

RMS/HRC 

by Radiant Made Simple™

RMS™ Installation and Owner Manual



Radiant Made Simple

75 W Veum Ave.

Appleton, MN 56208

(320) 297-9100

www.radiantmadesimple.com

Unit ID

Record here for future reference

Model No.: _____

S/N: _____

Install Date: _____

Important!

Read these instructions completely before starting.

This product requires an appropriately sized 220/240 VAC single phase 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.

RMS Package Contents

- | | |
|---|--|
| <ul style="list-style-type: none">• RMS Panelized System• Outdoor Temperature Sensor• Thermostat• RMS Manual | <ul style="list-style-type: none">• Boiler Installation Instructions• Pump Instructions Manual• 4 Mounting Screws• 5 Manifold Valves• 5 Manifold Barbed Fittings |
|---|--|

Additional Items Required

Accessory Kit, Part # 75-1015

Drill Pump (requires a high speed drill)

Crimp Tool

10 Black Crimp Rings

PEX Tubing Kit, Part # 300' Loop Kit

(Example: 1500 sq ft. requires 5 kits.)

Heat Transfer Fluid (Freeze Protection)

See Antifreeze in Hydronic Heat System in this manual

Introduction

The RMS panel system is designed specifically for installation in a poured concrete basement, shop or garage, and concrete slabs that are well-insulated below and around the outside edge of the slab. The system sizing assumes that there is a maximum area heat loss of 19 BTU/h/sq. ft., which exceeds the requirements for well-insulated basements heated to 70° F and garages or shops heated to 55° F in the coldest parts of the continental U.S. Use of this system in applications may exceed the heating capacity of the system and is at the discretion of the purchaser. Due to the potential variations in building envelope construction, we are not responsible for the application or misapplication of this product.

The RMS panel systems are available as follows:

Model Part No.	Description
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RMS-3-AA	Hydronic space heater capacity is 3 kW, 10,236 BTU/h
RMS-6-AA	Hydronic space heater capacity is 6 kW, 20,472 BTU/h
RMS-9-AA	Hydronic space heater capacity is 9 kW, 30,708 BTU/h
RMS-11-AA	Hydronic space heater capacity is 11 kW, 37,532 BTU/h

These systems 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.

Applications and sizing for each system are as follows:

Loops	RMS-3-AA 10,236 BTU/h		RMS-6-AA 20,472 BTU/h		RMS-9-AA 30,708 BTU/h		RMS-11-AA 37,532 BTU/h	
	Basement	Garage	Basement	Garage	Basement	Garage	Basement	Garage
1	300 ft ²	300 ft ²	n/a	n/a	n/a	n/a	n/a	n/a
2	^a 600 ft ²	^a 600 ft ²	600 ft ²	600 ft ²	n/a	n/a	n/a	n/a
3	n/a	n/a	900 ft ²	900 ft ²	n/a	n/a	n/a	n/a
4	n/a	n/a	^a 1200 ft ²	^a 1200 ft ²	1200 ft ²	1200 ft ²	1200 ft ²	1200 ft ²
5	n/a	n/a	n/a	n/a	1500 ft ²	1500 ft ²	1500 ft ²	1500 ft ²

^a The amount of loop pipe will yield 19 BTU/h/ft². In well insulated applications the heat loss may be less than 17BTU/h/ft². If used in an application where the BTU/h heat loss is greater than 19BTU/h/ft² the chosen system may not be able to heat the space to the desired temperature.

Tools and Supplies Required

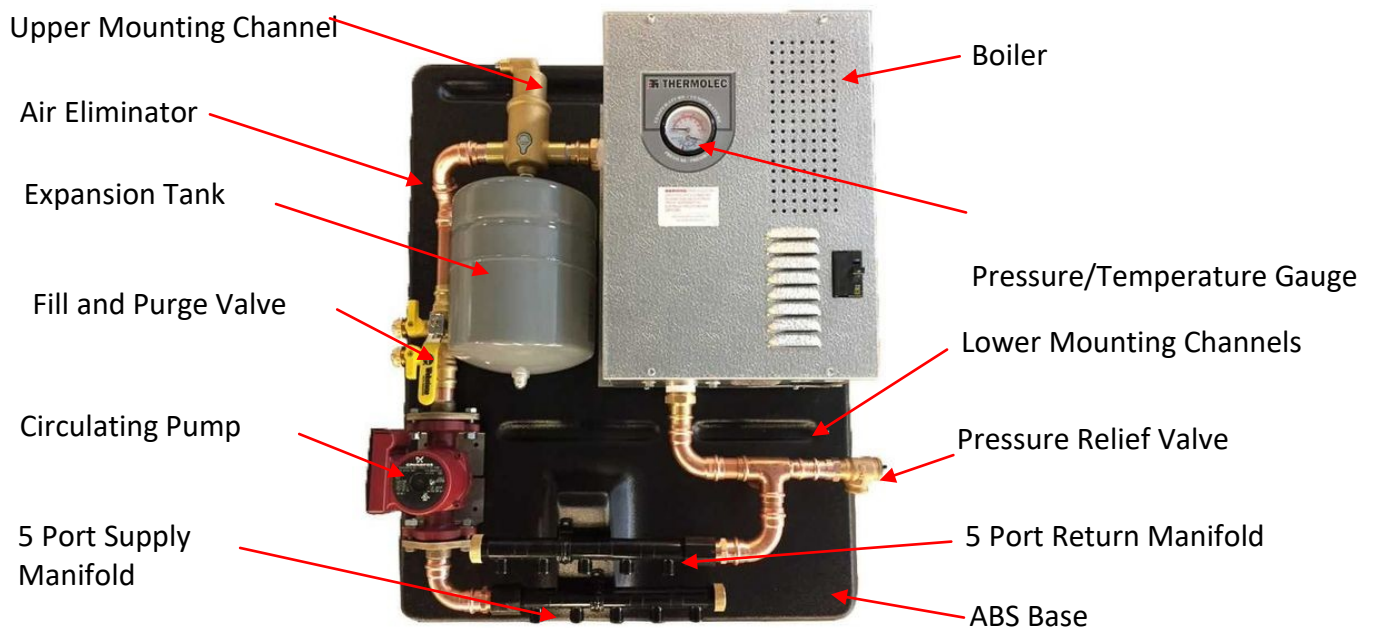
- Screwdriver (used to install panel to mounting surface)
- Sharp knife (used to cut PEX tubing)
- 2 hoses with double female ends (washing machine connector hose)
- Channel lock pliers (used to tighten hose connections)
- Fluid transfer pump (example: drill pump)
- Garden hose (used to flow fluid from the system into the 5 gallon pail)
- Five gallon pail (used as reservoir for filling system with fluid)
- Propylene glycol antifreeze (see chart in Purging Air and Filling with Anti-Freeze section)
- 2(2) -5' lengths of re-rod 3/8" or 1/2" (use to fasten tube bends for PEX tubing)

Caution

Your contractor must be informed that there is PEX tubing in the concrete floor and that they are not to nail into the concrete and damage the PEX tubing.

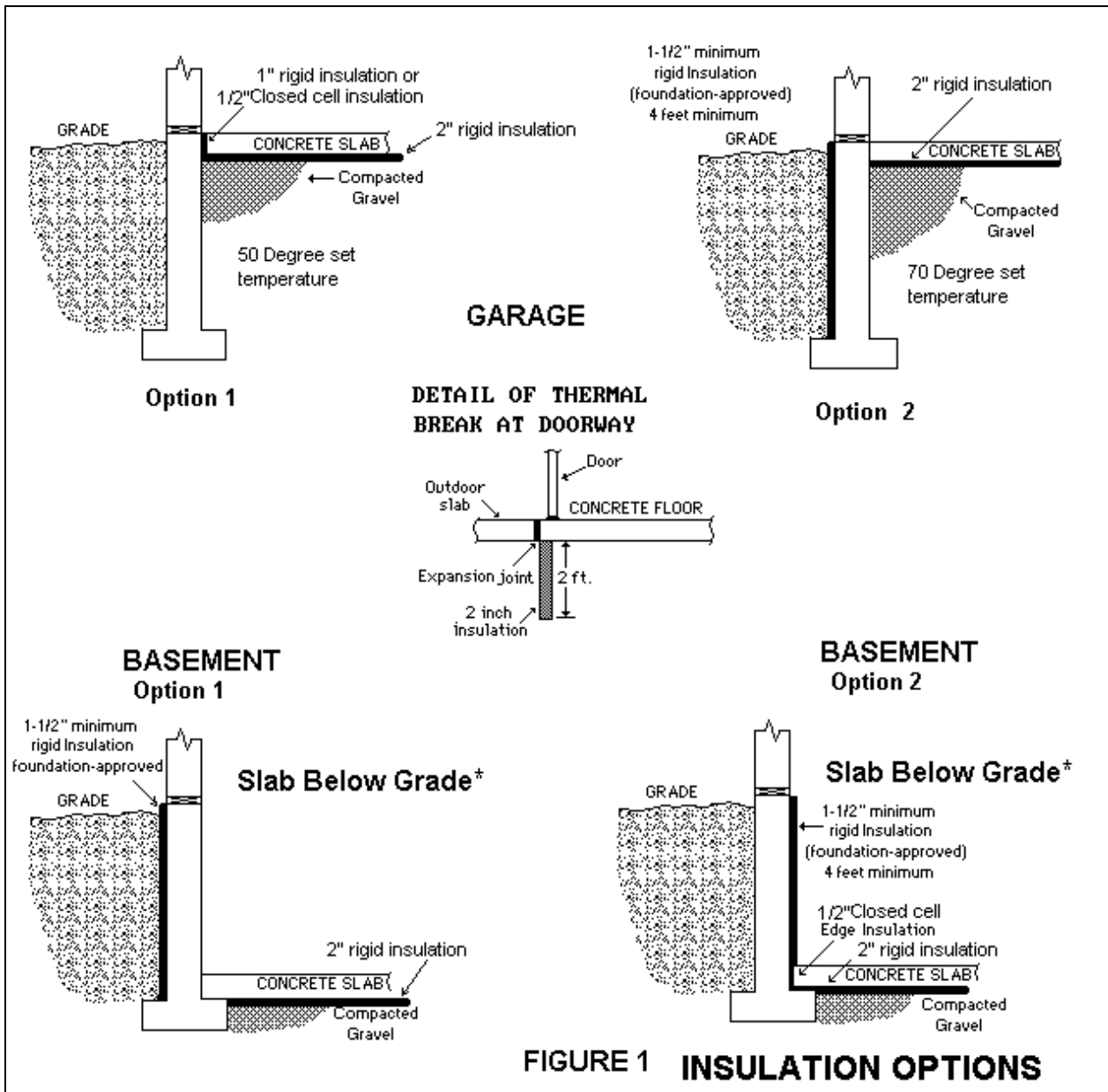
- The system pump is capable of pumping a maximum of 5 loops of ½" X 300' PEX tubing.
- Never connect more than 5 loops of ½" X 300' PEX loops to an RMS manifold.
- Ideal spacing for a slab on grade application is 1 linear foot of tubing for each 1 square foot of space.

Identification of Parts



Insulation

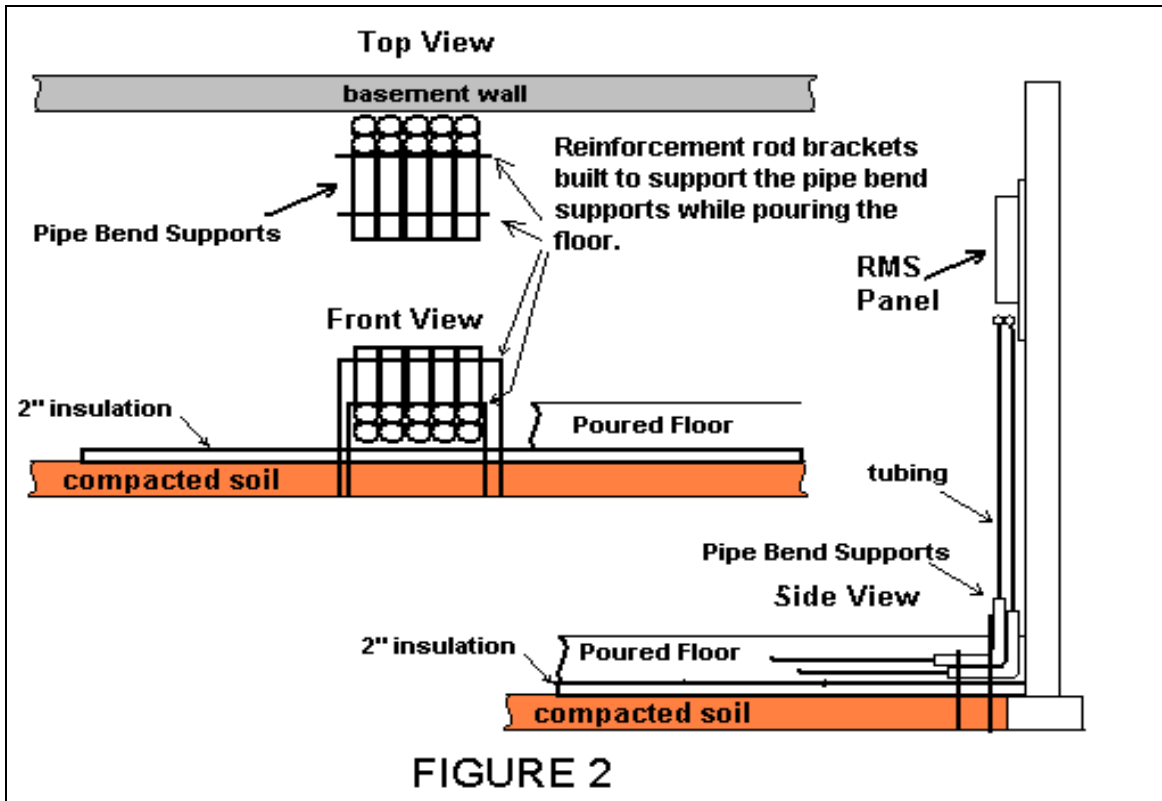
Prior to installing the radiant floor tubing in any application, the area beneath and around the outside edge of the concrete slab must be properly drained, compacted, and insulated. (See Figure 1) If this is not done, the heat that you intend to go into the room will also flow into the surrounding soil.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



Mounting the RMS 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

We recommend that you attach one end of the tubing to the supply manifold (rear), lay the tubing in the floor and come back to the manifold assemblies and connect the other end to the return manifold (front).

*Tip: Connect tubing to the rear ports before the front ports to allow easy access to the back row of fittings.

This also eliminates the need to cut the tubing. If you do cut the tubing, mark the cut and use a sharp knife or tubing cutter, taking care to make a square cut.

Tubing Layout

PEX tubing, staples, and tube bends sold separately. See part number W1Z-008A.

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, place PEX tubing at approximately 3" from what will be concrete slab edge and 12" apart.

PEX Installation TIP: *Divide the total area by the number of loops to be used. Space the tubing as required, filling that 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 enter and exit the concrete, with the pipe bend supports included. The tubes should exit the concrete directly below the RMS panel 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.) Attached is a plan for tubing layout (See Figure 3.) It is not always possible to make a complete loop and still have enough tube to get back to the manifold. 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

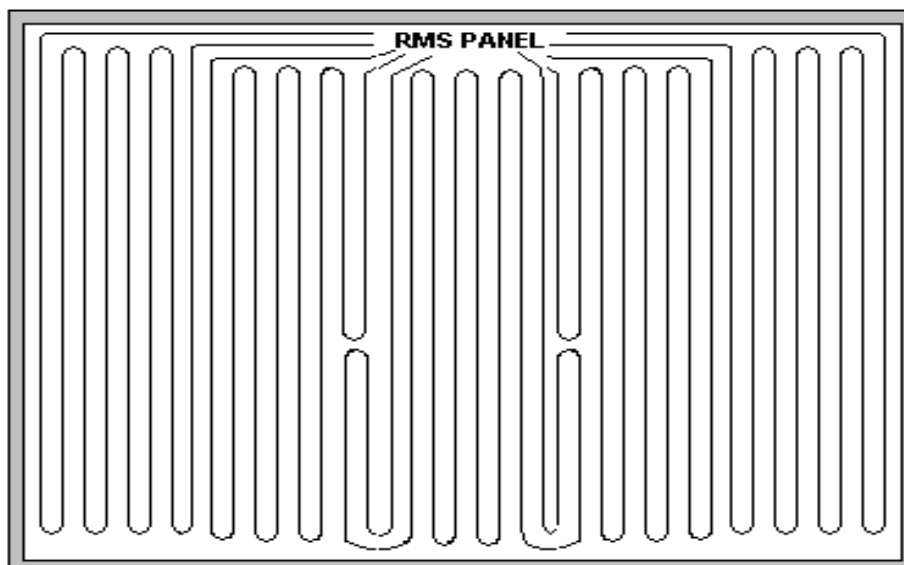


FIGURE 3

Pouring the Concrete

We strongly recommend hiring professionals for pouring and finishing the concrete 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. 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 filling and purging 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.

NOTE:

As a substitute for propylene glycol, RV anti-freeze containing propylene glycol may be used. Installer assumes all responsibilities for material and the ratio used.



CAUTION: Do not use RV anti-freeze products that have alcohol as the base.



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 the total system capacity of each RMS system and the amount of propylene glycol antifreeze solution to use.

Recommended Amount of Propylene Glycol Anti-Freeze Solution					
Model	RMS 3-AA	RMS 3-AA RMS 6-AA	RMS 6-AA RMS 9-AA	RMS 9-AA RMS 11-AA	RMS 9-AA RMS 11kAA
Loops	1	2	3	4	5
System volume	4.7	7.4	10.1	12.8	15.5
Propylene glycol anti-freeze ratio ^a	1.5	2.2	2.8	3.4	4
Gallons of water	5.2	7.2	9.3	11.4	13.5
Ounces of household chlorine bleach	1.3	1.9	2.4	3	3.5
^a The table above yields an approximate 23% concentration.					

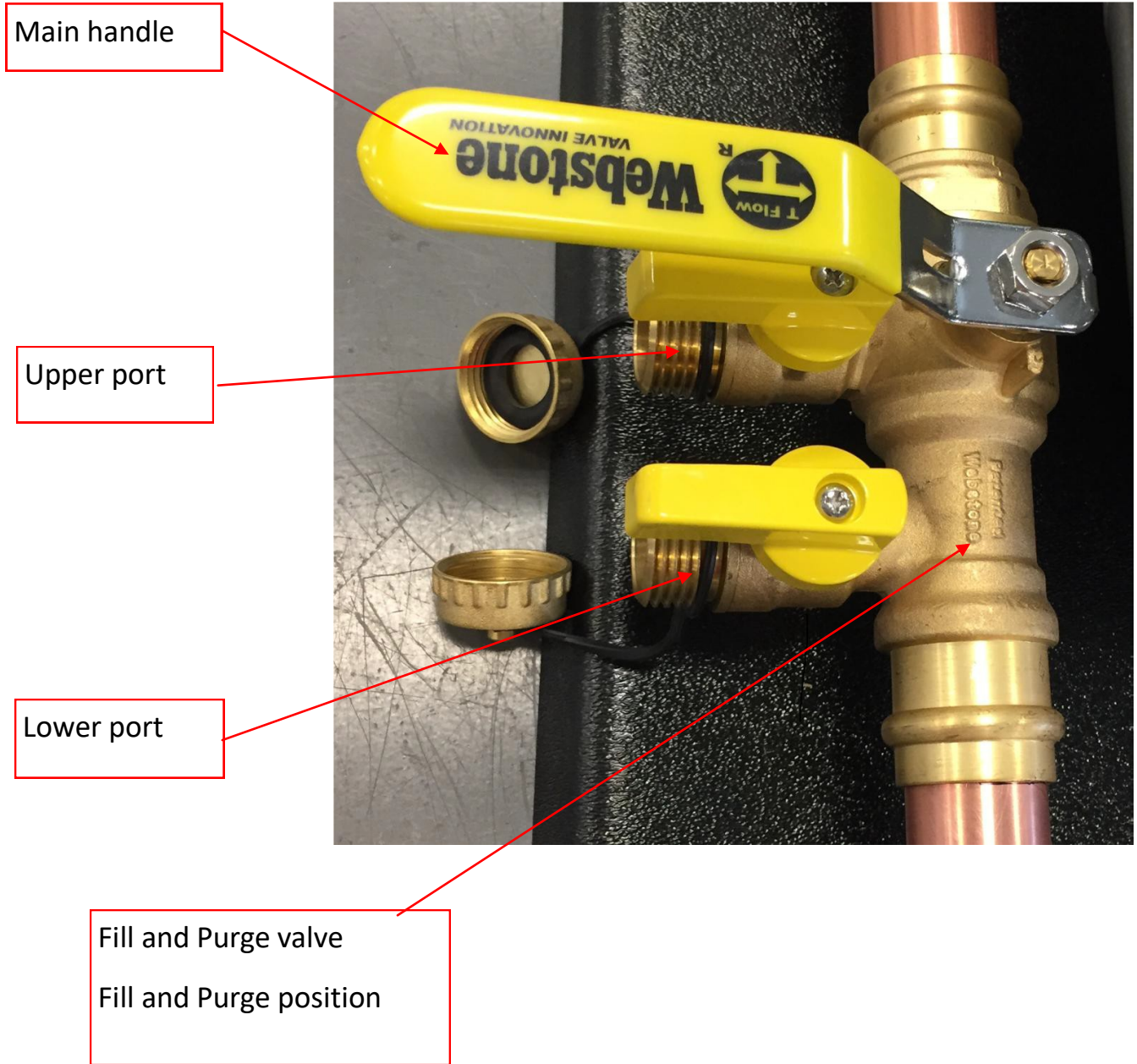
Purging Air and Filling With Anti-Freeze

Important Information:

When choosing a drill to run the pump, a higher RPM drill is desired. For best results your drill should be capable of 1200 RPM min. 1600 RPM or greater is desirable. If your drill's RPM is low, it will take longer to fill and purge the system and the final pressure will be lower.

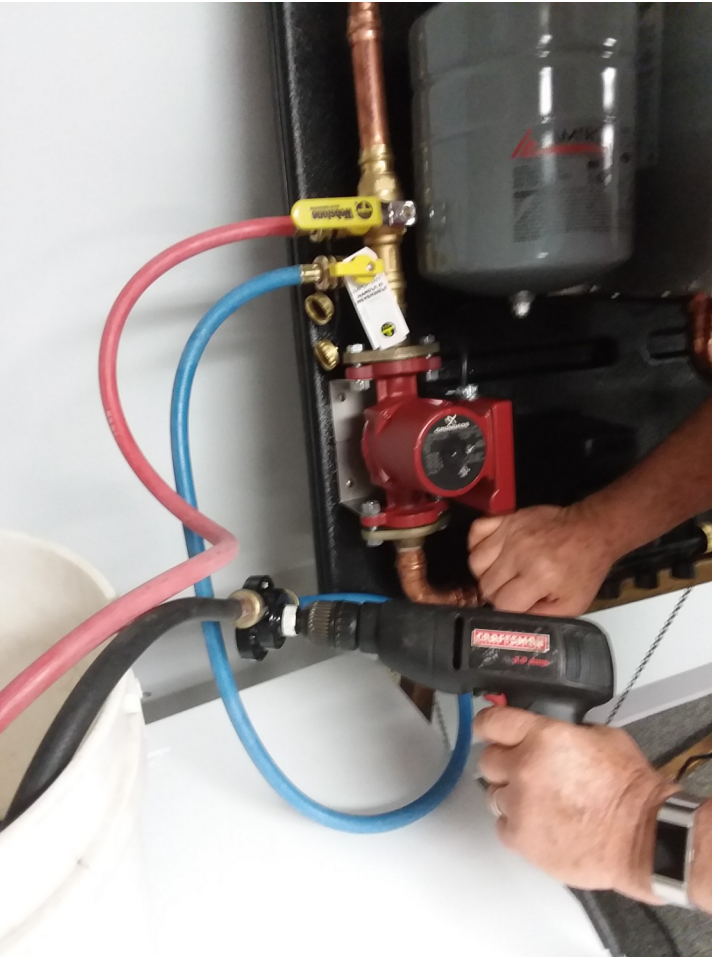
1. Position the FILL and PURGE VALVE main handle as shown in Figure 4
2. Connect a hose from a pail filled with our antifreeze solution to the drill pump inlet.
3. Connect a second hose from the pump outlet to the lower FILL and PURGE port. Open the lower PURGE port. (*Borrow the hoses from your washing 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. (Figure 5)
6. Start the drill pump, refilling the pail with propylene glycol antifreeze, (thermal transfer fluid), 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 thermal transfer fluid 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 transfer fluid 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 the system



Filling using drill pump



Filling the system using a 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 the thermostat. Locate the thermostat on an inside wall away from direct sunlight or any areas that may be influenced by drafts. See the RMS Wiring Diagram, p. 16, 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 RMS 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 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% 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 RMS 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

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