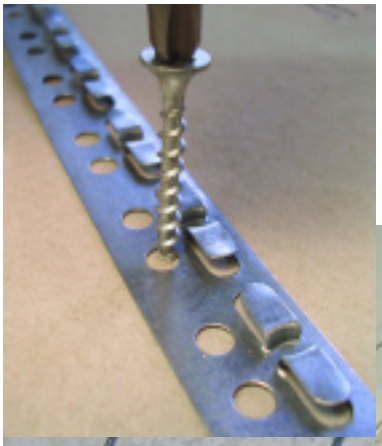
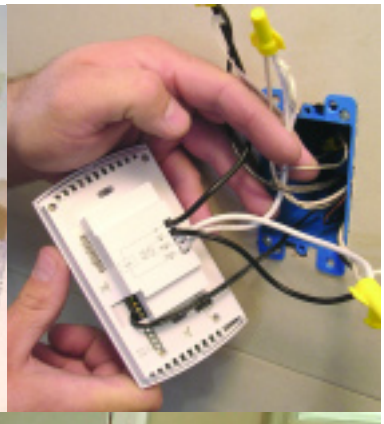
HeatWeave

WarmWire™





INSTALLATION MANUAL

www.wattsradiant.com 800-276-2419

Welcome

WarmWire is a simple, economical way to warm your floors, and provide years of lasting comfort. This instruction manual walks you through the complete process of installing a floor-warming system.

Fasten the cables to the floor, then, depending on your floor coverings, put down a layer of thin-set, thick-set, or self-level mortar on top of the cables. Finally, install your floor coverings. It's that simple!

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Project Facts:

Time to install:
An average size bath should take about 2 hours to install the cables and about 4 hours to install the electrical box, thermostat, and power.

Skill level:
Intermediate wiring and floor cover-laying skills. Consider using an electrician for roughing in the wiring, especially if you need to route from your circuit breaker panel. Consult with local building authorities, since many areas require that a qualified electrician perform all of the wiring and hookups.

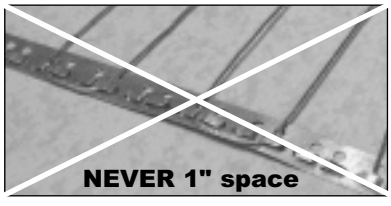
Phase 1: Designing Your System

WarmWire cables should be installed in all floor areas you want warmed. In some applications, WarmWire can be used to heat the room as well, but in general it is not designed for this purpose (you will need to do heat-loss calculations to determine if WarmWire will provide enough heat to match the heat loss).

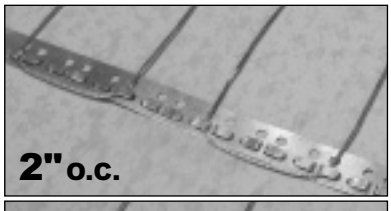
STEP 1.1

Make a sketch of the room. Measure the total square footage of floor area you wish to warm (measurements should be made all the way to the edge of walls, cabinets, tub, etc., for now). Keep in mind the following:

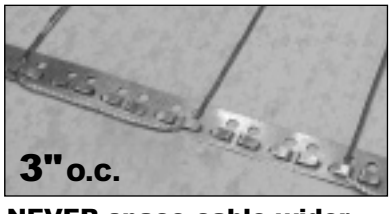
- The cable cannot heat beyond about 2" on either side of the cable, so consistent coverage is important.
- Permanent bench seats with tile or stone can also contain WarmWire.
- Do not place WarmWire in shower areas.
- You cannot place WarmWire underneath cabinets or fixtures or inside a wall.
- Do not run WarmWire into small closets or other confined areas that may cause excessive heat to build up.
- Do not install the cables closer than 6" from toilet rings to avoid possible melting of wax rings.
- In open areas, like sunrooms or dining rooms, consider installing WarmWire 6" to 12" around the perimeter of the room, since you rarely stand this close to walls.



NEVER space cable closer than 2" o.c.



2.5" spacing is achieved by alternating 2" and 3" spacing.



NEVER space cable wider than 3" o.c.

STEP 1.2

Select the cable spacing.

Following are typical locations with recommended spacing. This can vary depending on the insulation of the floor and room, and the desired effect. Never space cables closer than 2" apart as this will cause a very hot area, and may cause damage.

Typical uses:

- **2" spacing:** Sunroom floors, basement slabs, and baths with exterior walls. (NOTE: Insulation is always recommended due to high heat losses in these areas. Performance is never guaranteed due to construction and climate differences in these applications.)
- **2.5" spacing:** Bathrooms, kitchens, living areas, basements.
- **3" spacing:** Hallways, entryways, large areas with low heat loss.

STEP 1.3

Multiply the square footage you measured in Step 1.1 by 0.90 to allow for 3" spacing around the edges of the floor area.

STEP 1.4

Use this resulting square footage to select the appropriate cable from the WarmWire selection tables (p. 4).

Remember:

- Do not place over 15 amps at 120V (1800 Watts) or 13 amps (3120 Watts) at 240V through a HeatWeave thermostat control.
- You can select either 120V or 240V depending on the power available to you. But DO NOT mix voltages on the same system if you need more than one cable to cover an area.
- You cannot put more than 12 amps (1440 Watts) on a 15 amp circuit breaker, or 16 amps (1920 Watts) on a 20 amp circuit breaker.

If the exact size of cable calculated is not found in the WarmWire Spools tables (next page), you may need to adjust your warming area(s) or select the next size smaller than your area. **Remember, the cable cannot be cut to fit and must be embedded completely in mortar in the floor. Be careful not to select a kit that is too large.**

STEP 1.5

Select enough WarmWire Strap (Order No. 81003676) to secure the cable to the floor. A box contains 25 ft. of Strap, enough to prepare about 50 sq. ft. of floor at 4-ft. spacing. Straps are usually spaced 3–4 ft. o.c.

Example 1: There is 40 square feet of bathroom area to be warmed with 120V. It is to be spaced at 2.5" to provide 12 watts per square foot, providing comfortable warmth across the floor area. As seen in Table 1, we can use Model Number 120040WD.

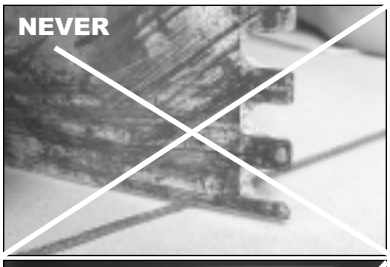
Table 1: 120 VAC WarmWire Spools

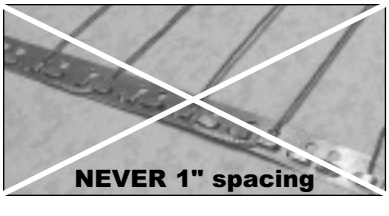
Model Number	Order Number	Total Sq. ft. at 2" o.c. 15W/sq. ft.	Total Sq. ft. at 2.5" o.c. 12W/sq. ft.	Total Sq. ft. at 3" o.c. 10W/sq. ft.	Wire Length (in Feet)	Amperage Draw	Resistance (in Ohms)
120010WD	81004574	8	10	12	47	1.0	108–132
120015WD	81004575	12	15	18	71	1.5	72–88
120020WD	81004576	16	20	24	94	2.0	52–64
120025WD	81004577	20	25	30	118	2.5	41–51
120030WD	81004578	24	30	36	141	3.0	33–40
120035WD	81004579	28	35	42	165	3.5	28–34
120040WD	81004580	32	40	48	188	4.0	24–30
120045WD	81004581	36	45	54	212	4.5	22–27
120050WD	81004582	40	50	60	235	5.0	19–24
120060WD	81004583	48	60	72	282	6.0	16–20
120070WD	81004584	56	70	84	329	7.0	14–17
120080WD	81004585	64	80	96	376	8.0	12–15
120090WD	81004586	72	90	108	423	9.0	11–13
120100WD	81004587	80	100	120	470	10.0	9–12

Example 2: There is 270 square feet of kitchen and dining area to be warmed with 240V. It is to be spaced at 3" to provide 10 watts per square foot, providing warmth across the floor area. As seen in Table 2, we can choose Models #240200WD and #240020WD and end up with about 264 square feet covered.

Table 2: 240 VAC WarmWire Spools

Model Number	Order Number	Total Sq. ft. at 2" o.c. 15W/sq. ft.	Total Sq. ft. at 2.5" o.c. 12W/sq. ft.	Total Sq. ft. at 3" o.c. 10W/sq. ft.	Wire Length (in Feet)	Amperage Draw	Resistance (in Ohms)
240020WD	81004588	16	20	24	94	1.0	217–265
240030WD	81004589	24	30	36	142	1.5	144–176
240040WD	81004590	32	40	48	188	2.0	105–128
240050WD	81004591	40	50	60	236	2.5	83–102
240060WD	81004592	48	60	72	282	3.0	66–81
240070WD	81004593	56	70	84	330	3.5	57–69
240080WD	81004594	64	80	96	376	4.0	49–61
240090WD	81004595	72	90	108	424	4.5	44–54
240100WD	81004596	80	100	120	470	5.0	39–48
240120WD	81004597	96	120	144	564	6.0	33–40
240140WD	81004598	112	140	168	658	7.0	28–34
240160WD	81004599	128	160	192	752	8.0	24–30
240180WD	81004601	144	180	216	846	9.0	22–27
240200WD	81004602	160	200	240	940	10.0	19–24



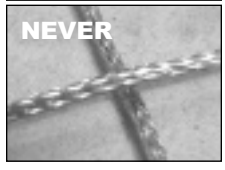


Phase 2: Preparation

Some Cautions:

As with any electrical product, care should be taken to guard against the potential risks of fire and electric shock and injury to persons. The following Cautions must be observed:

NEVER cut the heating cable. However, the 10' power lead can be cut shorter if needed.
NEVER bang a trowel or other tool on the cable. Be careful not to nick, cut, or pinch the cable causing it to be damaged.
NEVER install the heating portion of the cable in any walls, in closets, over walls or partitions that extend to the ceiling, or over cabinets.
NEVER extend the heating portion of the cable beyond the room or area in which it originates.
NEVER attempt to repair a damaged cable. Contact the factory for help.
NEVER overlap cables. Dangerous overheating can occur.
NEVER overlap a power lead across a heating cable as this could cause damage.
NEVER embed the cables in adhesives intended for laminate or vinyl flooring. It must be completely embedded in cement based mortar.
NEVER install the cables under cabinets or other built-ins. Excess heat can build up under these items.
NEVER combine systems of different voltages. Damage can result.
NEVER use 1" spacing.



ALWAYS maintain a minimum of 2" spacing between cables.
ALWAYS use copper only as supply conductors to the control and WarmWire. Do not use aluminum.
ALWAYS test the cable resistances and record them in the log in this manual.

ALWAYS pay close attention to voltage and amp requirements of the circuit breaker, thermostat, and the WarmWire cable system. For instance, do not supply 240 VAC to 120 VAC thermostats and cables.

ALWAYS make sure all electrical work is done in accordance with local building codes, the National Electrical Code (NEC), especially Article 424, Part IX, and Section 62 of the Canadian Electrical Code (CEC) Part I.

Some Tips:

Insulation. The better insulation you provide, the more efficiently the system operates to better heat your flooring. Concrete slab surfaces offer the most thermal drain and should be insulated underneath if at all possible.

Controls. The FloorStat™ floor-sensing thermostat will provide direct floor warming control for better comfort. Other controls may not give the level of control you desire. Always select controls that will meet the voltage and amp ratings of the system and are designed for resistance heating systems.

Mortars. Self-leveling mortars are becoming more popular to use because of their ease of application over the cables. If you are applying tiles, you will need to apply another layer of thin-set to lay the tiles.

LoudMouth™. The LoudMouth sounds a loud whistle if any damage occurs to the mat during installation. The LoudMouth stays connected to the power leads throughout mat and tile installation. The small screwdriver for connecting the leads is included with the LoudMouth monitor.

Items Needed:

Materials:
- HeatWeave WarmWire System
- HeatWeave WarmWire Strap
- Thermostat control with floor sensor (FloorStat)
- 20-amp circuit breaker (single for 120V and dual for 240V systems)
- Electrical box (extra deep) for thermostat; single-gang (not a gangable type) or 4"-square deep box with a single-gang “mud ring” cover
- 4" junction box with a cover, if needed
- Cable clamps for junction box (for new construction)
- Flex or rigid conduit (for new construction)
- 12-gauge or 14-gauge electrical wiring cable (consult your local code)
- Wire nuts (red) if using a junction box
- Nail plate

Tools:
- Digital multi-meter (for ohms testing; must read up to 20 kohm to measure sensor)
- Drill with 1/2" bit
- Hammer and chisel
- Wire strippers
- Phillips screwdriver
- Fish tape (for existing construction)
- Hole saw (for existing construction)

Floor covering installation tools:
- Book or video on Electrical Wiring Techniques
- Book or video on Floor Covering Installation Techniques

Phase 3: Check out the Product

STEP 3.1

Take the WarmWire out of the box and look it over to make sure there is no visible damage. There are armored leads coming out of the spool of cable called the “power leads” (they are just regular cables which do not heat). The power leads are approximately 10 feet long and will connect your “heating” cable to the thermostat for power.

STEP 3.2

Record the product information. There is a factory-applied nameplate label on the cable. Do not remove this label. Record the cable serial number, model number, voltage, and cable resistance range on the Cable Resistance Log (see next page). If you have more than one WarmWire cable, do this for each of them.

IMPORTANT:

To retain the Limited Warranty, the following measurements must be recorded, and all steps of this manual followed. Refer to the Limited Warranty now for complete requirements (see p. 20).

STEP 3.3

Take resistance readings of the cable to make sure it is not damaged. This is very important to do throughout the installation process. Use a quality digital ohm meter or multimeter to make these measurements. Analog meters (with the moving needle) are not accurate for this product and shouldn't be used.

Take resistance readings (1) before you begin installation, (2) after the cable is fastened to the floor, and (3) after floor coverings are installed. Checking these measurements frequently during tile installation is highly recommended to avoid burying a damaged wire.

Checking for Breaks

Measure resistance between the black and white leads (black and blue leads for 240V cables) and record this in the chart below. This measurement should be within the Cable Resistance range shown on the nameplate label. A cut or break in the wire is indicated by a resistance of "infinite" ohms (no continuity).

Checking for Short-Circuits

Measure resistance between the black and green leads and between the white and green leads (blue and green leads for 240V cables) and record this value below. These measurements should be "infinite" ohms (no continuity). A cut or pinch in the wire is indicated by a resistance value between zero and the cable resistance.

WarmWire Cable Resistance Log

	Cable 1	Cable 2	Cable 3
Cable Serial Number			
Cable Model			
Cable Voltage			
Cable Resistance Range			
OUT OF THE BOX BEFORE INSTALLATION (ohms)			
Cable black to white			
Cable black to green			
Cable white to green			
AFTER CABLE IS SECURED TO THE FLOOR (ohms)			
Cable black to white			
Cable black to green			
Cable white to green			
AFTER FLOOR COVERING IS INSTALLED (ohms)			
Cable black to white			
Cable black to green			
Cable white to green			

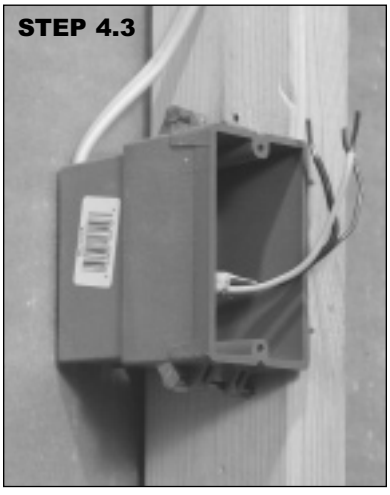
Phase 4: Electric Rough-In

Refer to the "Control Wiring Diagrams" section at the end of this manual for wiring diagrams of different voltages and applications. For additional help see **www.wattsradiant.com**.

New Construction (for Existing Construction see below)

OVERVIEW

We recommend the WarmWire system be installed on a dedicated circuit coming directly from your circuit breaker panel. Follow all National Electric Code (NEC) and other local electrical code requirements when installing this system. Work should be done with great care and with the power turned off to the circuit being worked on.



Optional: Install an extra-deep single-gang box if connecting one or two cables to the control, or use a 4"-square deep box with a single cover if connecting three cables, because the extra room is needed for the wire, wire nuts, and thermostat.

STEP 4.1
Install a maximum 20 amp circuit breaker(s) into the breaker panel, depending on the load of the WarmWire system. Use a 120V single-pole breaker for a 120V system. Use a 240V double-pole breaker for a 240V system. Use a GFCI (Ground Fault Circuit Interrupter) type if you are not using a HeatWeave FloorStat control which always includes a GFCI.

STEP 4.2
Install an electrical box for the thermostat. If installing one to two WarmWire cables, use an extra-deep single-gang box to allow plenty of room to work with the wiring. Use a 4"-square box if installing three to four WarmWire cables. It can be located almost anywhere since the thermostat operates on a floor sensor, not the air temperature. However, the best place is in the same room as the WarmWire, typically about 60" above the floor, and within reach of the power lead wires of the cable. If you have more than four WarmWire kits, you will need to connect their power leads in a junction box first (see step 4.4) to keep from over-filling the thermostat box. Then route one power supply from this junction box to the thermostat box.

STEP 4.3
Following code, feed 14-gauge or 12-gauge NM type electrical wiring from the circuit breaker panel to the thermostat electrical box. Leave approximately 6" to 8" of extra wire extended from the box to work with.

STEP 4.4
If you need to mount the thermostat box in a location that is too far to reach with the WarmWire power lead wires, you will also need to mount a junction box where you can terminate the lead wires. Use a standard junction box with a cover, mounting it below the floor, in the attic, or in another easily accessible location. It must be easily accessible and not put behind a wall or cabinet or similar obstruction. Then use 14-gauge or 12-gauge NM type or other accepted electrical wiring to connect from the junction box to the thermostat box.

STEP 4.5
Drill two 1/2" holes in the bottom plate directly below the thermostat electrical box. Then, as close to the floor surface as possible, drill two horizontal holes, intersecting the top holes.

STEP 4.6
If conduit is required by your local electrical code, cut a length of 1/2" to 3/4" electrical conduit to fit from the thermostat box down to the bottom plate. At the baseplate you may need to chisel out more of the wood to make it easier to feed the wires up through the conduit later.

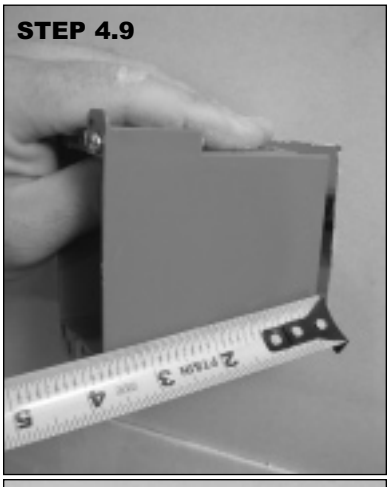
STEP 4.7
Mark the circuit breaker in your panel which feeds the WarmWire system with "HeatWeave floor warming/bath" or similar description.

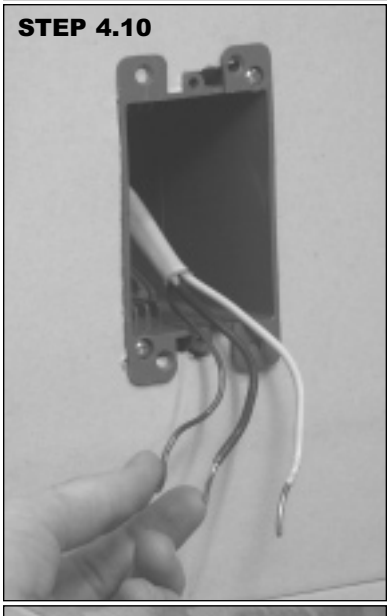
Existing Construction

OVERVIEW: We recommend that the WarmWire system be installed on a separate, dedicated, circuit coming directly from your breaker panel. In existing construction, however, it may be difficult to do this depending on the location of wiring and the breaker panel. Tapping off an existing circuit may be possible, but only if there is enough load capacity to handle both the WarmWire system and any additional loads that may be placed on the circuit. Remember, typical hair dryers can pull up to 10 amps (1200 watts) of load.

Follow all NEC and other local electrical code requirements when installing this system. Work should be done with great care and with the power turned off to the circuit being worked on.

STEP 4.8
If you are using a new breaker, install a maximum 20 amp circuit breaker into the breaker panel. Use a 120V single-pole breaker for a 120V system. Use a 240V double-pole breaker for a 240V system. Use a GFCI (Ground Fault Circuit Interrupter) type if you are not using a HeatWeave FloorStat control which always includes a GFCI.





STEP 4.9
Install an electrical box for the thermostat. If installing one to two WarmWire cables, use an extra-deep single-gang box to allow plenty of room to work with the wiring. Use a 4"-square box if installing three to four WarmWire cables. It can be located almost anywhere since the thermostat operates on a floor sensor, not the air temperature. However, the best place is in the same room as the WarmWire, typically about 60" above the floor, and within reach of the power lead wires of the cable. If you have more than four WarmWire kits, you will need to connect their power leads in a junction box first (see step 4.4) to keep from over-filling the thermostat box. Then route one power supply from this junction box to the thermostat box.

STEP 4.10
Following code, feed 14-gauge or 12-gauge NM type electrical wiring from the circuit breaker panel to the thermostat electrical box. Leave approximately 6" to 8" of extra wire extended from the box.

STEP 4.11
If you need to mount the thermostat box in a location that is too far to reach with the WarmWire power lead wires, you will also need to mount a junction box where you can terminate the lead wires. Use a standard junction box with a cover, mounting it below the floor, in the attic, or in another easily accessible location. (It must be easily accessible and not put behind a cabinet or similar obstruction). And then use 14-gauge or 12-gauge NM type or other accepted electrical wiring to connect from the junction box to the thermostat box.

STEP 4.12
At the floor level below the thermostat box, cut out a 2" tall by 2" wide piece of the wall surface. Use a wood chisel to notch out a channel in the base plate to make it easier to route the wires up the wall.

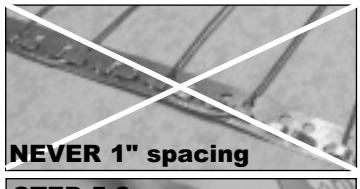
STEP 4.13
Mark the circuit breaker in your panel which feeds the WarmWire system with “HeatWeave floor warming/bath” or similar.

Phase 5: Installing the WarmWire

GETTING STARTED:

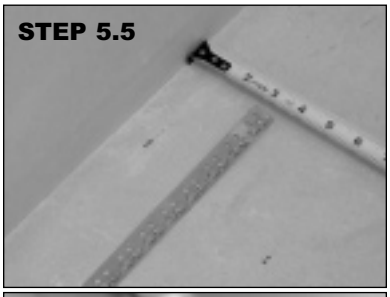
STEP 5.1
Use your sketch and design considerations made earlier in the “Designing your system” section to begin laying the WarmWire. Do not install the cables closer than about 4" to 6" from toilet rings and plumbing to keep from overheating these items.

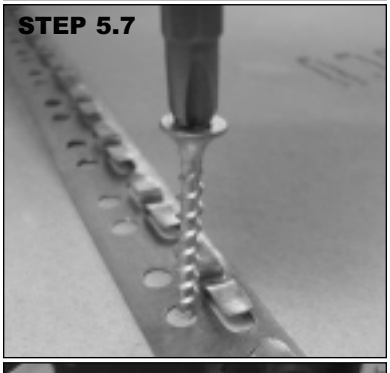
STEP 5.2
Make sure to space the cables to provide the warmth you want. DO NOT space them at 1" apart as this will cause a very hot area and may damage the system. Make sure you have the proper system size for the square footage you wish to cover before moving on.

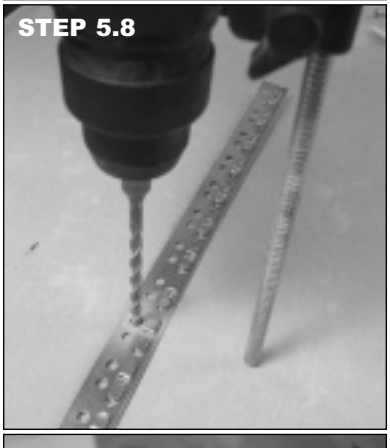


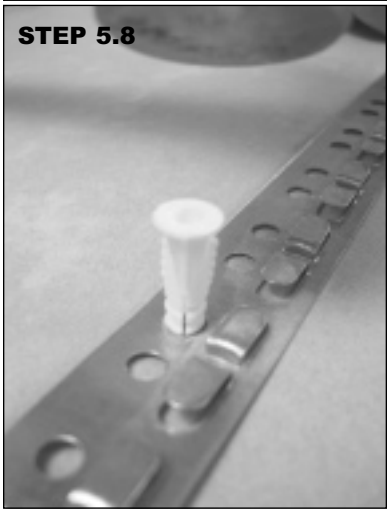
STEP 5.3
If this is new construction, draw lines on the floor or use templates to outline the area of any cabinets, fixtures, or future walls that will be placed in the room. DO NOT run WarmWire under cabinets, fixtures, or walls, or else excess heat may build up and cause damage.

STEP 5.4
Decide which way your WarmWire will run on the floor for the easiest coverage. Take a look at the sample diagrams in the Appendix to this manual for some help. Depending on the shape of the area, it may help to think of it in terms of several smaller areas. Remember, never cross the cables over each other or cut them shorter, or damage may result and may cause dangerous problems. A little extra forethought at this step of installation will make the rest of the job much easier.









GENERAL INSTALLATION:

STEP 5.5
Begin by measuring about 3" from the wall to place the WarmWire Strap. If your design called for 6"–12" away from the wall, install the strap at that distance.

STEP 5.6
Cut the WarmWire Strap to fit the length of the first area.

STEP 5.7
For floor surfaces other than concrete, begin securing the WarmWire Strap to the floor using galvanized nails or screws. We recommend securing the strap every 6" to 10".

STEP 5.8
If you have a concrete floor surface, use a hammer drill to set holes into the concrete. Then hammer an anchor into the hole, securing the WarmWire Strap. We recommend securing the strap every 6" to 10".

STEP 5.9
Cut another piece of cable strap for the other end of your area and secure 3" from the wall or other obstruction.

STEP 5.10
Unreel the power leads of the cable up to the factory splice. Let the coil of power leads just sit on the floor for now. Beyond the factory splice is the actual heating portion of the cable.

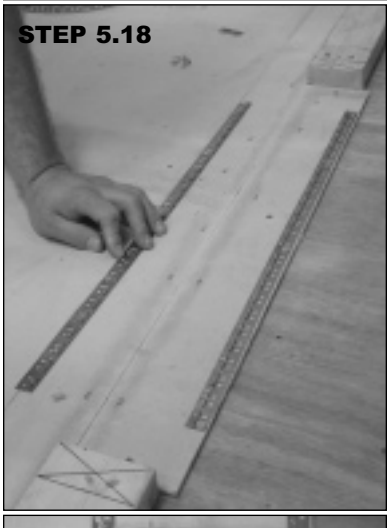
STEP 5.11
Before you install any more cable straps, fill in the first section with WarmWire. Begin by making a "strain-relief" at the beginning so the cable is not pulled loose by accident. Zigzag this location only as shown in the picture. Place the heating portion of the cable under the tabs and press down these tabs to hold the cable.

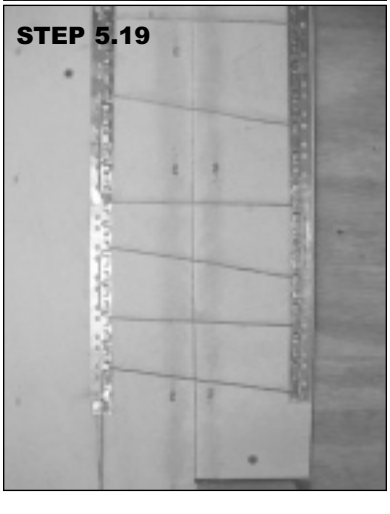
STEP 5.12
Weave back and forth across the area with the spacing desired until you reach the other side. Once you complete this area, press down all the tabs. Remember, NEVER space the cables less than 2" apart.

STEP 5.13
If you have additional areas to cover with the cable, in the same way cut the lengths of strapping necessary, attach them, and begin weaving the cable into that area.

OTHER INSTALLATIONS:

Because there are many shapes and different floor obstructions, we tried to give you three additional layouts you may encounter to fill the floor area. Certainly there are countless variations, but these should assist you in determining the best way to complete the job.





CORNER SHOWER OR VANITY

STEP 5.14
For an angled area, such as a corner shower, first cut several pieces of WarmWire Strap a little longer than the spacing you are using.

STEP 5.15
Use a chalk line or pen to mark the floor at 3" from the edge of the shower.

STEP 5.16
Use this chalk line to attach each piece of WarmWire Strap to the floor so the cable does not get any closer to the corner shower than 3". Make sure that the cable maintains even and parallel spacing.

STEP 5.17
Fill in the section with WarmWire.

DOOR ENTRYWAY

STEP 5.18
For an entryway or other small area where warmth is required, begin by cutting two lengths of WarmWire Strap a little shorter than the length of the entry opening. Then secure the two Straps parallel to each other.

STEP 5.19
Fill in this area. You may need to adjust your spacing so that the most area can be filled in as possible.

BENCH SEAT

STEP 5.20
If you have a bench seat or step area to cover (not in a shower area), place a single run up the riser. Use WarmWire straps to secure the cable to the seat area at the desired spacing, then install a single run down the riser. Again, the cable on the riser and seat area MUST be fully embedded in mortar and have approved floor coverings. Use hot glue where necessary to secure the WarmWire flat to the riser.

FINAL STEPS

STEP 5.24
If you have a second WarmWire cable to install in the area, remember that all power leads must come back to the control, or to a junction box and then to the control. Do not run the power lead across heating cables, under baseboard areas, or other potentially damaging areas. Never join two WarmWire cbles in series.

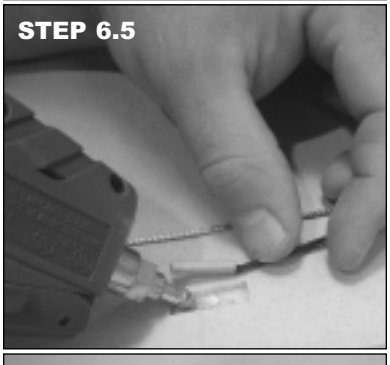
STEP 5.25
To help secure long lengths of heating cable, place additional lengths of the WarmWire Strap at about 3–4-ft. intervals. Just slide the strap under the cables upside down, then flip it over when it is positioned and press the tabs down over the cables. Secure the strap to the floor carefully, without damaging the WarmWire.

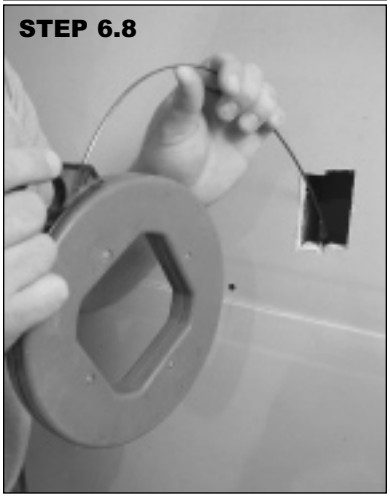
STEP 5.26
When you have completed all of the WarmWire installation, step back and take a look. Make sure all the tabs are down, spacings are correct, no wires cross, all the cables are undamaged, and all areas are covered that you want heated.

STEP 5.27
Take resistance readings of the cable again to make sure it has not been damaged during the installation. This is very important to do. Record these readings in the Cable Resistance Log shown on p. 6 of this manual.

STEP 5.28 (optional)
At this point, since the heating portion of the cable is fully installed, If possible, it is recommended to connect the cable temporarily to the power source and allow it to heat for several minutes. After you feel the cables begn to warm up, disconnect the power.

STEP 5.29
Lay cardboard, carpet, or similar material over the cables to protect them from damage until the floor covering is installed.





Phase 6: Finish Wiring

STEP 6.1
Chisel a channel in the floor to lay the power lead splice into. This will ensure the splice does not create a high-spot in the floor.

New Construction

STEP 6.2
Feed the power leads from the WarmWire up through the hole drilled in the baseplate, or up into the conduit to the thermostat box (or junction box if one was needed).

STEP 6.3
Secure the power lead splice into the chiseled channels with hot-glue.

STEP 6.4
Below the thermostat location, or wherever you choose to locate the thermostat sensor, measure at least 1 ft. into the WarmWire area. Mark the location halfway between two heating wires.

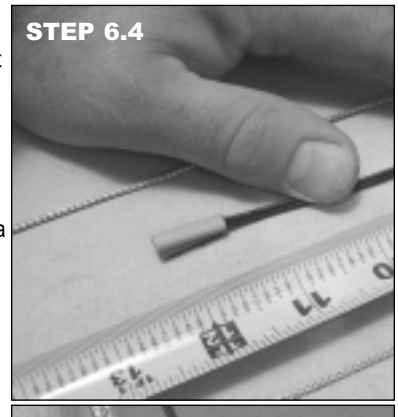
Tip: You may wish to install a second sensor in the floor as a backup, just in case the first ever gets damaged. The second sensor leads are simply not connected to the thermostat, but left unconnected and protected with electrical tape inside the thermostat box.

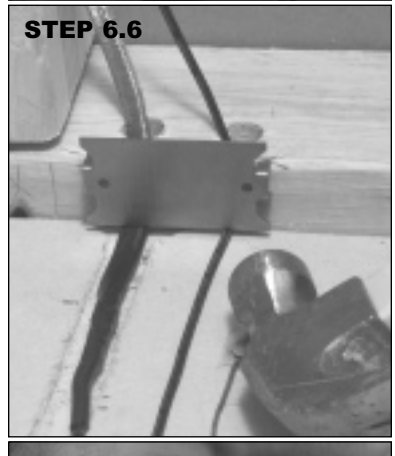
STEP 6.5
If necessary, chisel a channel to lay the sensor tip into, to make sure it does not create a high-spot in the floor. Then hot glue the tip into place.

STEP 6.6
Drill another hole into the baseplate, if needed, to feed the sensor wire up to the thermostat box. Finish by securing a steel nail plate over the wires to protect them against baseboard nails later.

STEP 6.7
If you had to end a power lead at a junction box, feed 14-gauge or 12-gauge electrical wire from this box to the thermostat box.

Tip: If you have more than one WarmWire cable, label the ends of the power leads with a brief description as to what area they "lead" to. Just use some tape and label them "Cable 1", "Cable 2", or "Kitchen", "Bath" or similar. It will help keep from mixing them up.



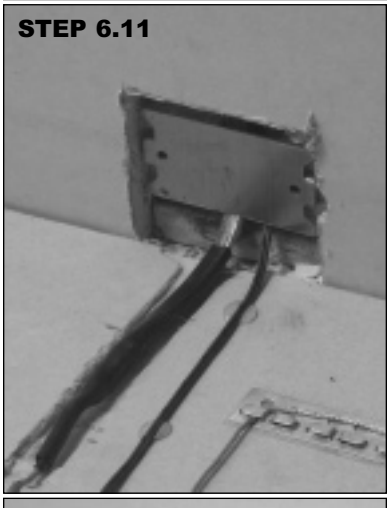


Existing Construction

STEP 6.8
Use a fish tape to pull the power leads up the wall to the thermostat box (or junction box if one was needed).

STEP 6.9
Below the thermostat location, or wherever you choose to locate the thermostat sensor, measure at least 1 ft. into the WarmWire area. Mark the location halfway between two heating wires.

Tip: You may wish to install a second sensor in the floor as a backup, just in case the first ever gets damaged. The second sensor leads are simply not connected to the thermostat, but left unconnected and protected with electrical tape inside the thermostat box.



STEP 6.10
Chisel a channel to lay the sensor tip into, to make sure it does not create a high-spot in the floor. Hot glue it into place.

STEP 6.11
Use a fish tape to pull the sensor up the wall to the thermostat box. Finish by securing a steel nail plate over the wires to protect them against baseboard nails later.

STEP 6.12
If you had to end a power lead at a junction box, feed 14-gauge or 12-gauge electrical wire from this box to the thermostat box.

Tip: If you have more than one WarmWire cable, label the ends of the leads with which area they go to. Just use some tape and label them “Cable 1”, “Cable 2”, or “Kitchen”, “Bath” or similar. It will help keep from mixing them up.

Phase 7: Install the Control

STEP 7.1
Read and follow the instructions that come with the thermostat control.

STEP 7.2
Refer to the Control Wiring Diagrams at the end of this manual for different voltages and applications.

STEP 7.3
Connect the power leads from the WarmWire (or the electrical wiring you ran from junction boxes) to the “LOAD” side of the thermostat control. Connect the incoming power to the “LINE” side of the thermostat control. Connect the sensor wires to the sensor terminals on the control. Connect the ground leads from the WarmWire to the ground wire from the incoming power.

STEP 7.4
Install the thermostat control into the thermostat box and turn the circuit breaker on to power this system. Test the system and control for several cycles. It should allow the heating cables to heat up correctly. Note: You may want to place a loose tile over the sensor tip to simulate warming the floor and allow the sensor to show this on the thermostat control.

STEP 7.5
Apply thermostat operation stickers (included with most controls) to the inside of the thermostat door or coverplate as recommended. Leave instruction sheets with the homeowner.

Phase 8: Install the Floor Covering

STEP 8.1 Select Type of Construction
Choose the best thin-set, thick-set, or self-leveling mortar method for your application. Consult with building professionals and/or HeatWeave personnel for help.

STEP 8.2 Floor Preparation
The floor must be completely swept of all debris including all nails, dirt, wood, and other construction debris. Make absolutely sure there are no objects on the floor that might damage the WarmWire cable.

STEP 8.3 Take One Last Look!
Look over the installation very carefully for signs of damage or missing sensor(s).

WARNING: Do not cut the wire or shorten the mat to make it fit the space. Doing so will cause dangerous overheating and will void the warranty!

STEP 8.4 Install the Floor

WarmWire can be installed in two general types of construction applications:

1. Thin-set or thick-set mortar beds (3/8"–1") over slabs or framed floors.
2. Self-leveling mortar beds (1/4"–1/2") over slabs or framed floors.

Always install WarmWire before installing mortar or cement. Do not lay WarmWire in wet mortar. We strongly recommend installing tile and stone flooring according to manufacturer’s recommendations, TCA guidelines, and ANSI specifications.

If installing non-masonry floor coverings, the best method is cover the WarmWire in a self-leveling mortar. Then install floating floors, vinyl, laminate or carpet, per industry and manufacturer's recommendations.

Thin-set or Thick-set Mortar Applications: There are several types of thin-set and thick-set mortar applications illustrated below and on the following pages.

a. If backer board or plywood sheeting is used to strengthen the floor, or if the mat will be placed directly onto the slab, install WarmWire in the thin-set mortar bond coat above these materials.

b. If a thicker mortar bed is used to strengthen the floor, WarmWire can be installed in either the mortar bed (dry-set) or in the mortar bond coat directly below the tile or stone.

CAUTION: If metal lath is used in the mortar bed, do not allow the WarmWire to come in direct contact with the lath because this could damage the wire.

Self-leveling Mortar Applications: There are only two approved methods of installing cement-based, self-leveling mortar beds over WarmWire – one for framed floor construction and one for slab construction. These are appropriate applications if installing engineered wood, vinyl, laminate, or carpet floor coverings. If installing WarmWire on a slab, simply attach the WarmWire to the slab, then pour self-leveling mortar 1/4" to 1/2" thick according to manufacturer's specifications. If installing WarmWire in self-leveling mortar over a frame floor, you must first stiffen the floor. Install floor covering after the mortar has cured.

In this application, WarmWire is generally installed above the self-leveling mortar in a thin-set bond coat. If you use plastic lath instead of the typical metal lath, the WarmWire can be installed in the self-leveling mortar bed.

Special Precautions

Isolation Membrane: If a crack isolation membrane or cork underlayment is being used, install the WarmWire above the membrane, unless otherwise recommended by the cork or membrane manufacturer. However, if Schluter® Ditra, Blanke Uni-Mat, or similar product is being used, install WarmWire below these products.

Insulation: Do not install rigid insulation directly above or below backer board or mortar. If possible, install insulation as shown in diagrams. Insulation dramatically enhances the performance and efficiency of floor-warming systems.

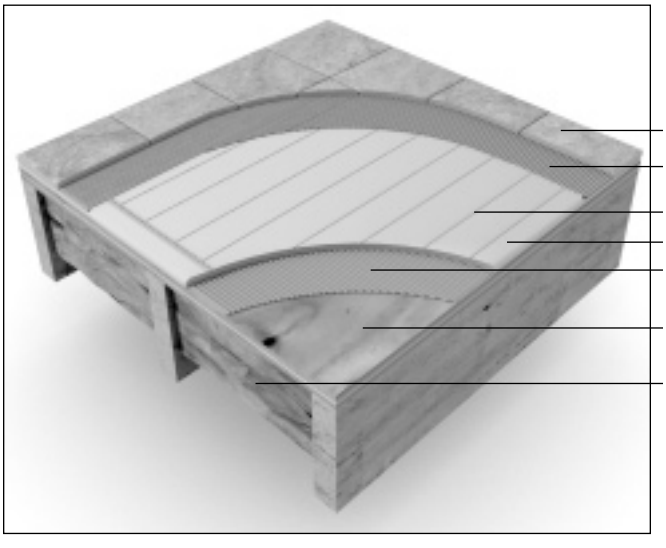
Mosaic Tile: If installing mosaic tile, we recommend a two-step process. First embed the WarmWire in a thin mortar bed (1/4"–3/8"), then thin-set the mosaic tile according to typical practice.

Expansion Joints: Do not install WarmWire through an expansion joint. Install the wire up to the joint, if necessary, but not through the joint.

STEP 8.5

After floor coverings have been installed, take resistance readings of the cable again to make sure it has not been damaged somehow during your installation. This is very important to do. Record these readings in the Cable Resistance Log shown earlier in the manual.

MORTAR APPLICATIONS

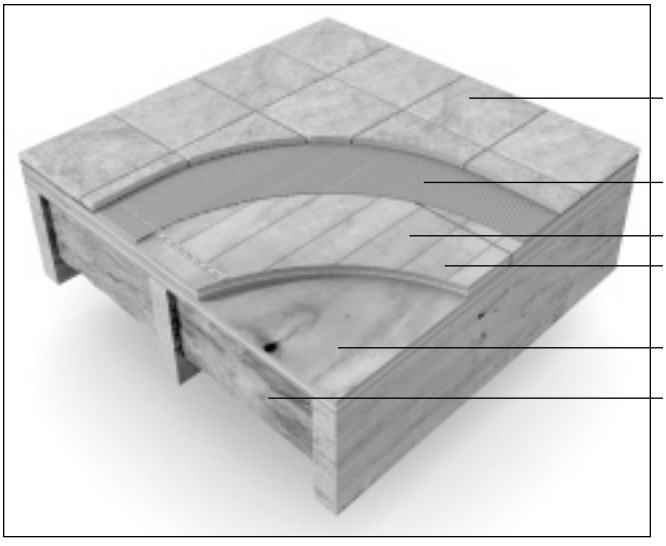


1. THIN-SET MORTAR OVER FRAMED FLOOR

(Dry-set or latex cement mortar; TCA #F144-03)

- Tile/stone
- Latex-Portland cement mortar bond coat
- WarmWire
- Backer board
- Mortar bed
- Plywood
- Insulation (per International Residential Code, Chapter 11)

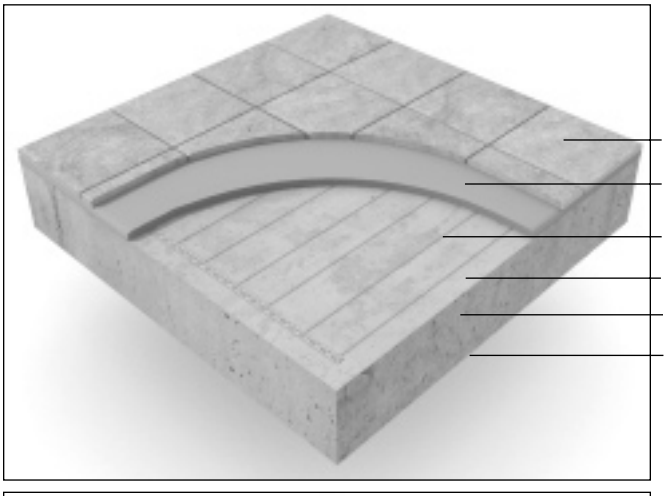
MORTAR APPLICATIONS



2. THIN-SET MORTAR OVER FRAMED FLOOR

(Dry-set or latex cement mortar; TCA #RH130-03)

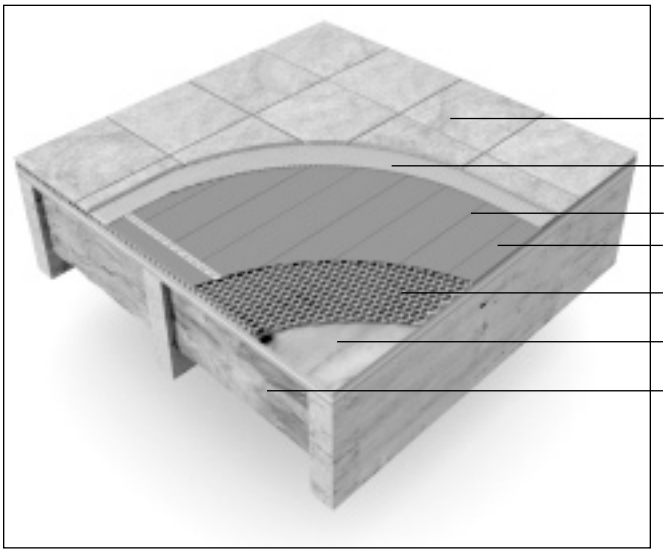
- Tile/stone
- Latex-Portland cement mortar bond coat
- WarmWire
- Plywood
- Plywood
- Insulation (per International Residential Code, Chapter 11)



3. THIN-SET MORTAR OVER SLAB

(Dry-set or latex cement on slab; TCA #RH115-03)

- Tile/stone
- Latex-Portland cement mortar bond coat
- WarmWire
- Crack isolation membrane or cork underlayment, as needed
- Slab
- Insulation beneath slab (per International Residential Code, Chapter 11)



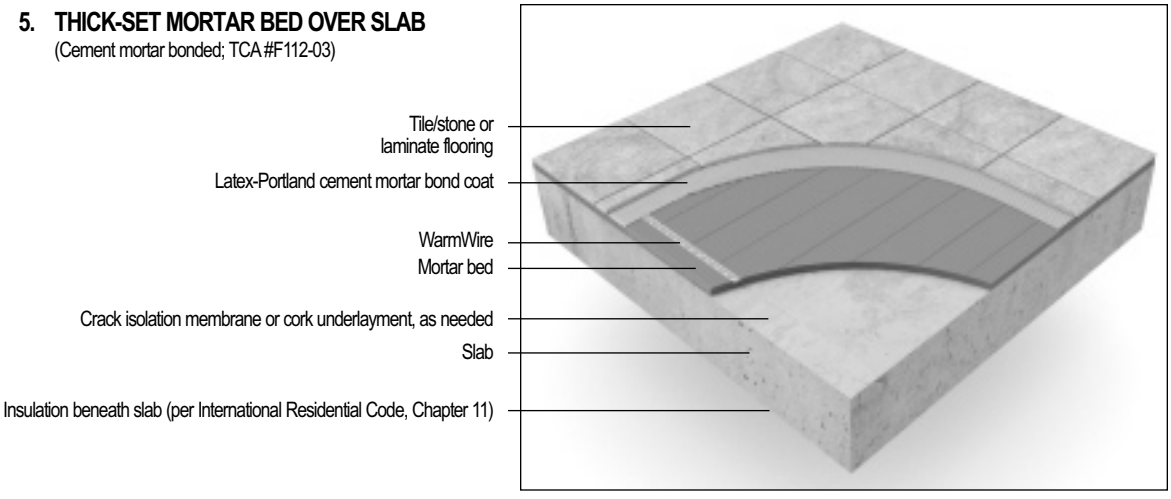
4. THICK-SET CEMENT MORTAR WITH LATH

(Cement mortar metal lath; TCA #145-03)

- Tile/stone or laminate flooring
- Latex-Portland cement mortar bond coat
- WarmWire
- Mortar bed
- Metal or plastic lath
- Plywood
- Insulation (per International Residential Code, Chapter 11)

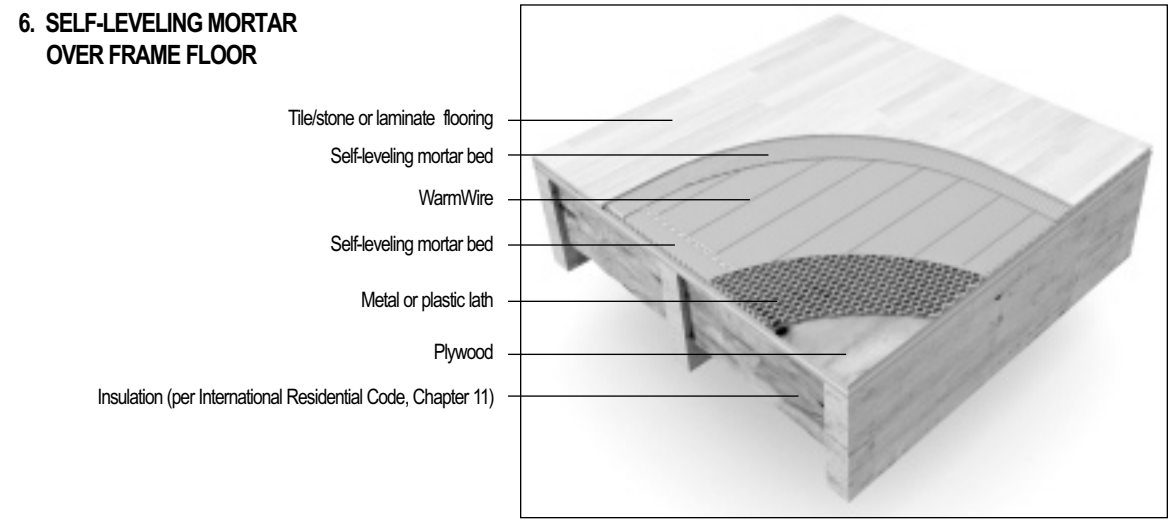
MORTAR APPLICATIONS

5. THICK-SET MORTAR BED OVER SLAB
(Cement mortar bonded; TCA #F112-03)

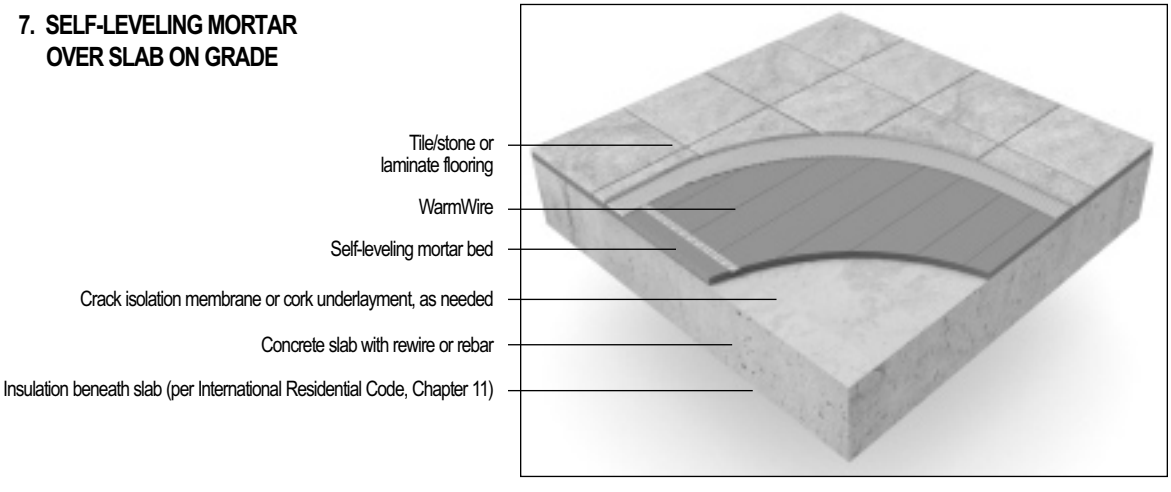


SELF-LEVELING APPLICATIONS

6. SELF-LEVELING MORTAR OVER FRAME FLOOR

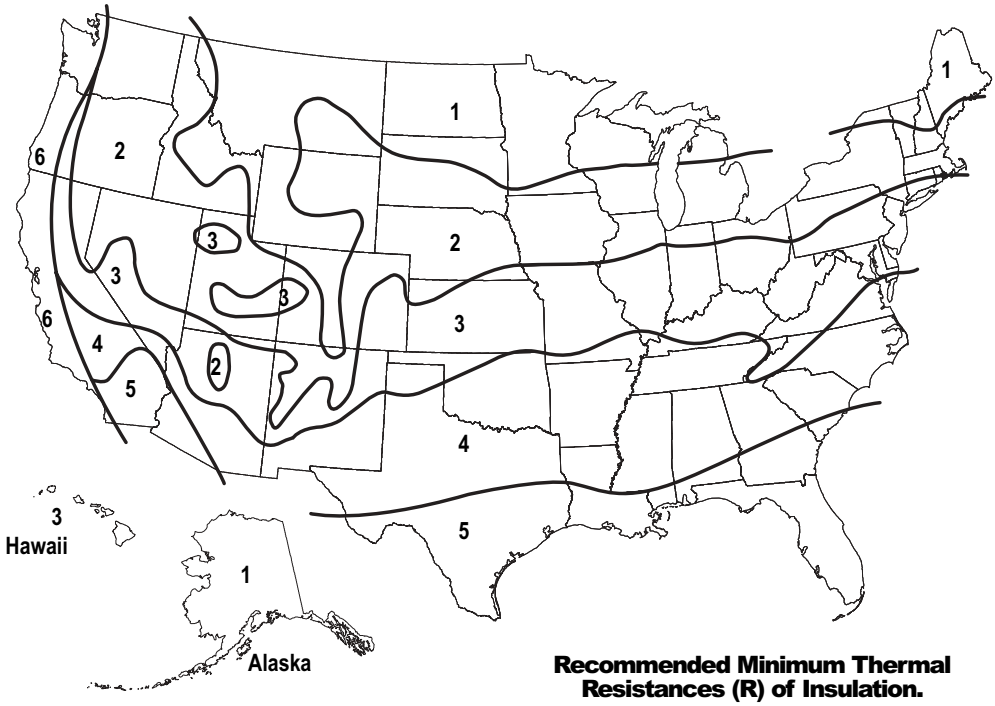


7. SELF-LEVELING MORTAR OVER SLAB ON GRADE



Phase 9: Install Insulation

Insulate under the subfloor for better performance and efficiency of the HeatWeave WarmWire system. Install according to the recommended minimums for your area of the country:



Recommended Minimum Thermal Resistances (R) of Insulation.

Zone	HDD*	Under Floor	Under Slab and Slab Perimeter (Depth Below Grade)
1	6500+	R-21	R-20, 4'
2	5000–6499	R-21	R-11, 4'
3	4000–4999	R-19	R-8, 3'
4	2500–3999	R-19	R-7, 2'
5	1500–2499	R-11	R-2, 2'
6	0–1499	R-11	R-2, 2'

The minimum insulation R-values recommended for various parts of the United States as delineated on the map of insulation zones. For any additional questions reference chapter 11 of the *2000 International Residential Building Code*.
*HDD = Heating Degree Days.

Phase 10: System Operation

After all WarmWire system components are in place and floor coverings are installed you may briefly test the operation of the system. But do not put it into full operation until the mortar materials are fully cured (typically one to four weeks. See the mortar manufacturer's recommendations for your specific type mortar).

Energize the system. Operate the controls so that the system turns on the floor-warming cable. The control will normally indicate that power is applied to the floor-warming cable. It takes some time to warm up. If you have a clamp-type ampmeter (electricians normally carry these) you may pull the thermostat back out of the wall and test to see if the cables are pulling current, thus indicating they are working as intended. Turn the system back off after NO MORE than 10 minutes of operation, and wait to operate it again after the floor mortar is cured.

Once the flooring is cured, you may operate this system with your controls for many years to come.

Enjoy your new HeatWeave WarmWire floor-warming system!

Troubleshooting

If you are not qualified to do electrical installations, we recommend hiring a qualified, licensed electrician to install HeatWeave WarmWire and related electrical components. If you, or your electrician, continue to have problems please read below for troubleshooting tips.

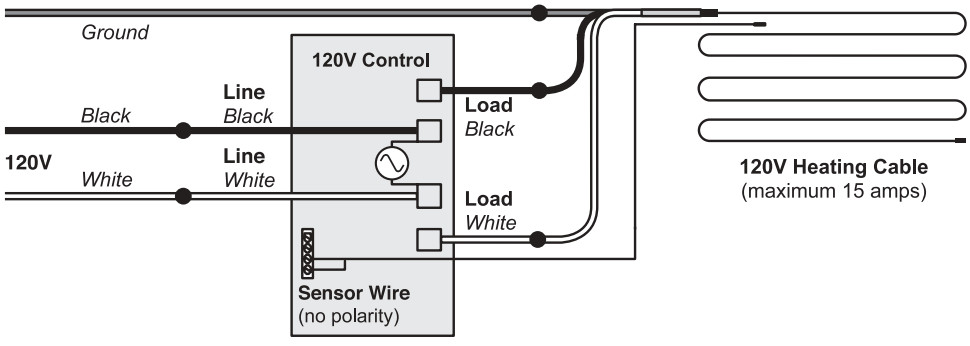
Any troubleshooting work should be done with the power removed from the circuit unless otherwise indicated.
See **www.wattsradiant.com** for further assistance.

Problem	Possible cause	Solution
Cable resistance measurement is different than the nameplate label	Used an Analog type meter (has a needle to indicate reading)	Obtain a digital type meter with ohms and remeasure.
	If measurement is showing an open or short-circuit, cable has been damaged	Contact the manufacturer.
	If measurement is just a little low or high, room temperature affected this resistance	Make the room 75°–85°F, or check with the manufacturer.
	Cables wired in “series” (end-to-end)	HeatWeave WarmWire cables must be connected in “parallel” if you have more than one cable (i.e. black-to-black, white-to-white).
The control is not working at all	No power is supplied	Check circuit breaker, measure voltage at the control.
	Defective control	Return to dealer for replacement.
The floor continuously heats	Sensor is loose or broken	If your control has a floor sensor, pull the wires loose and re-insert them. If it still does not work, measure resistance across the sensor wires: for a HeatWeave control it should be between 12,000 ohms (68°F) and 6,000 ohms (99°F).
The floor is not getting warm	Cable has been damaged	Measure cable resistance. Check for both “open circuit” and “short circuit” (as detailed earlier in this Manual). If damaged, contact the manufacturer.
	GFCI is tripped	Reset the GFCI. If it trips again, check for “short circuits” in the cable (as detailed earlier in this Manual). If damaged, contact the manufacturer. If not, replace the GFCI control.
	Incorrect voltage supplied	Measure voltage. 120V cable has black and white leads, 240V cable has black and red leads.
	Concrete slab floor	Surface temperatures rise slowly on slab. If after 5 to 8 hours of heating, it is not warmer to touch, check for cable damage (see “Cable has been damaged” above).
The control is not working correctly	Incorrect programming	Carefully read control instructions.
	Incorrect voltage supplied	Measure voltage at control, make sure it matches the control voltage rating.
	Sensor is disconnected or broken	See “The floor continuously heats” above.

Appendix: 120 Volt Control Wiring Diagrams

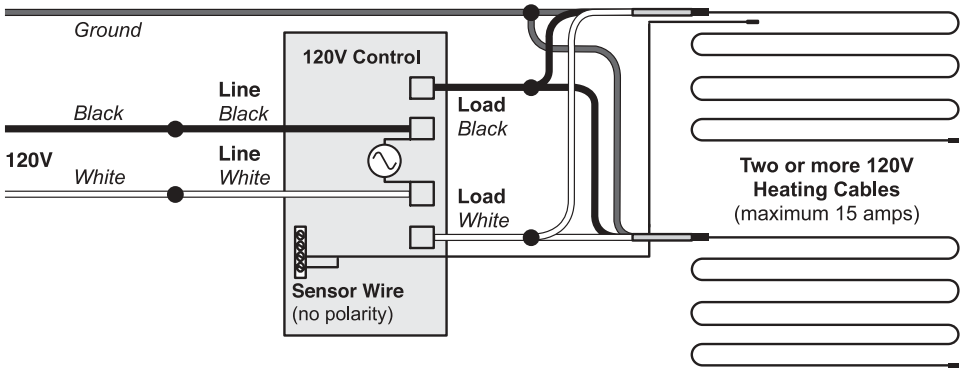
Typical Electrical Wiring Diagram with FloorStat Control (120V)

Dedicated 120-V, 20-amp (maximum) circuit (must be GFCI protected unless GFCI FloorStat is used).



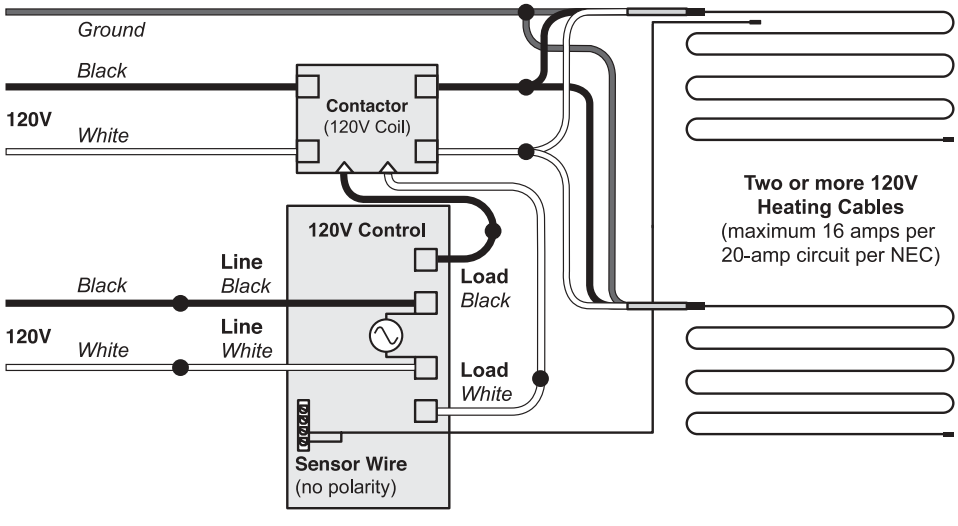
Typical Electrical Wiring Diagram with FloorStat Control (120V)

Dedicated 120-V, 20-amp (maximum) circuit (must be GFCI protected unless GFCI FloorStat is used).



Typical Electrical Wiring Diagram with FloorStat Control and Contactor (120V)

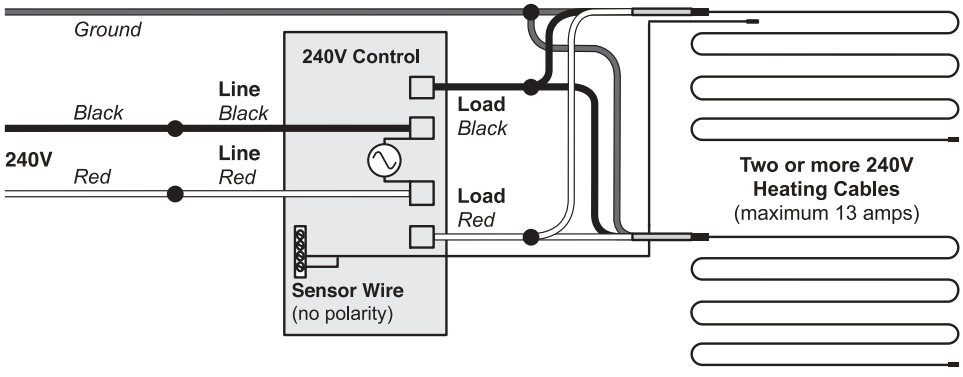
Dedicated 120-V, 20-amp (maximum) circuits (GFCI breaker provided by installer on contactor circuit).



Appendix: 240 Volt Control Wiring Diagrams

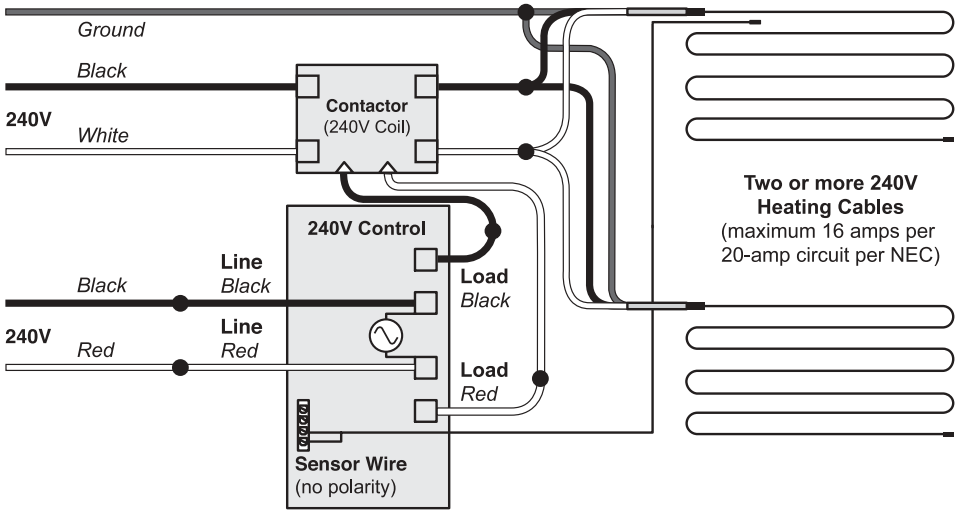
Typical Electrical Wiring Diagram with FloorStat Control (240V)

Dedicated 240-V, 20-amp (maximum) circuit (must be GFCI protected unless GFCI FloorStat is used).



Typical Electrical Wiring Diagram with FloorStat Control and Contactor (240V)

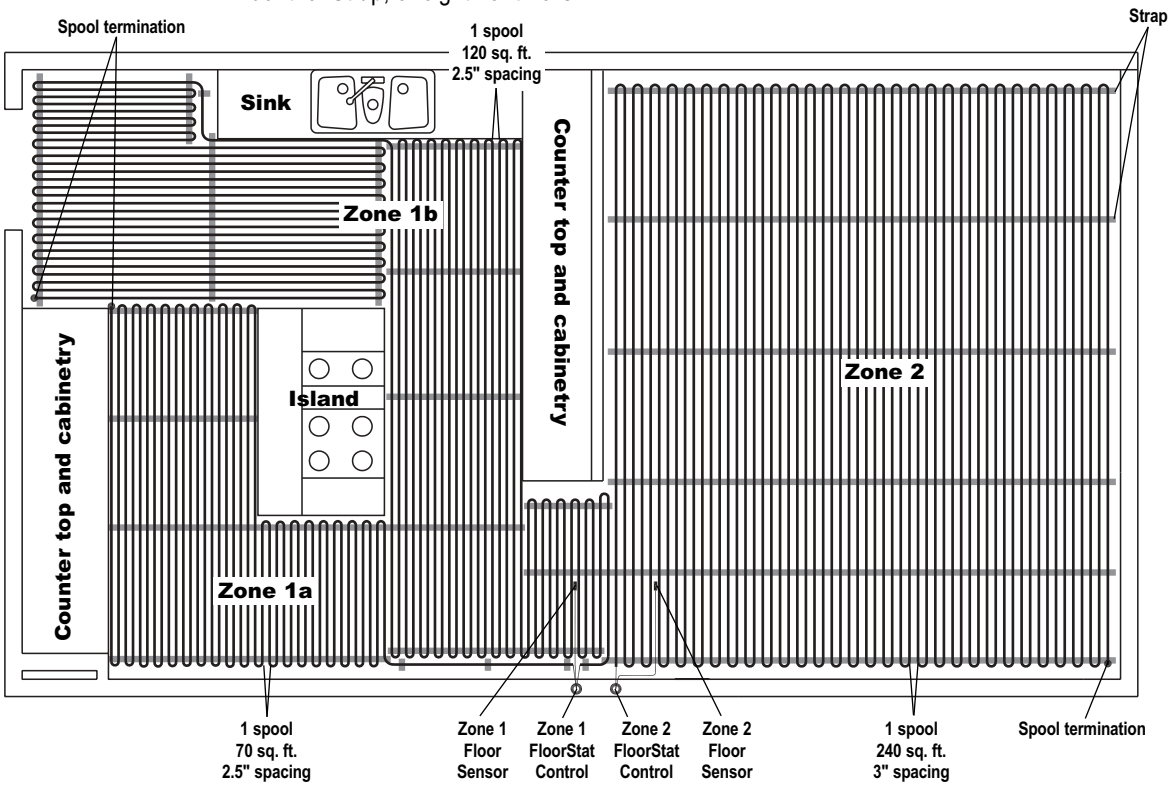
Dedicated 240-V, 20-amp (maximum) circuits (GFCI breaker provided by installer on contactor circuit).



Appendix: Sample WarmWire Layouts

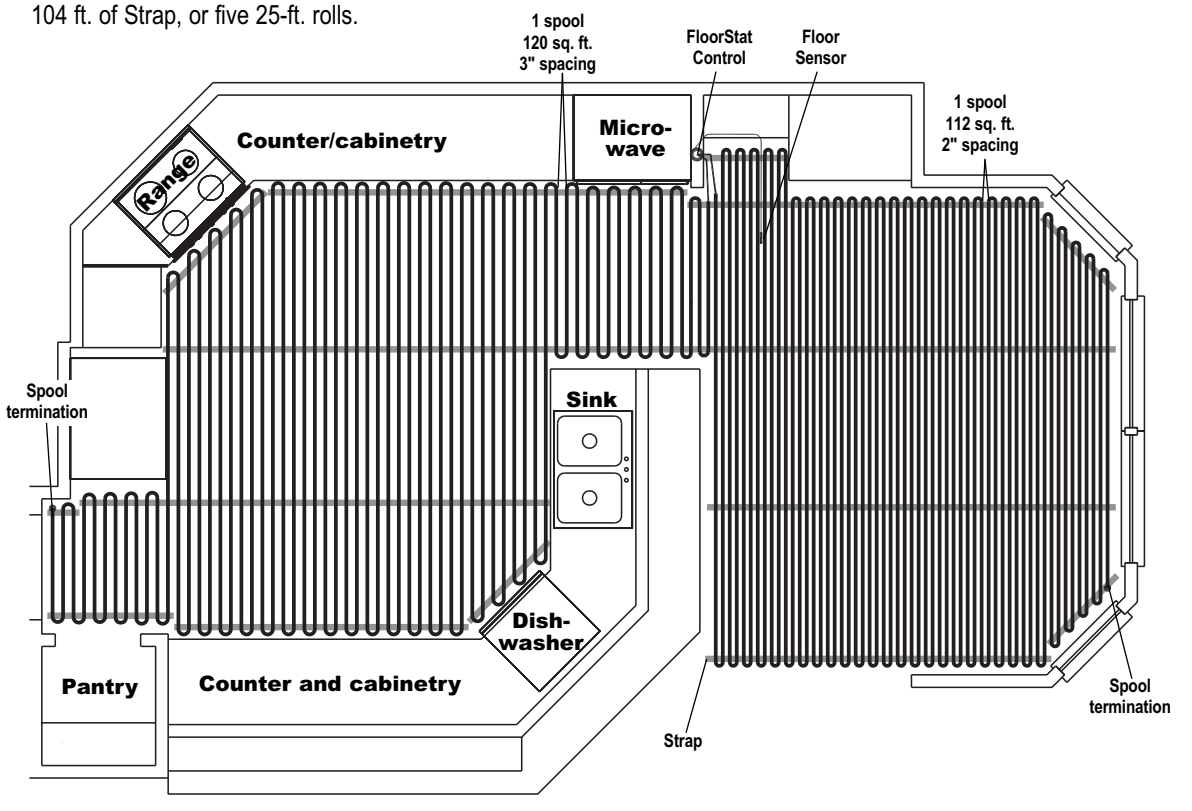
Kitchen and Family Room (normal heat loss, on-grade slab)

Two zones, 240 volts: Kitchen/Zone 1a = 1 spool, Zone 1b = 1 spool, 120 sq. ft., 2.5" spacing.
Family Room/Zone 2 = 1 spool, 240 sq. ft., 3" spacing
190 ft. of Strap, or eight 25-ft. rolls.



Kitchen and SunRoom (normal and high heat loss, framed floor construction)

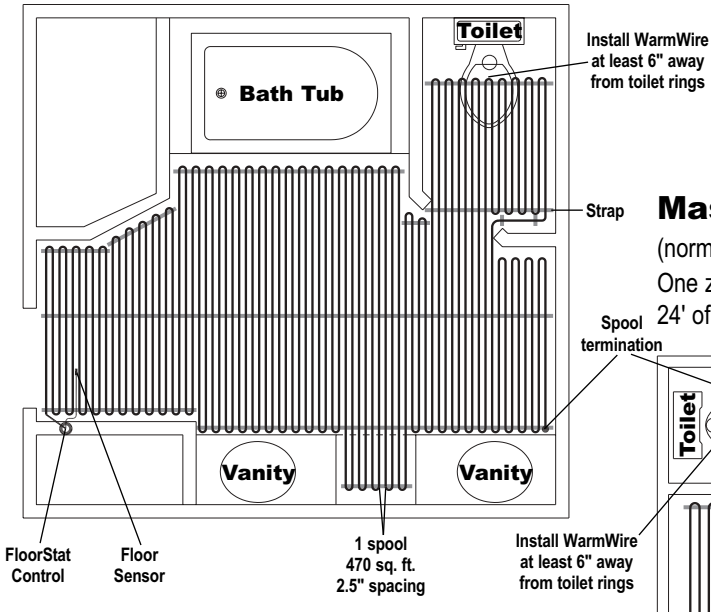
One zone, 240 volts: Kitchen = 1 spool, 120 sq. ft., 2.5" spacing. Sunroom = 1 spool, 112 sq. ft., 2" spacing.
104 ft. of Strap, or five 25-ft. rolls.



Appendix: Sample WarmWire Layouts

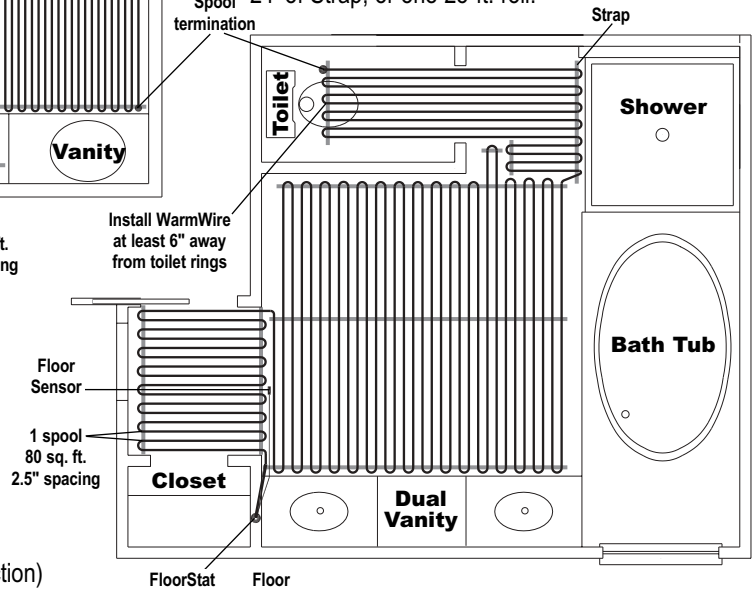
Master Bathroom (normal heat loss, framed floor construction)

One zone, 120 volts: 1 spool, 470 sq. ft., 2.5" spacing. 35 ft. of Strap, or two 25-ft. rolls.



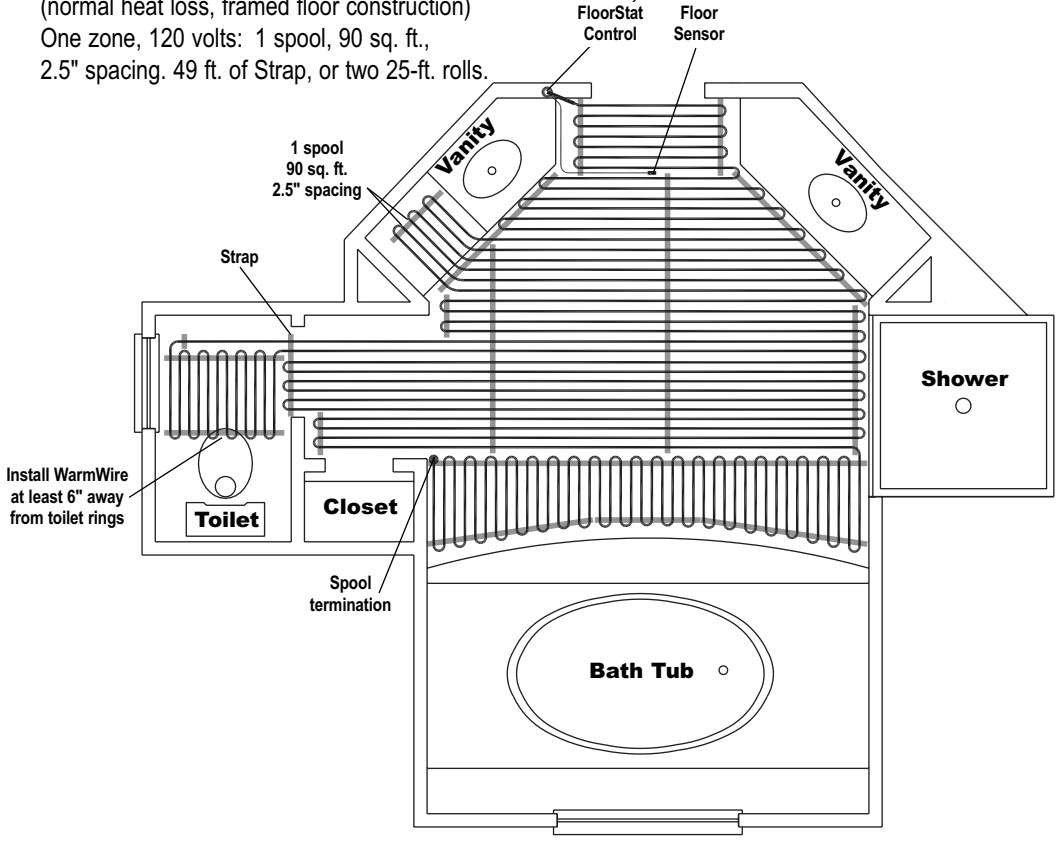
Master Bathroom (normal heat loss, framed floor construction)

One zone, 120 volts: 1 spool, 80 sq. ft., 2.5" spacing. 24' of Strap, or one 25-ft. roll.



Master Bathroom (normal heat loss, framed floor construction)

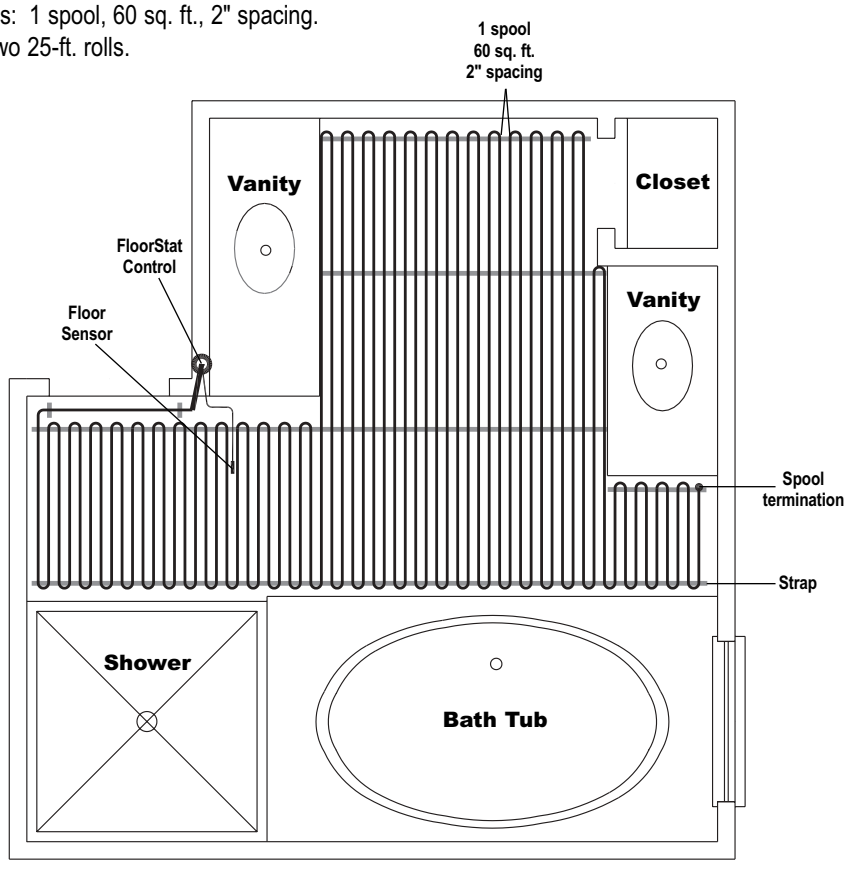
One zone, 120 volts: 1 spool, 90 sq. ft., 2.5" spacing. 49 ft. of Strap, or two 25-ft. rolls.



Appendix: Sample WarmWire Layouts

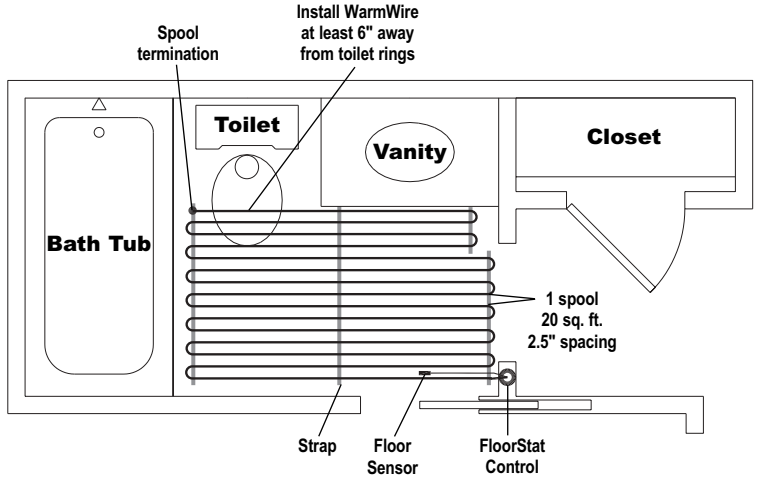
Basement Bathroom (high heat loss, below grade basement slab)

One zone, 120 volts: 1 spool, 60 sq. ft., 2" spacing.
39 ft. of Strap, or two 25-ft. rolls.



Master Bathroom (normal heat loss, framed floor construction)

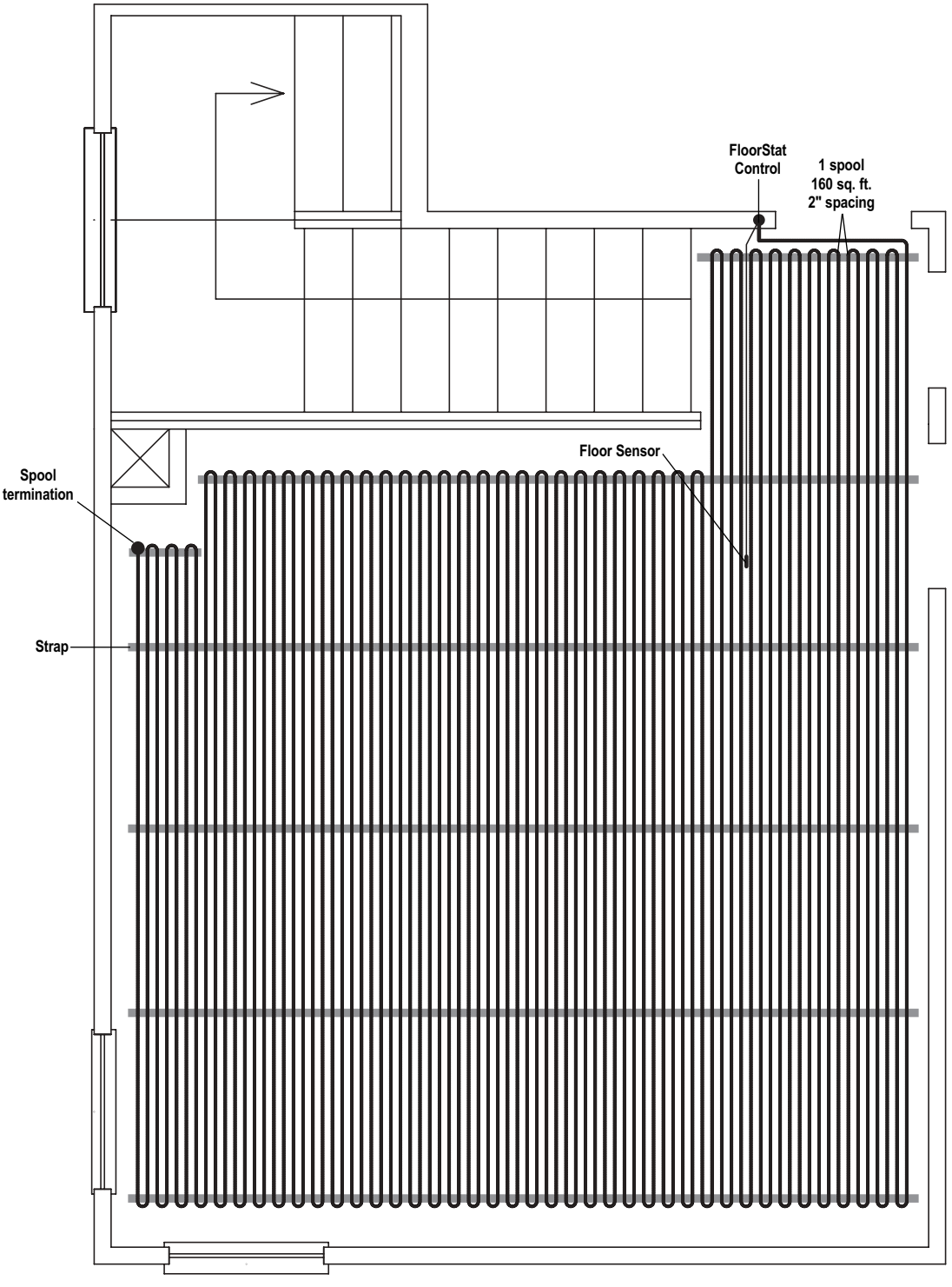
One zone, 120 volts: 1 spool, 20 sq. ft., 2.5" spacing.
11' of Strap, or one 25-ft. roll.



Appendix: Sample WarmWire Layouts

Recreation Room (high heat loss, below grade basement slab)

One zone, 240 volts: 1 spool, 160 sq. ft., 2" spacing.
69 ft. of Strap, or three 25-ft. rolls.



HeatWeave WarmWire Limited Warranty:

Watts Radiant warrants HeatWeave WarmWire electric floor warming cable ("the Product") to be free from defects in materials and workmanship for ten (10) years from the date of manufacture, provided the Product is installed in accordance with: the accompanying HeatWeave WarmWire Manual, any special written design or installation guidelines by Watts Radiant for this project, the National Electrical Code (NEC), the Canadian Electrical Code (CEC), and all applicable local building and electrical codes. This warranty is transferable to subsequent owners.

Controls sold under the HeatWeave WarmWire name are warranted, parts and materials, for one year. Other controls carry manufacturer's factory warranty.

Watts Radiant assumes no responsibility under this warranty for any damage to the Product caused by any tradespeople, visitors on the job site, or damage caused as a result of post-installation work.

The staff at Watts Radiant is available to answer any questions regarding the proper installation or application of the Product at this phone number: 800-276-2419 or 417-864-6108. If you are ever in doubt about the correct installation procedure to follow, or if the Product appears to be damaged, you must call us before proceeding with the installation, or proposed repair.

Under this Limited Warranty, Watts Radiant will provide one of the following remedies:

(a). If the Product is determined by Watts Radiant to be defective in materials and workmanship, and has not been damaged as a result of abuse or misapplication, we will refund the cost for the repair of the Product, as well as labor and materials required to repair the Product. Watts Radiant will not assume responsibility for the cost of flooring materials, or the cost to remove and replace flooring materials.

(b). Or, if Watts Radiant determines the repair of the Product is not feasible, we will replace the Product or refund the original cost of the Product.

This Limited Warranty is null and void if the project owner, or his designated representative, attempts to repair the Product without receiving prior authorization. Upon notification of a real or possible problem, Watts Radiant will issue and Authorization to Proceed under the terms of this Limited Warranty.

WATTS RADIANT DISCLAIMS ANY WARRANTY NOT PROVIDED HEREIN, INCLUDING ANY IMPLIED WARRANTY OF THE MERCHANTABLE OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. WATTS RADIANT FURTHER DISCLAIMS ANY RESPONSIBILITY FOR SPECIAL, INDIRECT, SECONDARY, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING FROM OWNERSHIP OR USE OF THIS PRODUCT, INCLUDING INCONVENIENCE OR LOSS OF USE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE OF THIS DOCUMENT. NO AGENT OR REPRESENTATIVE OF WATTS RADIANT HAS ANY AUTHORITY TO EXTEND OR MODIFY THIS WARRANTY UNLESS SUCH EXTENSION OR MODIFICATION IS MADE IN WRITING BY A CORPORATE OFFICER.

DUE TO DIFFERENCES IN BUILDING AND FLOOR INSULATION, CLIMATE, AND FLOOR COVERINGS, WATTS RADIANT MAKES NO REPRESENTATION THAT THE FLOOR TEMPERATURE WILL ACHIEVE ANY PARTICULAR TEMPERATURE, OR TEMPERATURE RISE. UL® STANDARD LISTING REQUIREMENTS LIMIT THE HEAT OUTPUT OF HEATWEAVE WARMWIRE CABLE, AND AS SUCH, USERS MAY OR MAY NOT BE SATISFIED WITH THE FLOOR WARMTH THAT IS PRODUCED. WATTS RADIANT DOES WARRANT THAT ALL CABLES WILL PRODUCE THE RATED OUTPUT LISTED ON THE CABLE NAMEPLATE, WHEN OPERATED AT THE RATED VOLTAGE.

Some states do not allow the exclusion or limitation of incidental or consequential damages and some states do not allow limitations on how long implied warranties may last. Therefore, the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Terms and Conditions

Shipping Discrepancies: Boxes and packages should be inventoried immediately upon receipt for completeness, and for possible shipping damage. Any visible damages or shortages must be brought to the attention of the store where you purchased the products.

Return Policy: Products should be returned to the store from which they were purchased, and are subject to the return policies of that store. Products that have been damaged or cut may not be returned for credit. This includes Product that has had mortar or concrete materials applied to them.

Please note: Watts Radiant offers free repair to cables that are damaged in the field. Ship the cable to Watts Radiant and we will repair it and ship it back at no charge. This offer does not apply to controls. You MUST call and ask for a Returned Goods Authorization (RGA) number BEFORE shipping damaged Product back to us, otherwise the shipment will be refused and returned to the sender.

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Watts Radiant is a subsidiary of Watts Water Technologies, Inc.