

## Important!

Read these instructions completely before starting.

**\*This product requires an appropriately sized 220/240 VAC circuit, and a 110/120 VAC single phase circuit.\***

These instructions should be used as a general guide only. Local electric code and utility requirements must be followed and take precedence over these instructions.

The RMS panel assemblies are manufactured with quality components for maximum life, durability and minimum service. To ensure a satisfactory installation it is important that you read these instructions carefully before installing and operating the system. Failure to do so may result in breach of warranty.

## Unpacking

Inspect the unit and check whether there are missing parts. Report any damage or claims to the carrier immediately. For all returns to be accepted they must be authorized by the manufacturer.

## HRC Package Contents

<ul style="list-style-type: none"><li>• HRC Panelized System</li><li>• Outdoor Temperature Sensor</li><li>• HRC Manual</li></ul>	<ul style="list-style-type: none"><li>• Boiler Installation Instructions</li><li>• Pump Instruction Manual</li><li>• 4 Mounting Screws</li></ul>
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## Introduction

Due to the potential variations in building envelope construction, we are not responsible for the application or misapplication of this product.

The Hydronic Radiant Center (HRC) panel system is designed to simplify the installation of an electric hydronic radiant heat system.

Model	kW	BTU/H	Max # of Loops @ 300'	Max coverage area, sqft <sup>1</sup>	Circuit Breaker Req <sup>2</sup>
HRC-003-1-AX	3	10,239	2	600	20A
HRC-006-1-AX	6	20,478	4	1100	40A
HRC-009-1-AX	9	30,717	5	1600	50A
HRC-011-1-AX	11	37,543	7	2000	60A
HRC-015-1-BX	15	51,180	9	2700	80A
HRC-018-1-BX	18	61,416	11	3200	100A
HRC-023-1-BX	23	78,476	14	4100	125A

The HRC panel system is available in the following sizes:

<sup>1</sup>Coverage area is based on a heat loss of 19 BTU/h/ft<sup>2</sup>.

<sup>2</sup>All models require a 240V, single phase electrical service for the boiler, and a 120 volt circuit for the circulator pump. Additional electrical circuits may be required.

These boilers will automatically modulate to use only the amount of electricity needed to satisfy the thermostat. If the floor is cold the boiler will run at 100% capacity until the floor is warmed to the temperature needed to heat the space.

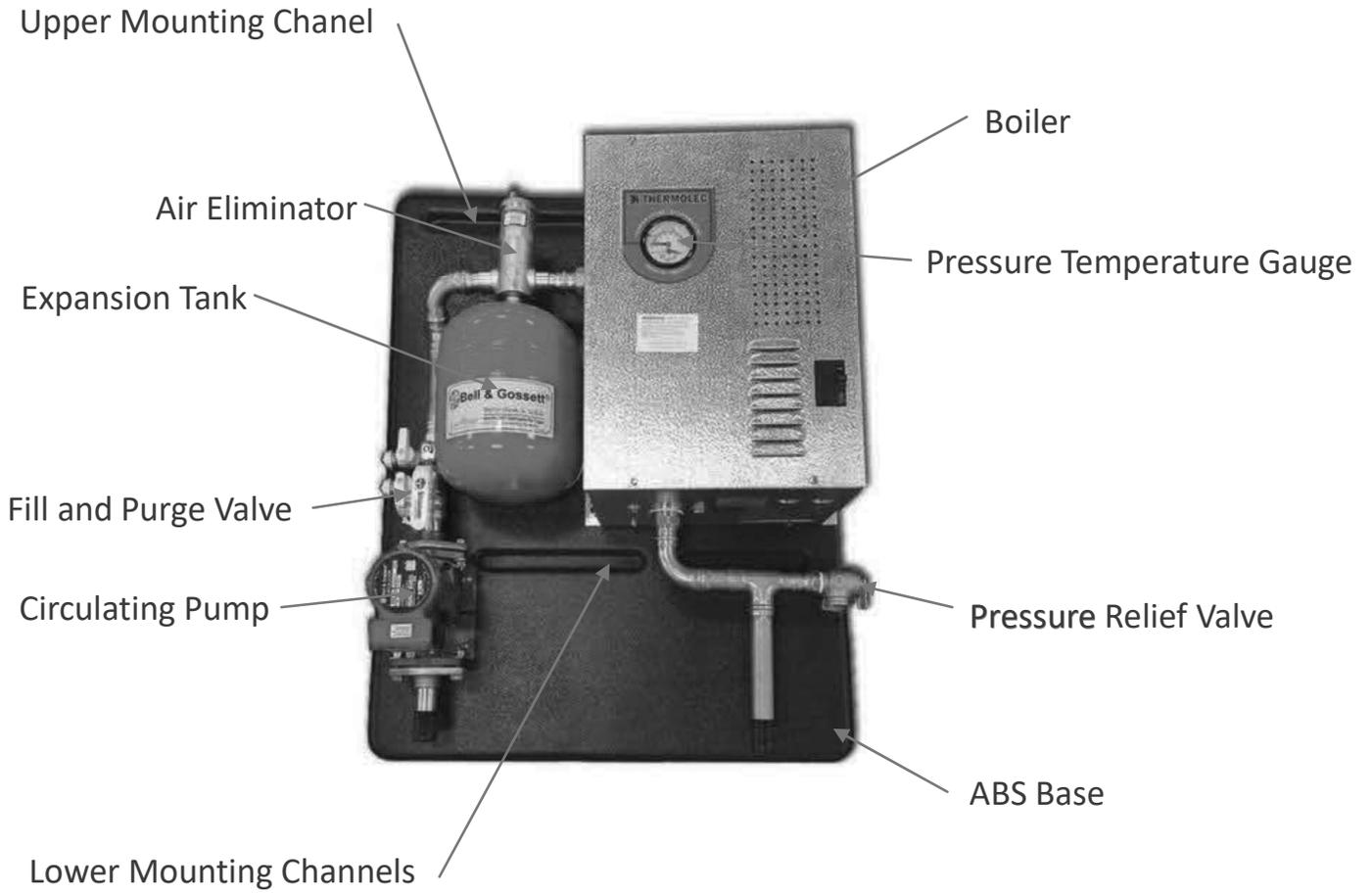
### Determining System Capacity

Calculate the total volume of each type pipe used in the system. Add the totals plus the HRC unit volume to have system capacity.

**The following table describes volume/100'.**

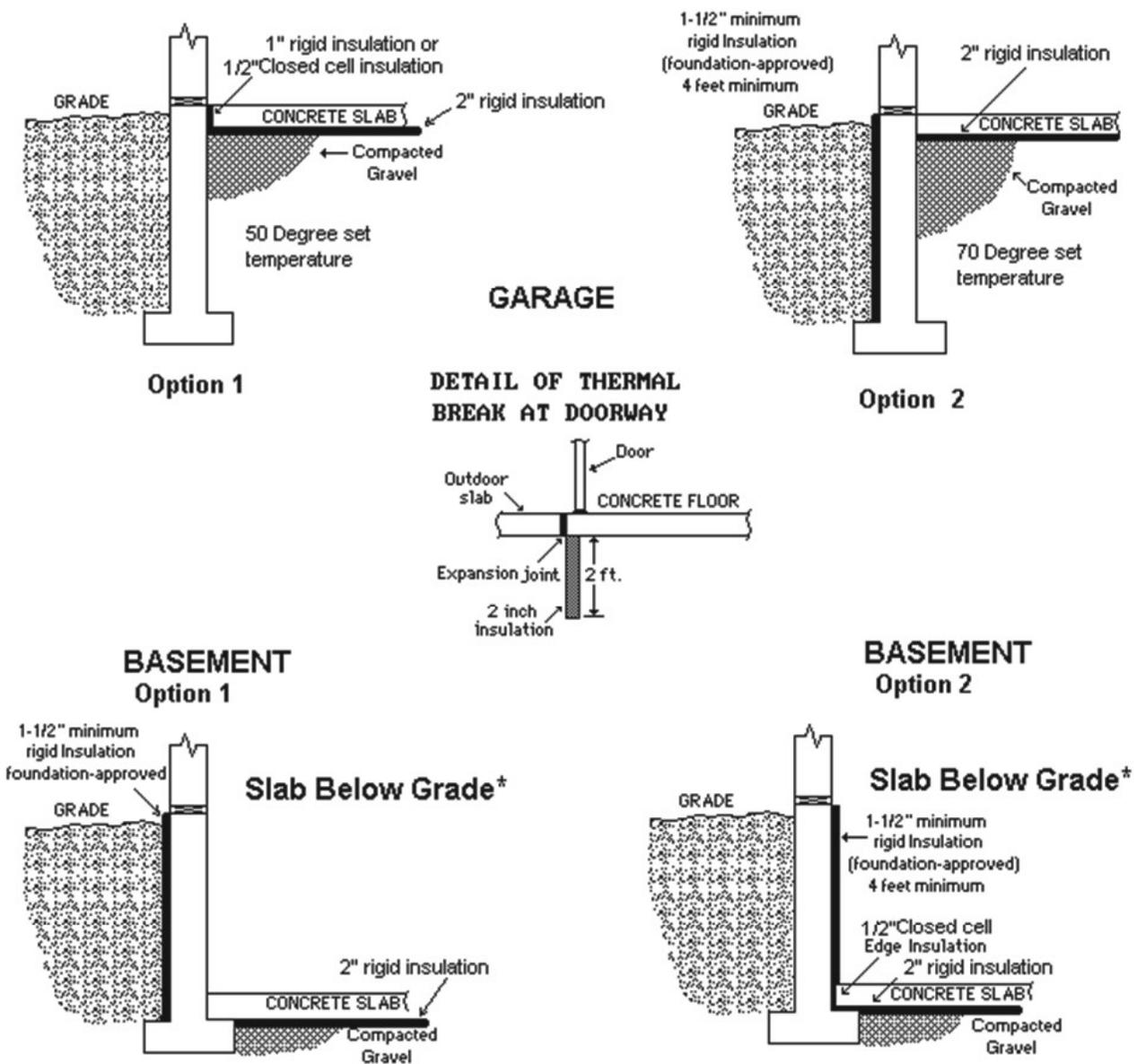
<b>This example displays the total volume needed in gallons:</b>	<b>gal.</b>
HRC Panel	2.0
10 ft. of 1" Copper	0.5
5 each 1/2" X 300' PEX tubing, ((.9 gal/100') X (5 X 300'))=13.5 gal.	13.5
Extra fluid for pumping	2.0
<b>Total gallons needed</b>	<b>18.0</b>

## Identification of Parts



# Insulation

Prior to installing the radiant floor tubing in any application, the area beneath and around the outside edge of the concrete slab must be properly drained, compacted, and insulated. (See Figure 1 below) If this is not done, the heat that you intend to go into the room will flow into the surrounding soil. This will cause high energy consumption, and the hydronic space heater size will possibly be too small for the additional heat loss. We recommend 1½ - 2 inches of high-density foundation-grade foam insulation beneath the slab and 1 inch of high-density foundation-grade foam insulation for the edge of the concrete. (½" closed cell insulation may be substituted) These products should be available from your local lumber yard or building center.

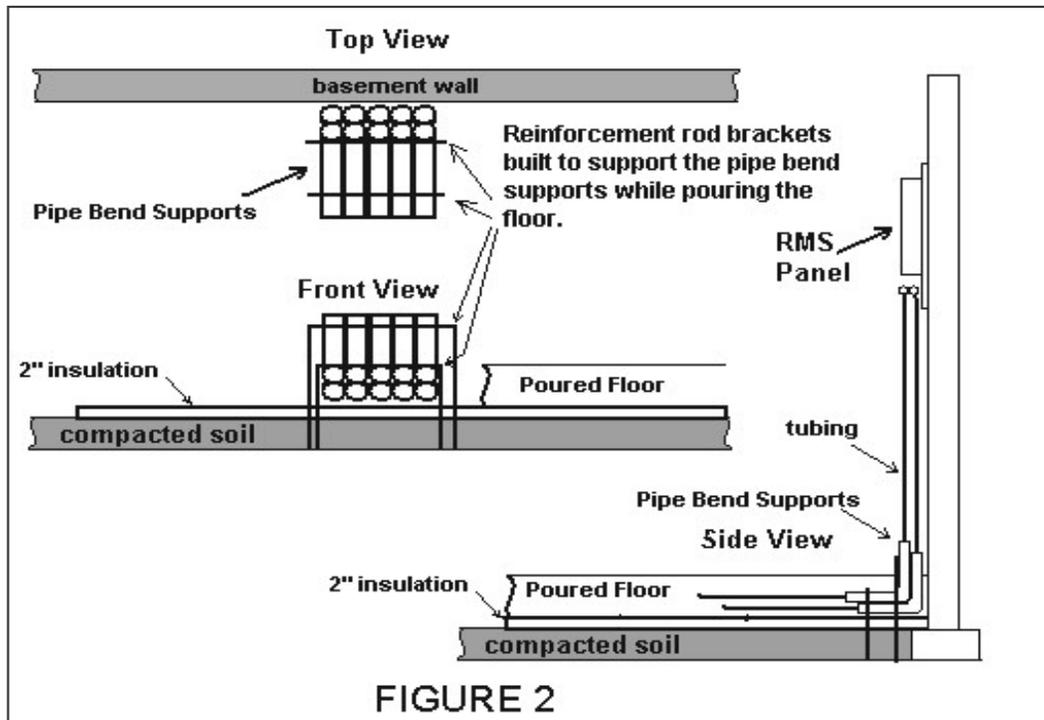


**FIGURE 1 INSULATION OPTIONS**

## Mounting the HRC Panel

Determine where the RMS panel will be located since all of the tubes will terminate there. The panel should be located in an area with enough room for all the PEX tubes to leave and return to the area without congestion. Attach the panel to the wall with the bottom of the panel 36" from the floor. Be sure to allow a minimum of 15" clearance above the unit to service the elements if needed. See Figure 2.

Install a plastic pipe (not supplied) from the pressure relief valve to within 6" of the floor.



## Attaching the Tubing

Be sure to attach one end of each loop to the supply manifold and the other to the return manifold.

Many manifolds will use a compression fitting to attach the PEX to the manifold. Follow the instructions that came with the manifolds purchased for your system.

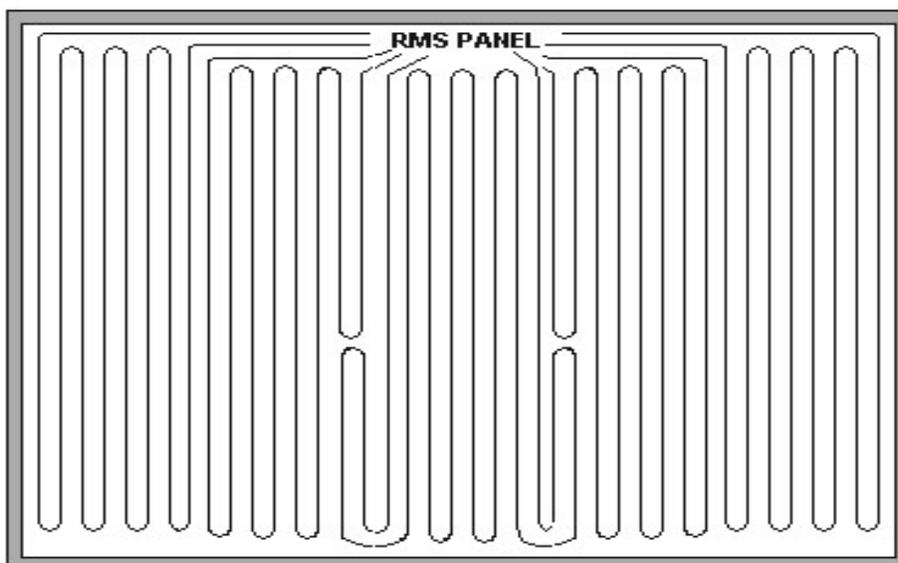
## Tubing Layout

The tubing should be laid out evenly spaced, with all the tubes of equal length  $\pm 5\%$ . If one tube is substantially shorter than another, that tube will have a greater water flow and the full-length tubes will have less water flow, causing uneven heat. As a general rule, tubing will be spaced to be 12 inches apart. If there are any areas that you may not want to heat all the time, install one of the loops to cover that area only. You can then shut off the valve that serves that loop to shut off the heat. *TIP: Divide the total area by the number of loops to be used. Space the tubing as required, filling the area with the loop serving it.*

Keep in mind that concrete tends to average the temperature of the slab so that precise separation of area temperatures is not possible. All tubes should be protected at the point they exit the concrete with the pipe bend supports included. The tubes should exit the concrete directly below the manifolds so that the tubes do not strain the manifold connections when attached. One method of ensuring this is to make two brackets out of re-rod and drive them into the soil to hold the pipe bend supports during installation. (See Figure 2.)

It is not always possible to make a complete loop and still have enough tube to get back to the manifold. (See Figure 3) In those cases, go as far as you can with the run and still allow enough length to get back to the manifold. Fill in the area with the next loop as shown. The tubing can be installed in applications with or without re-rod. If re-rod is not used, the tubing can be attached to the insulation with the plastic anchors that are included with the tubing. With the tubing held in place, tap the anchors down with a mallet. If re-rod is to be used, the tubing can be installed as described using the plastic anchors and the re-rod put in place afterward, or the re-rod can be put in place first. If you put the re-rod down first, we recommend tying the tubing to the re-rod with steel or plastic wire ties instead of attaching the tubing to the insulation with plastic anchors.

**TUBING LAYOUT PLAN**



**FIGURE 3**

## Pouring the concrete

We strongly recommend hiring professionals for pouring and finishing the slab. During pouring, reasonable care should be taken to prevent damage to the tubes. If the cement is to be wheeled, planks should be placed over the tubing to prevent damage. Radiant Floor PEX tubing is very tough but common sense and care will prevent a serious problem at this point. Follow the recommendations of your concrete installer before walking on the floor. Some concrete contractors will want the tubing filled with antifreeze and pressurized to keep the pipe at the bottom of the slab and prevent damage. In that case, follow the purging and filling instructions below before pouring the concrete.

## Anti-Freeze in Hydronic Systems

Antifreeze with inhibitors is required in hydronic systems to keep them from freezing and to prevent corrosion from attacking the system components. Most propylene glycol antifreeze products do not have enough inhibitors to be mixed at a ratio less than 30% and mixture stronger than 30% reduces the fluid's heat transfer capabilities and increases the pumping resistance. We have found a mixture of 23% to be ideal for pumping resistance, protection level, and heat transfer capabilities. Our antifreeze, EnviroGuard Ultra HD, is a special blend with enough inhibitors for the 23% solution.



### CAUTION:

- ◆ This system must be protected with propylene glycol antifreeze solution before final operation.
- ◆ Do not fill this system with water only, if any part of the cement slab is below 36° F. The antifreeze and water must be premixed before filling the system.
- ◆ We strongly recommend the use of softened water for filling this system.
- ◆ This system must be protected with antifreeze before final operation.
- ◆ We recommend an antifreeze mixture containing propylene glycol with sufficient additives for a 23% ratio when mixed with softened water.
- ◆ Collect and retain all fluid until filling and purging the system has been completed.
- ◆ Record the label description for the antifreeze used to protect the system.
- ◆ Record the antifreeze protection level.
- ◆ Record the number of floor loops, each loop length and size of tubing used in the system.

## Propylene Glycol Mixtures

The following table below shows an example amount of propylene glycol antifreeze solution to use.

<b>Material</b>	<b>Volume/100 feet</b>
1" Copper Pipe	4.5 gal.
½" PEX Pipe	.9 gal.
5/8" PEX Pipe	1.3 gal.

### Example:

18 Total gallons x .23 = 4.14 gallons (4 gallons of antifreeze)

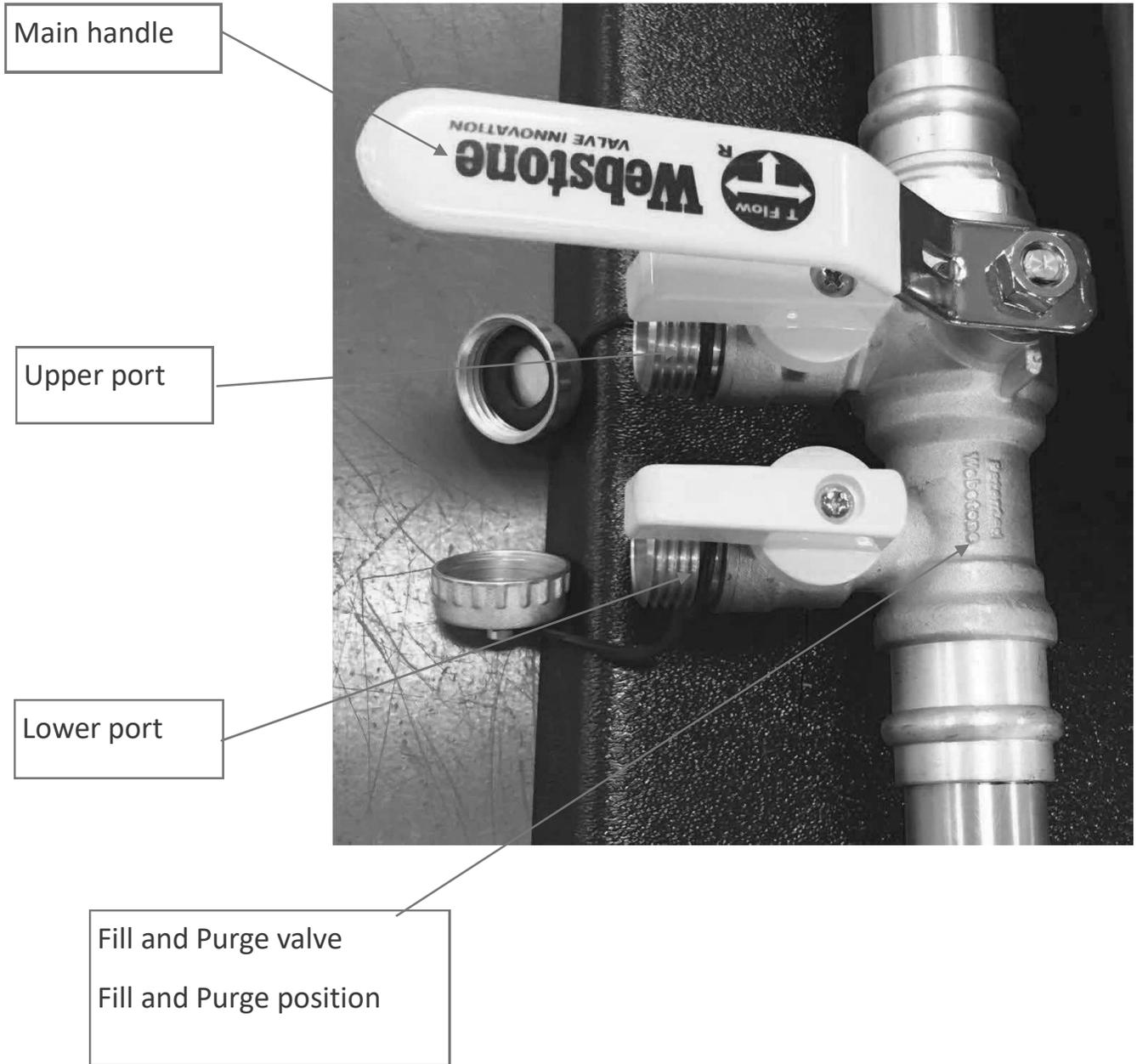
Mix 14 gallons of soft water and 4 gallons of propylene glycol to equal a total of 18 gallons.

Add 2 ounces of household chlorine bleach for each 10 gallons of fluid as a bactericide.

## Purging Air and Filling With Anti-Freeze

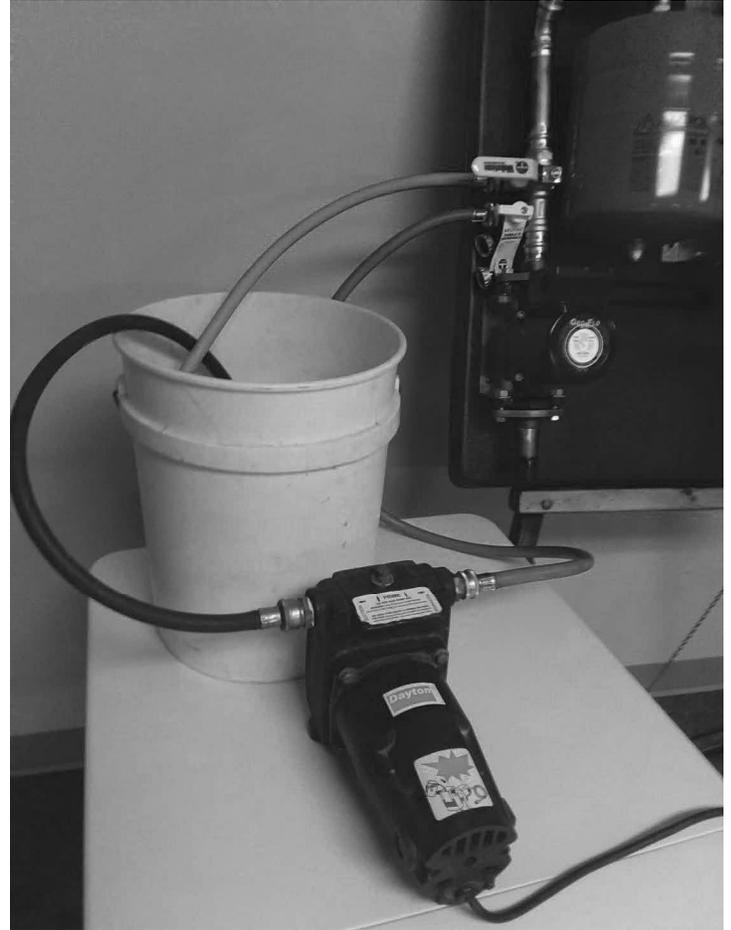
1. Position the FILL and PURGE VALVE main handle as shown in Figure 4
2. Connect a hose from a pail filled with our antifreeze solution to the pump inlet.
3. Connect a second hose from the pump outlet to the lower FILL and PURGE port. Open the lower PURGE port. (*Borrow the hoses from your washing machine if necessary for these connections.*)
4. Connect a third hose to the upper FILL and PURGE and place the other end in the pail. Open the upper FILL and PURGE port valve.
5. Close all of the manifold supply valves except for one.
6. Start the pump, refilling the pail with propylene glycol antifreeze mixture, as it is pumped into the system, keeping the fluid level above the hose inlet so the pump does not draw in air. When only the antifreeze mixture comes out of the upper FILL and PURGE port hose, with the pump running, close the open manifold valve and open the next valve. Repeat this procedure going through each loop making sure all air is out of the system.
7. Repeat steps 6 and 7 through a complete cycle of loops to ensure that all air is out of the system.
8. Once all the antifreeze mixture has been installed and air removed, with the pump running, open all manifold ports, and close the upper FILL and PURGE port valve. Pump enough transfer fluid through the lower FILL and PURGE port valve to pressurize the system to 20-25 psi and then close the lower FILL and PURGE port valve. With the pump off, place the main FILL and PURGE valve in the “operate position” as shown on the HANDLE. (*The handle will be vertical.*)
9. If you are unable to pressurize the system to 20-25 psi with the pump, connect the pump hose to the domestic water supply and add enough water to raise the pressure to 20-25 psi.
10. The system is now filled with antifreeze and purged of air.
11. Leave all hoses and the pump connected during the startup.
12. Inspect all fittings and joints for leaks.

Figure 4





Valve position for FILLING and PURGING



Filling using fluid transfer pump



Valve position to pressurize the system



Valve position to run the system

## Electrical Connections

The electric boiler must be wired according to the instructions included with the boiler and all local codes. This includes the 240 volt circuit for the heating elements, 120 volt circuit for the circulator pump, and low voltage for the thermostat. Locate the thermostat on an inside wall away from direct sunlight or any areas that may be influenced by drafts. See the HRC Wiring Diagram and component specific wiring instructions for more detail.

## Startup and Operation

*The system is now ready to operate.*

1. Turn on the circuit breakers to power the boiler and the circulating pump.
2. Set the thermostat to 5° above the room temperature. This will cause both the circulating pump and the boiler to start. Run the HRC heating system for ½ hour to ensure that any additional air is purged through the air bleed.
3. If the system pressure has dropped below 20 psi add enough antifreeze mixture to return the pressure to 20-25 psi. (*See step 8 of Purging Air and Filling with Antifreeze Section.*)
4. As the system warms up and the thermostat starts to cycle, monitor the system pressure. If the pressure rises above 25 psi bleed off any excess pressure with the upper purge and fill port valve. (*Open it very slowly to release only the excess pressure.*) If the system pressure gets as high as 30 psi the pressure relief valve will release any additional pressure.
5. In normal operation, the thermostat calls for heat, starting the circulator pump and the boiler. When the thermostat set point is satisfied, the circulator pump and boiler are turned off.

## **Maintenance**

There is little regular maintenance required. During the summer months, be sure to set your thermostat to a low setting or turn off the circuit breaker to prevent the system from heating the floor at the same time you are trying to cool the house. It is a good idea to turn the system on a couple times during the summer for 5 minutes to exercise the circulating pump. The pressure gauge should be checked periodically to make sure the system maintains a minimum of 15 PSI. If not, 23% Propylene glycol antifreeze mixture, needs to be added to adjust the system pressure and the system checked for leaks. (See Filling and Purging Section.) We recommend retightening the manifold fittings by hand when the system is fully warmed up. You should not have to add to this system regularly. If you hear gurgling sounds from the pump or you can see air bubbles circulating through the translucent pipe, recheck system pressure and adjust to 20 psi (with the pump not running) if needed.

## **Warranty**

The HRC panel is warranted against manufacturing defects for a period of 2 years from the date of purchase. In the event of a component failure Radiant Made Simple will, at our discretion, provide a replacement unit or repair components for installation. At our request, the defective part(s) must be returned to Radiant Made Simple in order to receive credit. This warranty covers parts only. Damage resulting from abuse, water damage, or faulty installation is specifically excluded. Radiant Made Simple's maximum liability shall be limited to the replacement cost of the unit.

## **Technical Support**

Technical support is available at: <https://radiantmadesimple.com/contact>

Or by calling (320) 297-9100 or (507) 463-3213 M-F 8:00 am–5:00pm Central time.



## Notes