 second. The display will read:



The central heating pump will come on. Run pump until all the air has been purged through each circuit. If you press the ▼▲ keys simultaneously, the central heating pump will shut off. The display will read:



Once the system has been purged of air, the installer can now proceed to program the control and system design parameters.

E. PROGRAMMING THE TOTAL SYSTEM CONTROL

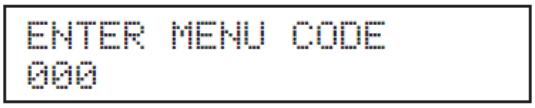
Before programming the Total System Control to the specific needs of the system, verify that the system is ready for operation. Be certain that:

- The Domestic Hot Water system is filled with water that meets the qualifications and all air is purged.
- The mixing valve supplied is properly installed.
- The Hydronic Heating System is filled with water and meets all qualifications and all air is purged.
- The outdoor reset sensor is installed in a proper location.
- The electrical power supply is installed by a licensed professional.
- Turn down thermostats, making sure that they are set so there is no call for heat while programming.

This section discusses how to program a few of the major sections of the control parameters for optimum system performance. See the control overview section for more detailed information on the operation of the display and other parameters.

1. Turn on the main power switch on the top right of the burner cabinet. NOTE: At first startup, the water in the tank is cold and the burner will ignite. This is normal operation. You can continue to adjust settings while the burner is running.

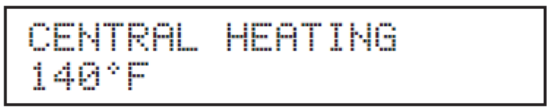
2. Press and hold **ENTER** for 4 seconds until you see the screen to enter the log in access code shown below.



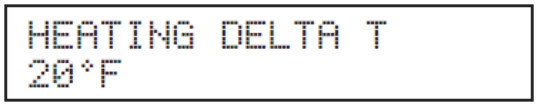
3. Use the ◀ key to move the blinking zero to the left most zero. Next, use ▲ and ▼ to log in 600, the access code. Press **ENTER** confirm the code and access Appliance Setting Program Navigation menu.

4. Once the code is confirmed, you can begin to set the Appliance Settings. Use the arrow keys to navigate. To change a setting, press **ENTER**. Appliance settings can be increased by pressing ▲ and decreased by pressing ▼ on the display. Once a new value has been selected, press **ENTER** to store the new value.

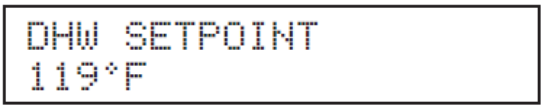
5. The first screen is the “Central Heating” value. Enter the value for your designed hydronic heating supply temperature. The factory default is 140^{o}F. NOTE: Values are determined based on program settings.



6. After you have entered and stored the “Central Heating” value, press ▶ once. The second screen adjusts the heating system “Heating Delta T” value. The factory default is 20^{o}F.



7. After you have entered and stored the “Heating Delta T” value, press ▶ once. The third screen adjusts the “DHW Set Point”. Adjust the value to the desired Domestic Hot Water temperature. The factory default is 119^{o}F. IMPORTANT NOTE: This value sets the tank temperature when the appliance is in warm weather shutdown. A mixing valve must be properly installed and adjusted to a proper outlet value for safe operation.



8. After you have entered and stored the “DHW Set Point” value, press **RESET** to return to the home screen on the display. This completes the essential programming in Appliance Setting Programs. If other values need to be changed in this section, such as the display time, refer to Control Overview, Part 9.

9. A proper outdoor reset curve should be set to further optimize system performance and efficiency. Figure 27 shows how each function will affect system performance. The values in Figure 27 show the system default.

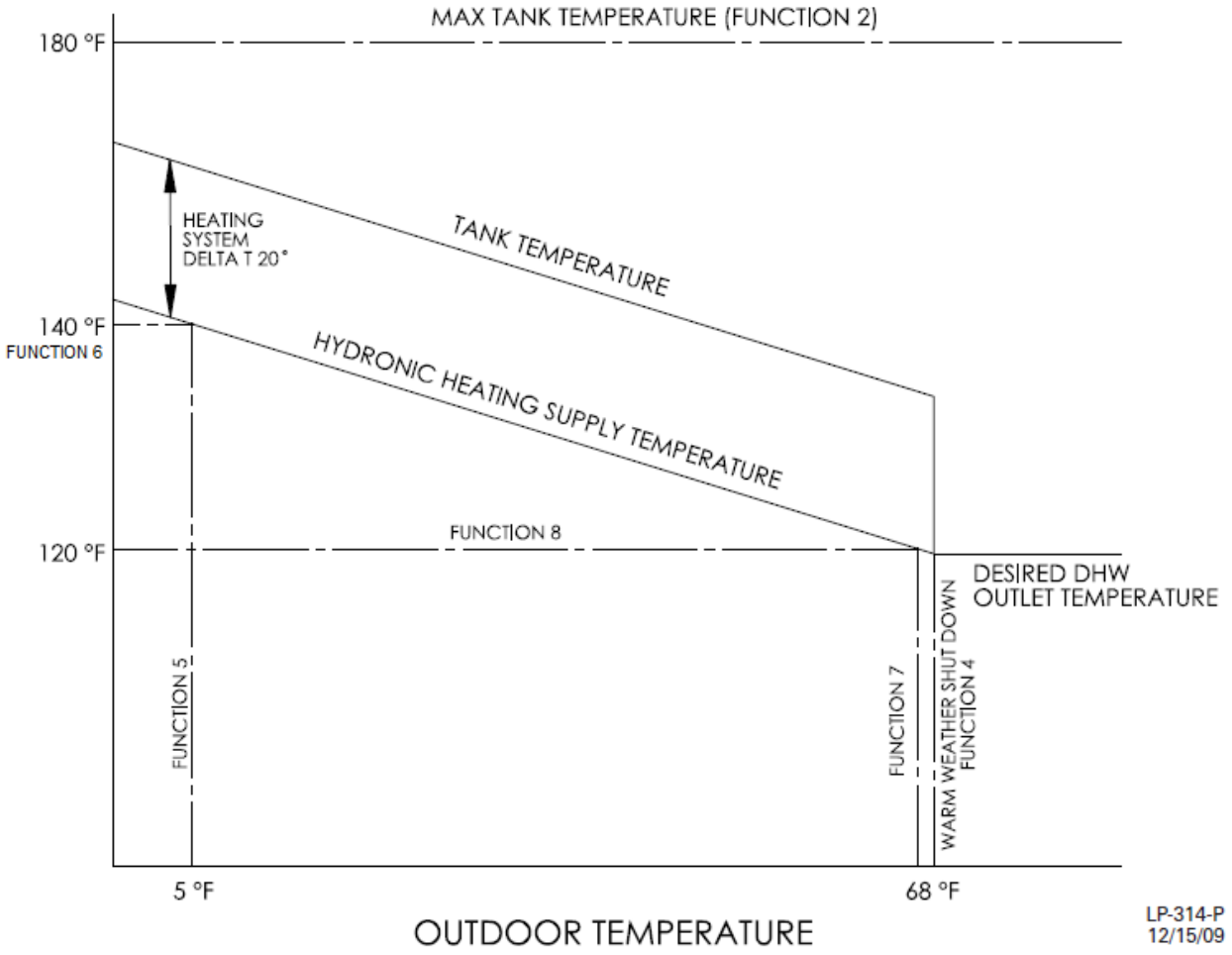
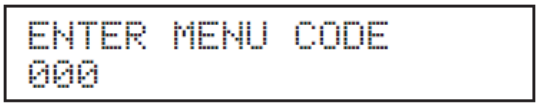


Figure 27

10. Press and hold **ENTER** for 4 seconds until you see the screen to log in the access code.



11. Use the ◀ and ▶ arrow keys to move the blinking zero to the left and right. Next, use the ▲ and ▼ arrow keys on to log in the access code of 925. Press **ENTER** to access the **System Setting Program Navigation** menu. Once the code is confirmed, you can set the **System Settings**. Use ◀ and ▶ to navigate through the **System Setting Program**.

12. Press ▶ 3 times to scroll to Function 4 - “WARM WEATHER OFF”. This is the warm weather shutdown. This function determines the outdoor temperature that will turn off the hydronic heating module and operate the appliance only as a water heater for the warmer weather. To adjust this value, press **ENTER** and the factory default of 68°F starts to blink. Use ▲ and ▼ to adjust this value to your system needs. To store the new value press **ENTER**.

13. Next, press ▶ once to scroll to Function 5 - “MIN OUTDOOR TEMP”. This function is the first step to setting the outdoor reset curve. Enter your system’s minimum outdoor temperature value. To adjust the value, press **ENTER** and the factory default of 5 °F starts to blink. Use ▲ and ▼ to adjust to your designed temperature. To store the new value press **ENTER**.

14. Press ▶ once to scroll to Function 6 - “MAX SUPPLY TEMP”. This function is the second step to setting your outdoor reset curve. Enter your system’s hydronic heating module maximum supply temperature value. To adjust the value, press **ENTER** and the factory default of 140 °F will start to blink. Use ▲ and ▼ to adjust to your designed temperature. To store the new value press **ENTER**. NOTE: This should be the same value entered in step 5.

15. Press ▶ once to scroll to Function 7 - “MAX OUTDOOR TEMP”. This function is the third step to setting your outdoor reset curve. Enter your system’s maximum outdoor temperature value. To adjust the value, press **ENTER** and the factory default of 68 °F will start to blink. Use ▲ and ▼ to adjust to your designed temperature. To store the new value press **ENTER**.

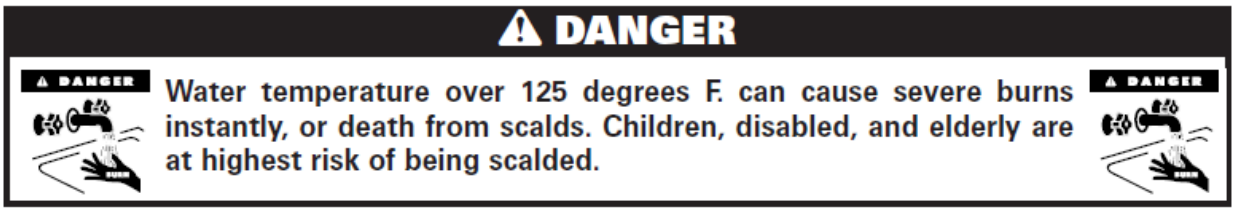
16. Press ▶ once to scroll to Function 8 - “MIN SUPPLY TEMP”. This function is the final step to setting your outdoor reset curve. Enter your system’s hydronic heating module minimum supply temperature value. To adjust the value, press **ENTER** and the factory default of 120 °F will start to blink. Use ▲ and ▼ to adjust to your designed temperature. To store the new value press **ENTER**.

17. The major Total System Control values are now programmed. Press **RESET** to return to the main screen. To adjust other system values, refer to Control Overview, Part 9.

18. Insure that there is no air lock or blockage in the tank side loop of the hydronic heating module. To do this, press and hold ▼ and **ENTER**. This will bring you into the pump service mode. Press ▲ 3 times until “SERVICE PUMP RS 5” is on the screen. This puts the hydronic heating module pump at 5 volts (50%). Press ▶ until the value is increased to 10, putting the pump at full speed. Once flow is confirmed, press ▲ and ▼ at the same time to return you to the main screen.

19. Allow the temperature in the tank to reach its value. Once the tank is up to temperature the burner will shut off.

20. Once the temperature in the tank is up to its set point, the DHW mixing valve must be set correctly. Turn on the hot water faucet at a nearby source. Use a temperature measuring device to measure the water temperature. DO NOT USE YOUR HANDS! Any skin contact at this point could cause serious injury. Adjust mixing valve to desired hot water outlet following Mixing Valve Instructions in Part 4.



21. Once a safe DHW outlet temperature is set with the supplied mixing valve, the system is ready to run. Adjust thermostats to the desired value. Total System Control will now modulate and control the system.

PART 11: SHUTDOWN AND MAINTENANCE

A. SHUTDOWN PROCEDURE

If the burner is operating, lower the set point value to 70^{o}F and wait for the burner to shut off. Then, wait for the combustion blower to stop so all latent combustion gases are purged from the system. This should take 40 to 90 seconds. After the combustion blower and burner have stopped operating, disconnect the electrical supply.

B. VACATION PROCEDURE

If there is danger of freezing, change the set point to 70°F. DO NOT turn off electrical power! If there is no danger of freezing, follow Shutdown Procedure, Part 11, Section A.

C. MAINTENANCE

CAUTION

In unusually dirty or dusty conditions, care must be taken to keep appliance burner and door in place at all times. Failure to do so VOIDS WARRANTY!

The appliance requires minimal periodic maintenance under normal conditions. However, in unusually dirty or dusty conditions, periodic vacuuming of the cover to maintain visibility of the display and indicators is recommended.

D. FAILURE TO OPERATE

Should the burner fail to light, the control will perform two more ignition trials prior to entering a lockout state. Note that each subsequent ignition trial will not occur immediately. After a failed ignition trial, the blower must run for approximately 10 seconds to purge the system. Therefore, a time period of approximately 40 to 90 seconds will expire between each ignition trial. If the burner lights during any one of these three ignition trials, normal operation will resume. If the burner lights, and goes off in about 4 seconds, check the polarity of the wiring. See Electrical Connection Section in Part 6.

If the burner does not light after the third ignition trial, the control will enter a lockout state. This lockout indicates that a problem exists with the appliance, the controls, or the gas supply. Under such circumstances, a qualified service technician should be contacted immediately to properly service the appliance and correct the problem. If a technician is not available, pressing **RESET** once will remove the lockout state so additional trials for ignition can be performed.

PART 12: TROUBLESHOOTING

A. APPLIANCE ERROR CODE

If any of the sensors detect an abnormal condition or an internal component fails during the operation of the appliance, the display may show an error message and error code. This message and code may be the result of a temporary condition, in which case the display will revert to its normal readout when the condition is corrected.

However, it may also be the result of a condition that the controller has evaluated as not safe to restart the water heater. In this case, the boiler control will be locked out, the red FAULT light will be lit steadily, and the message “LOCKOUT” will be displayed on the readout on the lower line. The appliance will not start until a qualified technician has repaired the fault and pressed the **RESET** button for more than 1 second. If there is an error message displayed on the readout and the message “LOCKOUT” is not displayed and the FAULT light is not lit, then the message is the result of a temporary condition and will disappear when the problem corrects itself.

IMPORTANT NOTE: If you see error messages on your display readout, call a technician immediately since the message may indicate that more serious problems will occur soon.

B. APPLIANCE ERROR

When an error condition occurs, the controller will display a description and code on the display readout. These error messages and their recommended corrective actions are described in Section D, Appliance Control Fault Codes.

C. APPLIANCE FAULT

1. When a fault condition occurs, the controller will illuminate the red FAULT light and display a fault message in the display. The alarm output will also be activated. Most fault conditions also cause the CH pump to run in an attempt to cool the heater.

2. Note the fault message that is displayed and refer to the Fault Code section for an explanation of the fault message, along with several suggestions for corrective actions.

3. Press **RESET** to clear the fault and resume operation. Be sure to observe the operation of the unit for a period of time to assure correct operation and no recurrence of the fault message.

D. APPLIANCE CONTROL FAULT CODES

⚠ WARNING

When servicing or replacing any components of this appliance, be certain that:

- **The gas is off.**
- **All electrical power is disconnected.**

⚠ DANGER

When servicing or replacing components that are in direct contact with this appliance, be certain that:

- **There is no pressure in the appliance. (Pull the release on the relief valve to relieve pressure.)**
- **Appliance water is not hot.**
- **Electrical power is disconnected.**

⚠ WARNING

Do not use this appliance if any part has been under water. Improper or dangerous operation may result. Contact a qualified service technician immediately to inspect the heater and repair or replace any part of the water heater which has been under water.

⚠ CAUTION

This appliance has wire function labels on all internal wiring. Observe the position of each wire before removing it. Wiring errors may cause improper and dangerous operation. Verify proper operation after servicing.

Resistance Tables

Outdoor Sensor (7250P-319)	
Outside Temperature (°F)	Resistance (ohms)
–22	171800
–13	129800
–4	98930
5	76020
14	58880
23	45950
32	36130
41	28600
50	22800
59	18300
68	14770
77	12000
86	9804
95	8054
104	6652
113	5522

Temperature Sensors UPPER SENSOR 7100P-004 / LOWER SENSOR 7100P-005 / CLIP ON SENSOR 7100P-172	
Water Temperature (°F)	Resistance (ohms)
32	32550
41	25340
50	19870
59	15700
68	12490
77	10000
86	8059
95	6535
104	5330
113	4372
122	3605
131	2989
140	2490
149	2084
158	1753
167	1481
176	1256
185	1070
194	915
203	786
212	667

Table 11

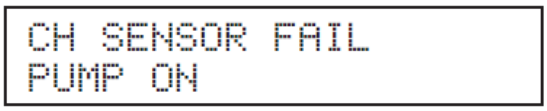
Fault Code FOU

```
OUTDOOR SENSOR    FOU
PUMP ON
```

This display indicates that the outdoor sensor is defective, either shorted or open, or the outdoor temperature is below –40°F. NOTE: The installer must choose YES for Function 12 to enable this feature. The unit will continue to operate when this error is displayed but the control will ignore the outdoor reset feature and run at the programmed temperature. The bottom line of the display will indicate the status of the pump.

Remedy:
Inspect wiring from outside sensor for damage or shorted connections and repair as necessary. Measure resistance of outdoor sensor and compare to resistance chart. If not within range on chart, shorted or open, replace sensor.

Fault Code E07



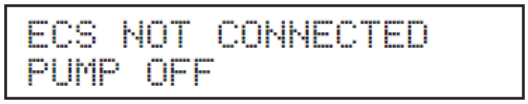
This display indicates that one or both of the clip-on temperature sensors in the hydronic heating module has been disconnected. This error allows the tank portion of the unit to still operate, but will not allow the hydronic heating module to operate until the error is cleared. The error will clear if proper sensor connection is restored. The second line indicates the status of the pump.

Remedy:
1. Go to the STATUS menu screen that displays “CH Supply” on the bottom line. This will help to determine which sensor has the error. If the temperature displayed is a reasonable number, the error will be in the return temperature sensor (Horizontal Pipe). If the temperature displayed is not reasonable, the error will be in the supply sensor (Vertical Pipe).

2. Check the electrical connection to the thermistor on the outlet manifold. Check the wiring harness. If both are connected properly, replace the control. NOTE: Verify the themistor values by referencing the Resistance Tables in Section 12.

3. Replace themistor if necessary.

Fault Code ECS NOT CONNECTED



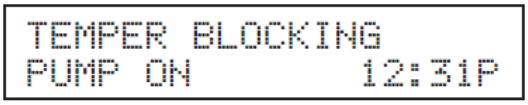
This display indicates that the main control board and the smaller ECS control board are not communicating properly. This error allows the tank portion of the unit to still operate, but will not allow the hydronic heating module to operate until the error is cleared. The second line indicates the status of the pump.

Remedy:
1. Check to make sure both ends of the ribbon cable are connected properly and securely in place.

2. If both ends have a proper connection, check the ribbon cable for damage or wear. If any problems are found, replace the ribbon cable.

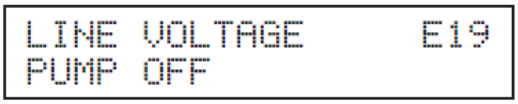
3. If problem still occurs with the new ribbon cable, replace the ECS board.

Fault Code TEMPER BLOCKING



This display indicates a temporary hold on the burner ignition. This situation occurs when the top tank sensor is above the set point and the bottom of the tank is substantially cooler than the top. This is a temporary hold on the burner only and all other functions will remain functioning properly. This error will clear itself when either the top tank temperature drops below the set point or the bottom temperature rises.

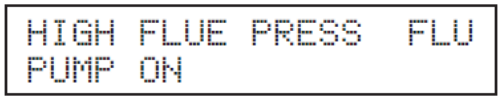
Fault Code E19



This display indicates that the line voltage frequency is out of range. This could happen if the unit is being powered from a small gasoline powered generator that is not functioning correctly or overloaded.

Remedy:
Inspect power wiring to unit and repair as necessary. If connected to line voltage, notify electric utility company. If connected to alternate power source such as generator or inverter, make sure the line voltage frequency supplied by the device is 60 Hz.

Fault Code FLU



This display indicates that there is excessive flue pressure. This code will reset automatically after the high pressure condition is resolved. The second line indicates the status of the pump.

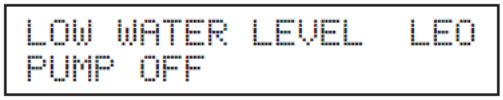
Remedy:
1. Assure that the flue is not blocked.

2. Check the switch wiring by applying a jumper in place of the switch. If the code clears with the jumper in place, REPLACE the flue switch and connect the wires to the new switch BEFORE running unit.

⚠ WARNING

Do not use a jumper to remedy this error. A faulty switch MUST be replaced. Failure to do so could result in serious injury or death.

Fault Code LEO



This display indicates that there is a low water level in the main tank. This code will not allow the unit to run until correct water level is restored. The second line indicates the status of the pump. Note: While the water level is low, the pump will be off.

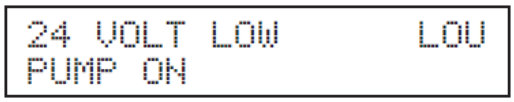
Remedy:
1. Assure that there is adequate pressure and flow from the cold water inlet by slightly opening the drain valve near the tank.

2. Assure that the DHW system has all air removed through a high point hot water source, i.e. sink or shower.

3. Check wiring.

4. Check probes. Replace if necessary.

Fault Code LOU



This display indicates that the 24 volt power supply on the control is damaged or overloaded. This code will reset automatically if it is the result of an overload and that overload condition is removed. The second line indicates the status of the pump. Note: While 24 volt power is low, the pump output will be on.

Remedy:
1. Check line voltage. Must be between 100-128 volts.

2. Disconnect TT wiring. If error clears, there is an issue in the thermostat wiring. Review external wiring.

3. If available, connect PC and use HTP service software to check the 24v supply display in the lower left corner of the screen. The number displayed here must be greater than 128 and should be at least 250. Use this as a troubleshooting guide as you follow the steps below.

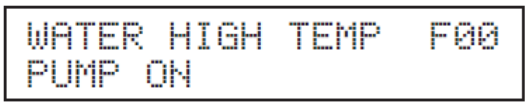
4. Remove 12 pin Molex connector from the field wiring board. If the message clears, then the problem is with external low voltage wiring. Examine the external low voltage sensor wiring for shorts to ground and repair as necessary. If message is still present, disconnect the UL 353 low water cutoff to see if message clears. Replace faulty part. Check low voltage wire harness in boiler for shorts to ground.

5. Remove the 20 pin Molex from the ECS board. If the message clears, examine the wiring to the heating module and fan for shorts or grounds and repair as necessary.

6. If message only occurs when the burner tries to light, check gas valve for excessive current draw.

7. If message is present with the low voltage harness disconnected from the 926 control board, replace the 926 control board.

Fault Code F00



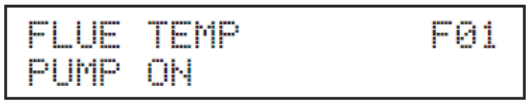
This display indicates that the water in the tank has overheated. This is a serious safety issue, as indicated by the red fault light and the flashing the word LOCKOUT on the display. The unit will not restart until it cools sufficiently and a technician repairs the cause of overheating and resets the unit. During this lockout fault, the pump will be on as indicated on the second line of the display in an effort to cool down the boiler.

Remedy:
1. Check central heating pump operation.

2. If the circulator pump is running, be sure that there is water in the system and that the water is moving through the system as intended. Be sure that all correct ball valves and or zone valves are open or closed as intended.

3. Observe the temperature/pressure gauge. If the water is not hot and this message is displayed, check the wiring to the water eco sensor and repair if necessary. If the wiring is correct, the water is not excessively hot and this code is still present, replace the eco sensor.

Fault Code F01



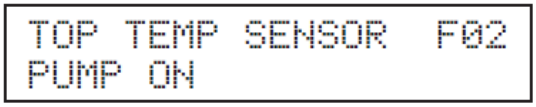
This display indicates that the flue temperature limit switch of the unit has tripped. This is a serious safety issue, as indicated by the red fault light and the word LOCKOUT flashing on the display. The unit will not restart until the flue cools down sufficiently and a technician repairs the cause of the problem and pushes the **RESET** button on both the device and the display. During this lockout fault, the pump will be on as indicated on the second line of the display.

Remedy:
1. Check the flue for obstructions or any sign of damage (especially signs of excessive heat). Repair as necessary.

2. Push the red reset button on the flue temperature switch located on CPVC vent elbow. NOTE: Switch temperature must be less than 90°F to reset.

3. Press **RESET** on the display. Run the unit and check the flue temperature by using an external thermometer in the flue pipe. If the flue temperature is below 190°F and the switch trips, replace the switch. If the flue temperature is excessive, check and adjust the combustion controls on the unit.

Fault Code F02

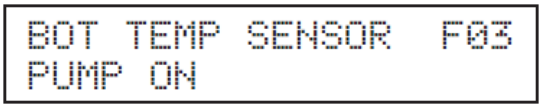


This display indicates that the top temperature sensor of the tank has failed. This code indicates a serious safety issue by the red fault light and the word LOCKOUT flashing on the display. The unit will not restart until a technician replaces the sensor and resets the unit. During this lockout fault, the circulator pump will be on as indicated on the second line of the display.

Remedy:
1. Check the electrical connection to the thermistor on the outlet manifold. Verify 5 VDC by checking in Molex connector. If no 5 VDC, check harness. If harness is OK, replace control. NOTE: Verify thermistor values by referencing chart in this manual.

2. Replace thermistor if necessary.

Fault Code F03

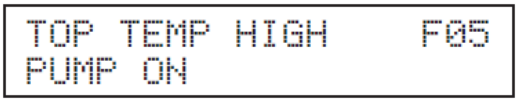


This display indicates that the bottom temperature sensor of the unit has failed. This code indicates a serious safety issue by the red fault light and the word LOCKOUT flashing on the display. The unit will not restart until a technician replaces and resets the unit. During this lockout fault, the pump will be on as indicated on the second line of the display

Remedy:
1. Check the electrical connection to the thermistor. Check the wire harness. If harness is OK, replace control. NOTE: Verify thermistor values by referencing chart in this manual.

2. Replace thermistor if necessary.

Fault Code F05



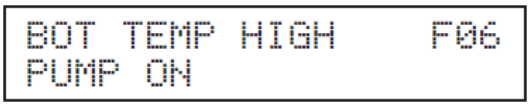
This display indicates that the top temperature of the tank is excessive. If this code is accompanied by the illuminated red fault light and LOCKOUT flashing on the display, then this code indicates that the temperature on the top sensor has exceeded 230°F and a serious safety issue exists. The unit will not restart until a technician repairs the cause of the excessive temperature and resets the unit.

If the red fault light is not illuminated and this message is displayed then the top temperature of the tank is at or above 210°F. The message will clear automatically when the temperature drops below 194°F. While this message or lockout fault is displayed, the pump will be on as indicated on the bottom line.

Remedy:
1. Check the electrical connection to the thermistor on the outlet manifold. Verify 5 VDC by checking in Molex connector. If not 5 VDC, check harness. If harness is OK, replace control. NOTE: Verify thermistor values by referencing the resistance table in Part 12.

2. Replace thermistor if necessary.

Fault Code F06



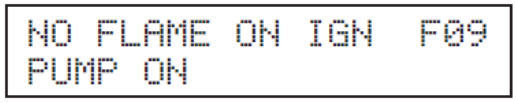
This display indicates that the bottom temperature of the tank is excessive. If this code is accompanied by the illuminated red fault light and LOCKOUT flashing on the display, then the temperature on the bottom sensor has exceeded 230°F and a serious safety issue exists. The boiler will not restart until a technician repairs the cause of the excessive temperature and resets the unit.

If the red fault light is not illuminated and this message is displayed then the bottom temperature of the tank is at or above 210°F. The message will clear automatically when the temperature drops below 194° F. During the time that this message or lockout fault is displayed, the pump will be on as indicated on the bottom line of the display.

Remedy:
1. Check the electrical connection to the thermistor on the outlet manifold. Verify 5 VDC by checking in Molex connector. If not 5 VDC, check harness. If harness is OK, replace control. NOTE: Verify thermistor values by referencing chart in this manual.

2. Replace thermistor if necessary.

Fault Code F09



The unit tried to ignite four times during a call for heat and failed ignition all four times. This code indicates a serious safety issue. The unit will not restart until a technician repairs the cause of no ignition and resets the display. The red fault light and word LOCKOUT will flash on the display. During this lockout fault, the pump will be on as indicated on the bottom line.

Remedy:
1. Watch the igniter through the observation window provided.

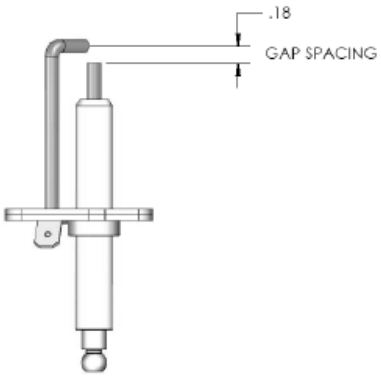
2. If there is no spark, for natural gas units check the spark electrode for the proper gap. Use 2 quarters together as a gauge to check gap spacing (see Figure 28).

3. Remove any corrosion from the spark electrode and flame rectifier probe.

4. If there is a spark but no flame, check the gas supply to the boiler.

5. If there is a flame, check the flame sensor.

6. Check any flue blockage or condensate blocks.

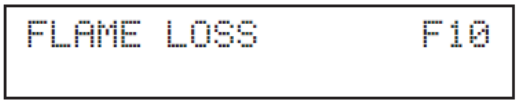


NATURAL GAS SPARK ELECTODE

NOTE: If receiving an F09 fault code, check the gap spacing between points on the electrode.

Figure 28

Fault Code F10



The flame was lost while the unit was lit 3 times during 1 demand call. The red fault light and the word LOCKOUT flashing on the display indicate a serious safety issue. The unit will not restart until the technician repairs the cause of flame loss and resets the unit. During this lockout fault, the pump will be on as indicated on the bottom line of the display.

Remedy:
1. Monitor the gas pressure to the unit while in operation.

2. Assure that the flame is stable when lit.

3. Check to see if the display readout changes from “GAS VALVE ON” to “RUN” within a few seconds after the boiler ignites

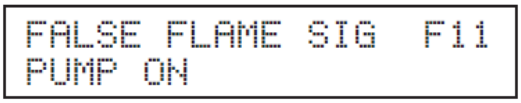
4. Check the FLAME signal on the status display. It should be above 1.0 when the unit is firing.

5. If the signal reads less than 1 microampere, clean the flame rectifier and spark probe.

6. If the problem persists and the ‘FLAME” signal is still less than 1.0, replace the flame probe and spark igniter probe.

7. The flame signal should be steady after the unit has been firing for 1 minute and is normally at 5.0 to 9.0. If the flame signal is not steady, disassemble the burner door and check the burner and its sealing gaskets.

Fault Code F11



There is flame when the control is not telling the unit to run. The red fault light and the word LOCKOUT flashing on the display indicate that this code is serious safety issue. The unit will not restart until a technician repairs the cause of the lockout and resets the unit. During this lockout fault, the pump will be on as indicated on the second line of the display.

Remedy:
1. Look into window. If there is flame, turn the gas off to the unit at the service valve and replace the gas valve.

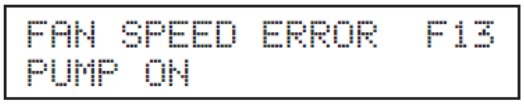
2. If the flame signal on the status menu is greater than 1.0 when the burner is not lit, replace the spark igniter and the flame rectification probe.

3. If the flame signal is not present after turning off the gas supply, check the gas valve electrical connection.

4. Check for condensate backup. Repair the condensate system as necessary. If condensate has partially filled the combustion chamber, the refractory wall may be damaged and should be replaced.

5. Turn the gas on at the service valve after corrective action is taken.

Fault Code F13

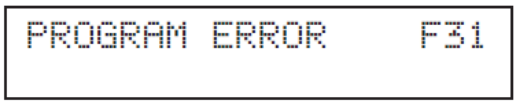


The fan speed had been more than 30% faster or slower than the control commanded speed for more than 10 seconds. The red fault light and flashing LOCKOUT on the display indicates a serious safety issue. The unit will not restart until the technician repairs and resets the unit. During this lockout fault, the pump will be on as indicated on the second line of the display.

Remedy:
1. Check the combustion air fan wiring.

2. Measure the DC voltage from the red fan wire to ground while it is connected to the fan. It should be between 24 to 40 volts. If it is lower than 24 volts, check for excessive external loads connected to the sensor terminals. Disconnect the 5 pin plug from the fan and check the voltage on the red wire again. If it is now between 24-40 volts, replace the fan. If it is still below 24 volts replace the boiler control board.

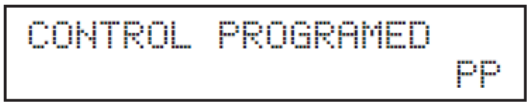
Fault Code F31



There was an error while programming the control. The control's memory could be corrupt. The boiler control will not function in this state and the pump will be off. The only way to recover from this error is to reprogram the control. If this error occurs at any time other than when a technician is servicing the unit, the control has failed and must be replaced.

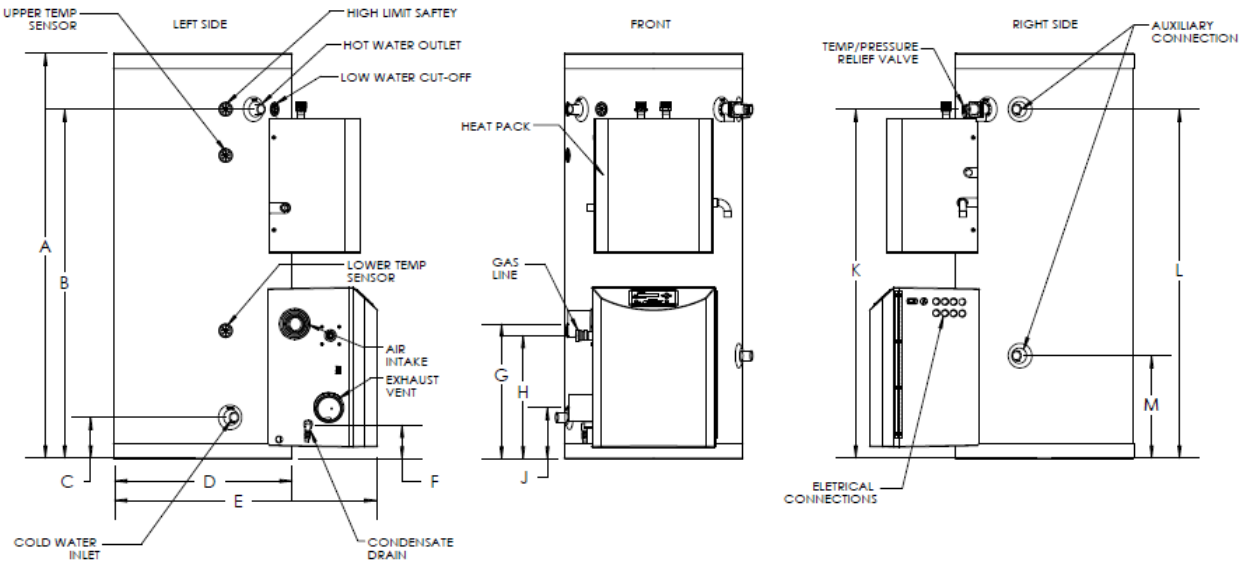
Remedy:
Control must be reprogrammed. If reprogramming does not solve problem, control must be replaced.

Fault Code PP



The control has been programmed by a technician or the factory. After programming, the control was left in a locked out mode. Press **RESET** to begin use of the control.

Remedy:
Press **RESET** for at least one second.



VERSA-HYDRO WATER HEATER DIMENSIONS													
MODEL #*	GALLONS	A	B	C	D	E	F	G	H	J	K	L	M
PHE130-55 / PHE199-55	55	53"	45"	5"	23"	34"	4"	17-1/2"	16"	6-1/2"	45"	45"	13"
PHE130-80 /PHE199-80	80	72"	64-1/2"	5-1/2"	23"	34"	6-1/4"	19-1/2"	18"	8-1/2"	64-1/2"	64-1/2"	13"
PHE130-119 /PHE199-119	119	74"	66"	7-1/4"	27"	37"	7-1/2"	20-1/2"	19"	9-1/2"	66"	66"	14-1/2"

VERSA-HYDRO WATER HEATER SPECIFICATIONS								
MODEL #*	GALLONS	BTU'S	AIR INTAKE/ EXHAUST VENT SIZE	WATER INLET/ OUTLET SIZE	AUXILIARY CONN.	GAS LINE CONN.	SYSTEM RELIEF PIPE SIZE	SHIPPING WEIGHT
PHE130-55 / PHE199-55	55	130,000	2"	1" NPT	1"	3/4"	3/4"	205 LBS.
		199,000	3"					
PHE130-80 / PHE199-80	80	130,000	2"	1" NPT	1"	3/4"	3/4"	265 LBS.
		199,000	3"					
PHE130-119 / PHE199-119	119	130,000	2"	1" NPT	1"	3/4"	3/4"	435 LBS.
		199,000	3"					

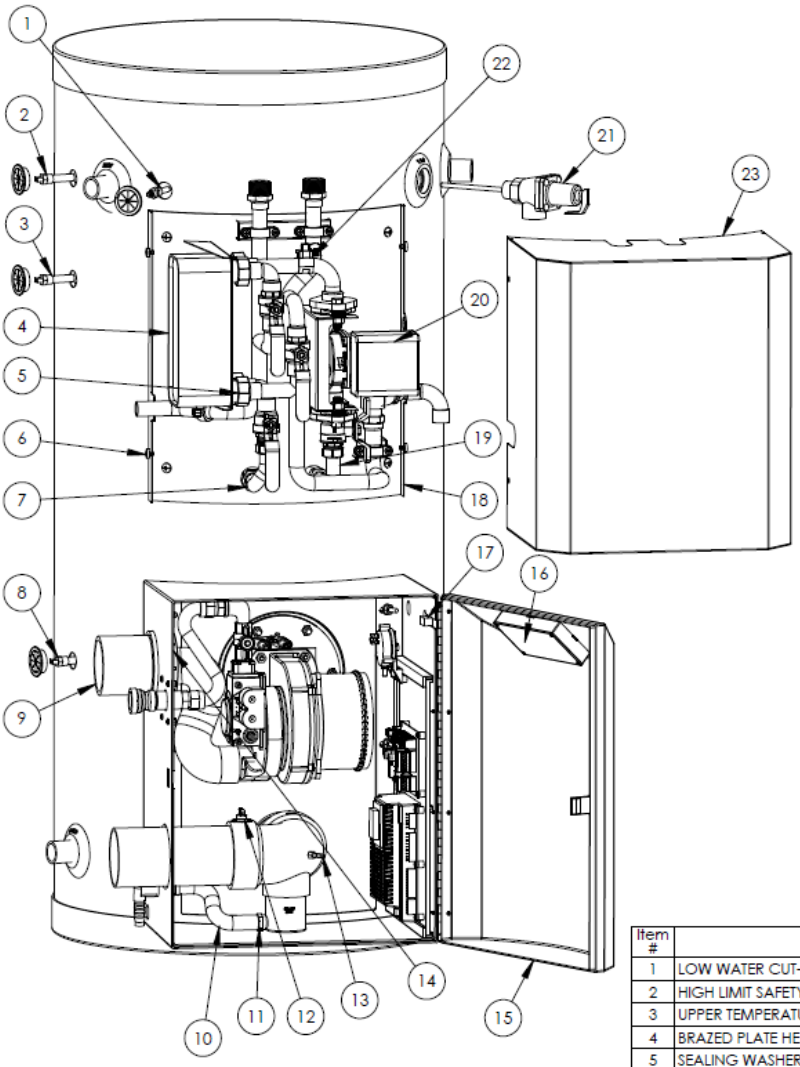
* A Suffix of "N" denotes natural gas and "LP" denotes propane gas

ALL DIMENSIONS ARE APPROXIMATE

LP-314- X
08/31/10

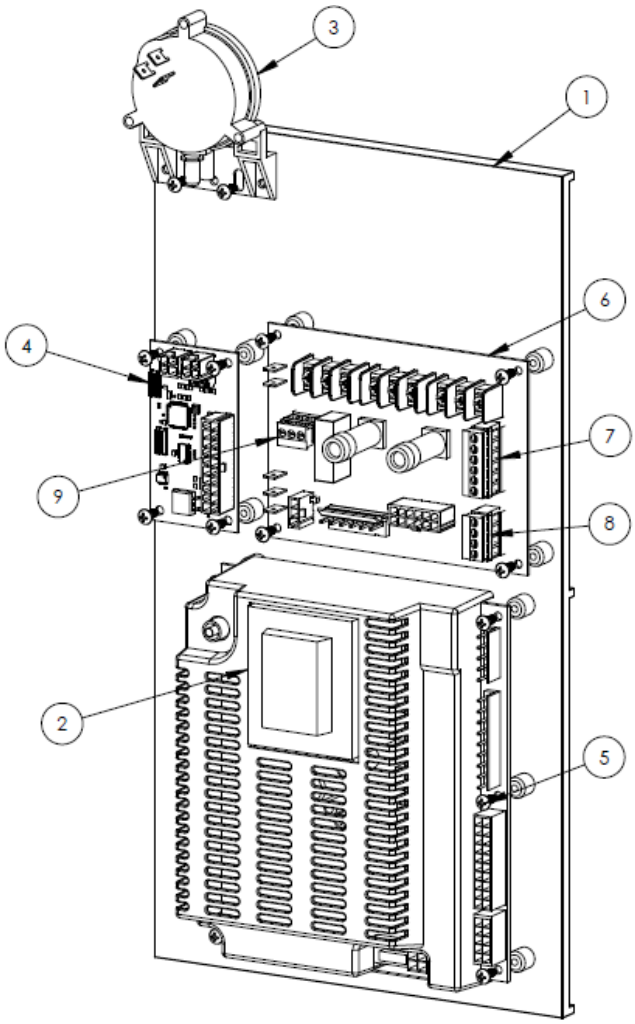
Figure 29

LP-314-K
08/17/10



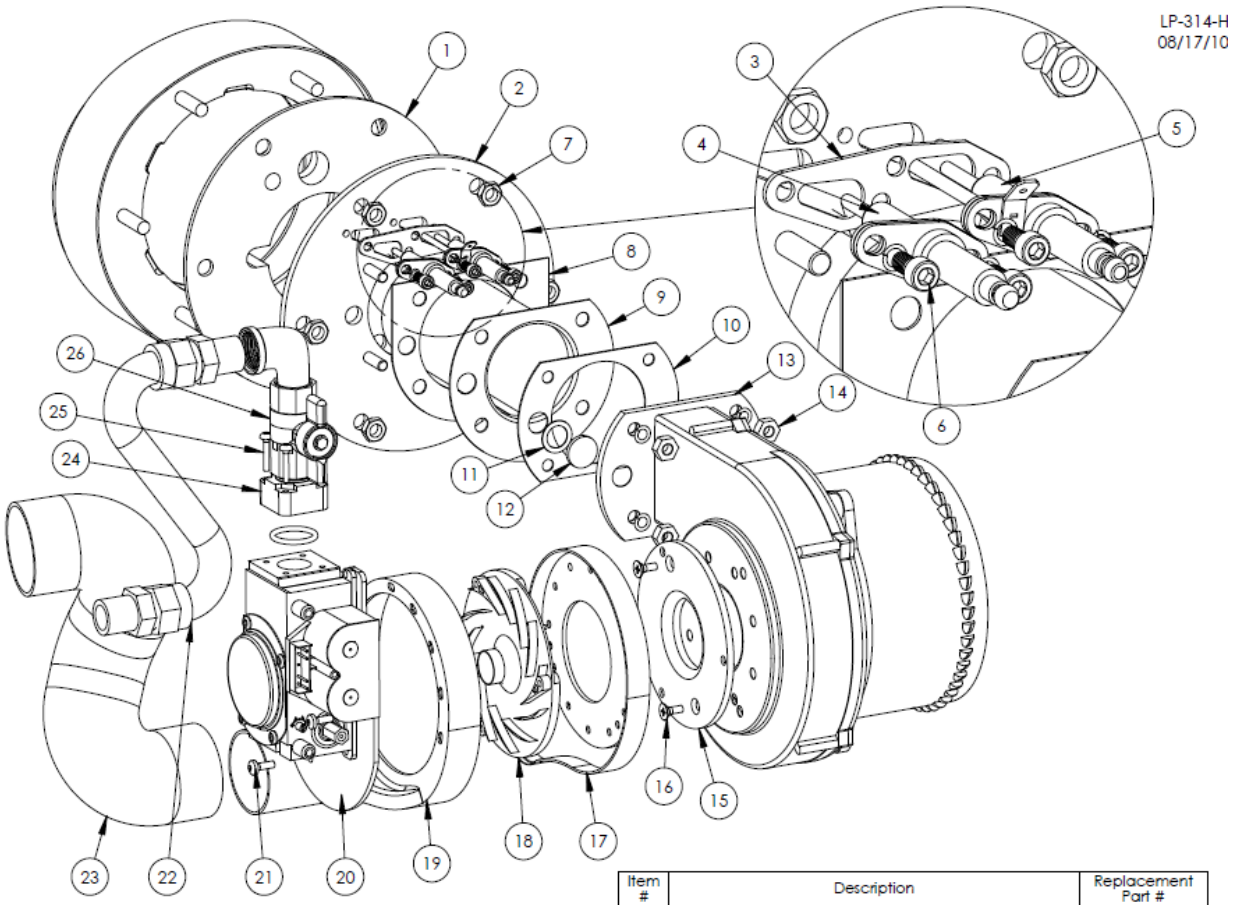
Item #	Description	Replacement Part #
1	LOW WATER CUT-OFF SENSOR	7100P-852-1
2	HIGH LIMIT SAFETY	7100P-006
3	UPPER TEMPERATURE SENSOR	7100P-004
4	BRAZED PLATE HEAT EXCHANGER	7100P-132
5	SEALING WASHER - BSPP NUT	8600P-044
6	THUMB SCREW - HYDRONIC MODULE COVER	7100P-149
7	FLEX LINE - EXCHANGER SIDE (w/NUTS, WASHERS)	7100P-171
8	LOWER TEMPERATURE SENSOR	7100P-005
9	2" COUPLING - AIR INLET (130K BTU)	7100P-114
	3" COUPLING - AIR INLET (199K BTU)	7100P-103
10	CONDENSATE HOSE	7100P-121
11	CLAMP - CONDENSATE HOSE	7250P-215
12	THERMODISC FLUE ECO 210°	VS210
13	S.S. HOSE BARB	7250P-154
14	COUPLING NUT - AIR INLET	7100P-104
15	55-80 GAL. PLASTIC CABINET	7100P-264
	199 GAL. PLASTIC CABINET	7100P-265
16	CONTROL BOARD DISPLAY (w/MEMBRANE, BOARD, HOUSING, CABLE)	7100P-266
17	POWER SWITCH	7500P-087
18	55-80 GAL. HYDRONIC MODULE BACKPLATE	7100P-156
	199 GAL. HYDRONIC MODULE BACKPLATE	7100P-135
19	FLEX LINE - PUMP SIDE (w/NUTS, WASHERS)	7100P-165
20	HYDRONIC HEATING MODULE PUMP	7100P-131
21	TEMPERATURE AND PRESSURE RELIEF VALVE	TP1400
22	CLIP-ON PIPE TEMPERATURE SENSOR	7100P-172
23	55-80 GAL. HYDRONIC MODULE COVER	7100P-134
	199 GAL. HYDRONIC MODULE COVER	7100P-136

Figure 30



Item #	Description	Replacement Part #
1	ELECTRONIC BACK PLATE	7100P-102
2	CONTROL BOARD	7450P-122
3	BLOCKED VENT PRESSURE SWITCH	7250P-150
4	ECS BOARD	7100P-018
5	#6 X 3/8" THREAD FORMING SCREW	N/A
6	FIELD CONNECTION BOARD	7100P-083
7	6 PIN TERMINAL BLOCK	7100P-254
8	4 PIN TERMINAL BLOCK	7100P-255
9	3 PIN TERMINAL BLOCK	7100P-256
10	ECS RIBBON CABLE (NOT SHOWN)	7100P-221
11	LOW VOLTAGE WIRE HARNESS (NOT SHOWN)	7100P-257
12	HIGH VOLTAGE WIRE HARNESS (NOT SHOWN)	7100P-258
13	HYDRONIC MODULE WIRE HARNESS (NOT SHOWN)	7100P-259
14	55 GAL. SENSOR WIRE HARNESS (NOT SHOWN)	7100P-260
	80 GAL. SENSOR WIRE HARNESS (NOT SHOWN)	7100P-261
	119 GAL. SENSOR WIRE HARNESS (NOT SHOWN)	7100P-262

Figure 31 – LP-314-G



Item #	Description	Replacement Part #
1	GASKET - MOUNTING PLATE	7100P-139
2	MOUNTING PLATE	7100P-007
3	GASKET - PROBES	7100P-155
4	FLAME RECTIFICATION PROBE (w/GASKET)	7100P-082
5	IGNITOR ELECTRODE (w/GASKET)	7100P-093
	IGNITOR ELECTRODE - LP (w/GASKET)	7100P-094
6	10-32 X 3/8 SCREWS/#10 LOCK WASHERS	N/A
7	NUTS - 5/16-18	N/A
8	GASKET - BURNER MOUNTING FLANGE	7100P-152
9	BURNER - 130K BTU	7100P-096
	BURNER - 199K BTU	7100P-095
10	GASKET - BURNER OUTLET	7000P-361
11	GASKET - SIGHT GLASS	7000P-105
12	SIGHT GLASS (w/GASKET)	G2000
13	COMBUSTION BLOWER (w/GASKET, SIGHT GLASS)	7100P-015
14	1/4-20 BRASS NUTS/1/4 LOCK WASHERS	7100P-268
15	ADAPTER PLATE	7250P-644
16	FLAT HEAD SCREW - ADAPTER PLATE	7100P-045
17	AIR INTAKE ADAPTER - BLOWER SIDE	7500P-185
18	SWIRL PLATE - BLACK (130K BTU)	7100P-042
	SWIRL PLATE - WHITE (199K BTU)	7500P-092
19	AIR INTAKE ADAPTER - VALVE SIDE	7500P-184
20	GAS VALVE (130K BTU)	7000P-862
	GAS VALVE (199K BTU)	7000P-863
21	SCREWS - GAS VALVE	7100P-046
22	1/2" FLARE X 1/2" NPT FLEX HOSE	7100P-140
23	TUBE - AIR INLET	7500P-189
24	GAS VALVE ADAPTER	7250P-454
25	SCREWS - M4 X 20MM GAS VALVE ADAPTER	7250P-717
26	GAS SHUT-OFF VALVE	7250P-140

Figure 32

PART 13: MAINTENANCE

Periodic maintenance should be performed once a year by a qualified service technician to assure that all the equipment is operating safely and efficiently. The owner should make necessary arrangements with a qualified heating contractor for periodic maintenance of the heater. Installer must also inform the owner that the lack of proper care and maintenance of the heater may result in a hazardous condition.

INSPECTION ACTIVITIES		DATE LAST COMPLETED			
PIPING		1st YEAR	2nd YEAR	3rd YEAR	4th YEAR*
Near heater piping	Check heater and system piping for any sign of leakage; make sure they are properly supported.				
Vent	Check condition of all vent pipes and joints.				
Gas	Check Gas piping, test for leaks and signs of aging. Make sure all pipes are properly supported.				
SYSTEM					
Visual	Do a full visual inspection of all system components.				
Functional	Test all functions of the system (Heat, Safeties)				
Temperatures	Verify safe settings on heater or Anti-Scald Valve				
Temperatures	Verify programmed temperature settings				
ELECTRICAL					
Connections	Check wire connections. Make sure they are tight.				
Smoke and CO detector	Verify devices are installed and working properly. Change batteries if necessary.				
Circuit Breakers	Check to see that the circuit breaker is clearly labeled. Exercise circuit breaker.				
CHAMBER/BURNER					
Combustion Chamber	Check burner tube and combustion chamber coils. Clean according to maintenance section of manual. Vacuum combustion chamber.				
Spark Electrode	Clean. Set gap at ¼".				
Flame Probe	Clean. Check ionization in uA (d7 on status menu in Start-up Procedures). Record high fire and low fire.				
CONDENSATE					
Neutralizer	Check condensate neutralizer. Replace if necessary.				
Condensate hose	Disconnect condensate hose. Clean out dirt. Fill with water to level of outlet and re-install. (NOTE: Verify the flow of condensate, making sure that the hose is properly connected during final inspection.)				
GAS					
Pressure	Measure incoming gas pressure (3.5" to 14" W.C.)				
Pressure Drop	Measure drop in pressure on light off (no more than 1" W.C.)				
Check gas pipe for leaks	Check piping for leaks. Verify that all are properly supported.				
COMBUSTION					
CO/CO2 Levels	Check CO and CO2 levels in Exhaust (See Start-up Procedures for ranges). Record at high and low fire.				
SAFETIES					
ECO (Energy Cut Out)	Check continuity on Flue and Water ECO. Replace if corroded.				
Water Pressure Switch	Check operation. Check for signs of leakage. Replace if corroded.				
Thermistors	Check wiring. Verify through ohms reading.				
FINAL INSPECTION					
Check list	Verify that you have completed entire check list. WARNING: FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.				
Homeowner	Review what you have done with the homeowner.				

Table 14 - *Continue annual maintenance beyond the 4th year as required.

ADDITIONAL INSTALLATION REQUIREMENTS FOR THE COMMONWEALTH OF MASSACHUSETTS

In the Commonwealth of Massachusetts, the installer or service agent shall be a plumber or gas fitter licensed by the Commonwealth.

When installed in the Commonwealth of Massachusetts or where applicable state codes may apply; the unit shall be installed with a CO detector per the requirements listed below.

5.08: Modifications to NFPA-54, Chapter 10

(1) Revise NFPA-54 section 10.5.4.2 by adding a second exception as follows:

Existing chimneys shall be permitted to have their use continued when a gas conversion burner is installed, and shall be equipped with a manually reset device that will automatically shut off the gas to the burner in the event of a sustained back-draft.

(2) Revise 10.8.3 by adding the following additional requirements:

(a) For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

1. INSTALLATION OF CARBON MONOXIDE DETECTORS. At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the service of qualified licensed professionals for the installation of hard wired carbon monoxide detectors

a. In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.

b. In the event that the requirements of this subdivision cannot be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

2. APPROVED CARBON MONOXIDE DETECTORS. Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

3. SIGNAGE. A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, "GAS VENT DIRECTLY BELOW, KEEP CLEAR OF ALL OBSTRUCTIONS".

4. INSPECTION. The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08 (2)(a) 1 through 4.

(b) EXEMPTIONS: the following equipment is exempt from 248 CMR 5.08 (2)(a) 1 through 4:

1. The equipment listed in Chapter 10 entitled "Equipment Not Required to be Vented" in the most current edition of NFPA 54 as adopted by the Board; and

2. Product Approved side wall horizontally vented gas fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

(c) MANUFACTURER REQUIREMENTS – GAS EQUIPMENT VENTING SYSTEM PROVIDED. When the manufacturer of Product Approved side wall horizontally vented gas equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for installation of the equipment and the venting system shall include:

1. Detailed instructions for the installation of the venting system design or the venting system components; and

2. A complete parts list for the venting system design or venting system.

(d) MANUFACTURER REQUIREMENTS – GAS EQUIPMENT VENTING SYSTEM NOT PROVIDED. When the manufacturer of a Product Approved side wall horizontally vented gas fueled equipment does not provide the parts for venting the flue gases, but identifies "special venting systems", the following requirements shall be satisfied by the manufacturer:

1. The referenced "special venting system" instructions shall be included with the appliance or equipment installation instructions; and

2. The "special venting systems" shall be Product Approved by the Board, and the instructions for that system shall include a parts list and detailed installation instructions.

(e) A copy of all installation instructions for all Product Approval side wall horizontally vented gas fueled equipment, all venting instructions, all parts lists for venting instructions, and/or all venting design instructions shall remain with the appliance or equipment at the completion of the installation.

MAINTENANCE NOTES

HTP CUSTOMER INSTALLATION RECORD FORM

The following form should be completed by the installer for you to keep as a record of the installation in case of a warranty claim. After reading the important notes at the bottom of the page, please also sign this document.

Customer's Name:	
Installation Address:	
Date of Installation:	
Installer's Code/Name:	
Product Serial Number(s):	
Comments:	
Installer's Phone Number:[1]	
Signed by Installer:	
Signed by Customer:[2]	

IMPORTANT:

Customer: Please only sign after the installer has reviewed the installation, safety, proper operation and maintenance of the system. In the case that the system has any problems, please call the installer. If you are unable to make contact, please contact your HTP Sales Representative.

Distributor/Dealer: Please insert contact details.