



SPOT WARMING

INSTALLATION MANUAL

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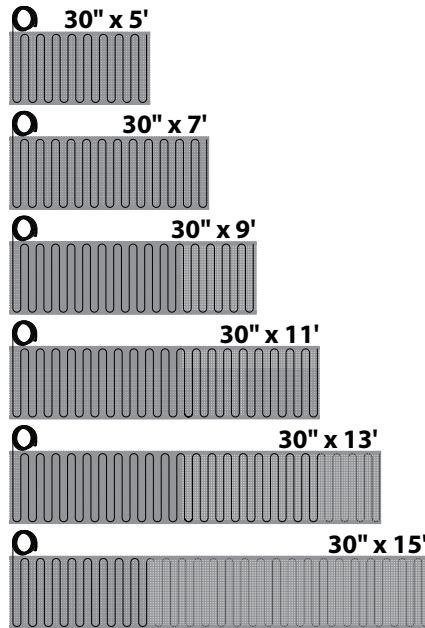
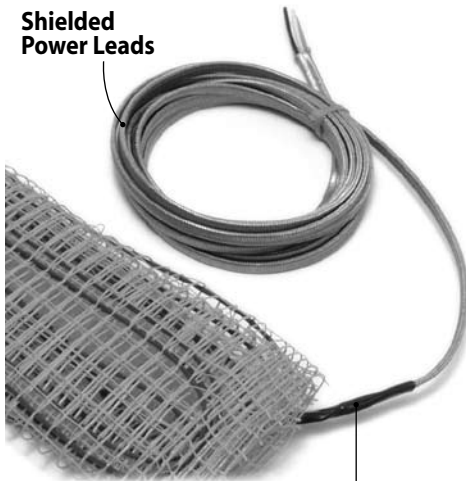
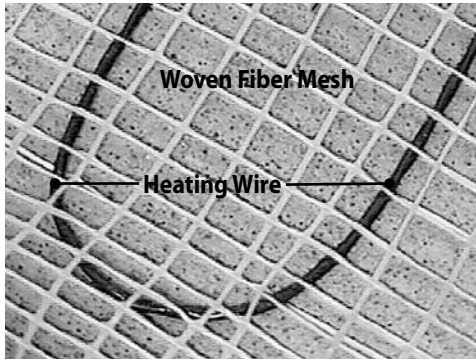
Troubleshooting Guide

800-276-2419

Made in the
USA 



Welcome to Premier Spot Warming



Premier spot-warming mats come in six sizes: 30" x 5', 30" x 7', 30" x 9', 30" x 11', 30" x 13', 30" x 15'.



Premier is a floor-warming product for interior floors. It cannot be used for exterior applications, snowmelting, or ceilings. Install only below ceramic or porcelain tile, stone, or brick floors, or in a self-leveling mortar bed below vinyl floors, floating wood and laminate floors. Use only cement-based mortar. Do not use solvent-based adhesives or pre-mixes because they are not as heat resistant.

The heating wire is woven into a special fiber mesh to make rectangular mats. These mats are built for 120 volts (VAC). One or more mats wired in parallel at the thermostatic control may be used to warm a tile floor, but care must be taken not to exceed the capacity of the wiring, the control, the breaker, or the Ground Fault Circuit Interrupter (GFCI).

Materials and Tools Needed

- Floor-warming mat(s)
- Installation manual (included in the installation kit)
- Double-sided tape (included in the installation kit)
- Floor-sensing control (with built-in GFCI, included in the installation kit)
- Floor sensor (included with control)
- Floor insulation (contact the factory for assistance)
- Hot-glue gun
- An extra-deep electrical box for the floor-sensing control. Can be single-gang for one or two mats, or 4" square with a mud ring for more mats.
- 12-gauge electrical wiring
- Digital ohmmeter (multi-meter) able to measure up to 20,000 ohms (Ω)
- Tile installation products (mortar, backer board, tile, etc.)
- Trowel (plastic preferred) with 3/8" notches (or greater), and other tiling tools
- Various electrical and construction tools (wire stripper, screwdriver, chisel, etc.)
- Insulation (for under the floor)
- Book or video on electrical wiring techniques
- Book or video on installing tile, stone, or other floor coverings

The mat is designed to deliver 12 watts per square foot. The floor temperature attainable is dependent on how well the floor is insulated, the temperature of the floor before start up, and in the case of uninsulated slab applications, the thermal drain of the underlying materials. These are the three most common installations:

1. Wood framing: With Premier installed on a well-insulated wood subfloor, and thin-set mortar and tile on top, most floors can be heated up to 20°F warmer than they would otherwise be.

2. Insulated concrete slab: With Premier installed on an insulated concrete slab (see page 6), and thin-set mortar and tile on top, most floors can be heated up to perhaps 15°F warmer than they would otherwise be.

3. Uninsulated concrete slab: With Premier installed on an uninsulated concrete slab, and thin-set mortar and tile on top, most floors can be heated up to perhaps 10°–15°F warmer than they would otherwise be.

Please consult the factory if there are questions regarding the surface temperature that can be expected from the mat in any particular construction.



CAUTION

Read these cautions carefully before beginning the installation.

NEVER:

- NEVER** install the mat under carpet, wood, vinyl, or other non-masonry flooring without embedding it in thin-set, thick-set, or self-leveling mortar.
- NEVER** install the mat in adhesives or glues intended for vinyl tile or other laminate flooring. It must be embedded in cement-based mortar.
- NEVER** cut the heating wire. The power leads can be cut shorter, if necessary, but not removed completely.
- NEVER** bang a trowel on the mat/wire to remove excess mortar from the trowel.
- NEVER** cut the mats to make them shorter. Only the fiber mesh can be cut to make turns or to help make the mat fit a particular area.
- NEVER** attempt to repair the heating wire if it is damaged. Contact the factory for instructions before proceeding.
- NEVER** splice one mat heating wire to another mat heating wire to make a longer mat. Multiple mats must be connected in parallel directly to 120-VAC power in a junction box or to the control.
- NEVER** install one mat on top of another or overlap the mat on itself. This will cause dangerous overheating.
- NEVER** forget to install the floor sensor.
- NEVER** install the mats over expansion joints in the mortar or slab unless an appropriate antifracture membrane is installed per Tile Council of America (TCA) recommendations.
- NEVER** install mats under cabinets or other built-ins, or in small closets. Excessive heat will build up in these small spaces, and the mat can be damaged by fasteners (nails, screws, etc.) used to install built-ins.
- NEVER** remove the nameplate label from the mat power leads.

ALWAYS:

- ALWAYS** completely embed the heating wire and factory connection in mortar.
- ALWAYS** enter mat and sensor resistance readings in the Mat and Sensor Resistance Log (see page 4) before, during, and after the installation process.
- ALWAYS** pay close attention to voltage and amperage requirements of the breaker, the control, and the mat. For instance, do not supply 240 VAC to 120-VAC mats or controls.
- ALWAYS** make sure all electrical work is done by qualified persons in accordance with local building and electrical codes, and the National Electrical Code (NEC), especially Article 424, Part IX of the NEC, ANSI/NFPA 70, and Section 62 of CEC Part I.
- ALWAYS** use copper only as supply conductors.
- ALWAYS** affix the warning label (included with this manual) to the control cover plate or other location where it is easily noticed in the area containing the mat.
- ALWAYS** seek help if a problem arises. If ever in doubt about the correct installation procedure to follow, or if the product appears to be damaged, the factory must be contacted before proceeding with the installation.

Call Premier Underfloor Heating at **800-276-2419** if there are any questions or problems regarding the installation of the mat or its related electrical components.



NEVER cut the heating wire.



NEVER bang a trowel on the mat or the heating wire to remove excess mortar. The heating wire can be damaged or severed by this practice.

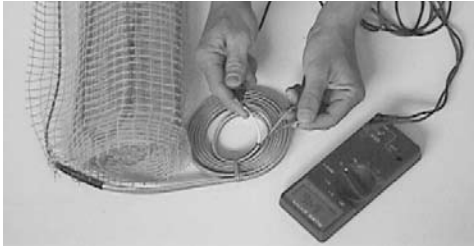
Mat Resistance Values

| Mat Size | Resistance Range |
|-----------|------------------|
| 30" x 5' | 84–102 ohms |
| 30" x 7' | 61–75 ohms |
| 30" x 9' | 47–58 ohms |
| 30" x 11' | 37–46 ohms |
| 30" x 13' | 30–37 ohms |
| 30" x 15' | 24–29 ohms |

Floor Sensor Resistance

| Temperature | Typical Values |
|-------------|----------------|
| 55°F (13°C) | 17,000 ohms |
| 65°F (18°C) | 13,000 ohms |
| 75°F (24°C) | 10,000 ohms |
| 85°F (29°C) | 8,000 ohms |

PART 1: Inspect the Mat and Sensor



Before beginning installation, record resistance readings in the Mat and Sensor Resistance Log below. To retain the Limited Warranty, these resistances and other data must be recorded.

Use the LoudMouth™ Monitor

The LoudMouth monitors the mat during the entire installation process. Should the mat be cut or damaged, this device sounds an alarm. The LoudMouth will prevent burying a damaged heating wire below hardened mortar and tile or stone.



Throughout the installation process, it is very important to take resistance readings of the mat and the floor sensor wire to make sure they have not been damaged. Use a quality digital ohmmeter (multi-meter) able to measure up to 20,000 ohms (Ω) to take these readings. Analog meters (with the moving needle) are not accurate enough for these products.

The LoudMouth™ monitor (shown at left) constantly monitors the heating wire during the entire installation.

Essential Product Information and Warranty

Do not remove the nameplate label from the power leads (see lower left). Record the mat serial number, mat size, voltage, and resistance range printed on this label into the resistance log below for each mat and sensor.

To retain the Limited Warranty, these items and the following measurements must be recorded, as well as all steps of this manual followed. Refer now to the Limited Warranty on page 19 for complete requirements.

Measurements

At the very least, take resistance readings (1) before beginning installation, (2) after the mat and sensor are secured to the floor, and (3) after floor coverings are installed. It is highly rec-

ommended that these measurements also be checked frequently during tile installation to avoid burying a damaged heating wire or defective sensor.

Checking for Breaks

Measure mat resistance between the black and white leads, and record below. This resistance should be within the range shown on the nameplate label. Measure between the lead wires of the floor sensor. This resistance varies according to the temperature sensed in the tip. The sensor resistance table on page 3 provides approximate values for comparison. A cut or break in the wire is indicated by a resistance of "infinite" ohms (no continuity, or "OL" for "open line").

Checking for Short-Circuits

Measure mat resistances between the black and green leads and between the white and green leads. Record below. This measurement should be "infinite" ohms (no continuity or "OL" for "open line"). A cut or pinch in the heating wire is normally indicated by a resistance value greater than zero and less than the mat resistance.

If the resistance is not correct, or if the heating wire has been cut or damaged, quickly clean up the damaged area and contact the factory for further instructions.



Record the information from this nameplate label into the Mat and Sensor Resistance Log provided at right. Leave this nameplate label attached to the power leads for later inspection.

MAT AND SENSOR RESISTANCE LOG

| | MAT #1 | MAT #2 | MAT #3 |
|--|--------|--------|--------|
| Mat Serial Number | | | |
| Mat Size | | | |
| Mat Voltage | | | |
| Factory Mat Resistance Range | | | |
| OUT OF THE BOX BEFORE INSTALLATION (ohms) | | | |
| Mat black to white | | | |
| Mat black to green | | | |
| Mat white to green | | | |
| Sensor Wire | | | |
| AFTER MAT IS FASTENED TO FLOOR (ohms) | | | |
| Mat black to white | | | |
| Mat black to green | | | |
| Mat white to green | | | |
| Sensor Wire | | | |
| AFTER FLOOR COVERINGS ARE INSTALLED OVER THE MAT (ohms) | | | |
| Mat black to white | | | |
| Mat black to green | | | |
| Mat white to green | | | |
| Sensor Wire | | | |

RETAIN THIS LOG TO RETAIN YOUR WARRANTY!

DO NOT DISCARD!

PART 2: Control and Electrical Service

Do not perform any electrical work unless qualified to do so. Contact the factory with any additional questions before beginning the installation.

The Control

Use the floor-sensing control to directly regulate the floor temperature where the mat(s) are placed. The control has its own "ground fault protection" (GFCI) which will guard against electrical hazards in case the mats are damaged. The control handles up to 150 sq. ft. of mat (15 amps total), and comes with its own floor sensor that must be installed to operate correctly.

Easy Electric Calculator for 120-volt Mats

| Mat Size | No. of Mats | Mat Amp Draw | Amp Draw |
|-------------------|-------------|--------------|----------|
| 30" x 5' | | x 1.3 Amps = | |
| 30" x 7' | | x 1.8 Amps = | |
| 30" x 9' | | x 2.3 Amps = | |
| 30" x 11' | | x 2.8 Amps = | |
| 30" x 13' | | x 3.3 Amps = | |
| 30" x 15' | | x 3.8 Amps = | |
| Total Amps | | | |

Getting Started

Find a good place for the control, preferably on an interior wall, and measure 54" to 60" above the floor. Each mat has a 10'-long power lead. Locate the control within reach of the mat. Mount an extra-deep, single-gang electrical box (for one or two mats), or mount a 2-1/8" deep, 4" square box (for more mats), with a single-gang mud ring, to the stud according to local code requirements.

For new construction, it is recommended that a 1/2" conduit be installed from the box to the bottom plate directly below to contain the mat power leads. For installation of up to three mats, install 3/4" conduit to the electrical box to hold up to three power leads. (See Appendix for connecting multiple mats.) Drill two holes in the top and two corresponding holes in the side of the plate to receive the conduit. One hole is for routing the power leads, and the other is for the floor-sensor wire. Fasten the conduit to the stud with conduit strap.

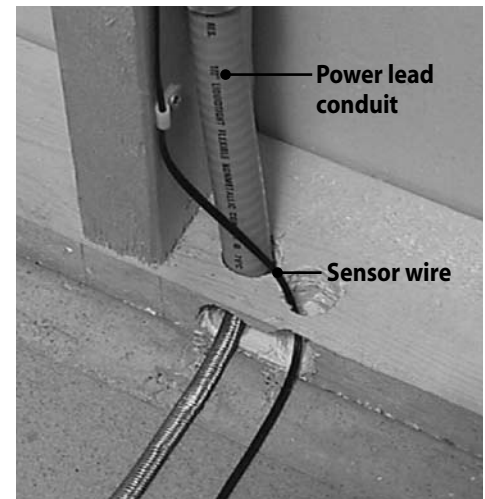
For a remodeling project, conduit may not be required for the 14-gauge

power leads, especially for a wall that is already covered. Check your local code.

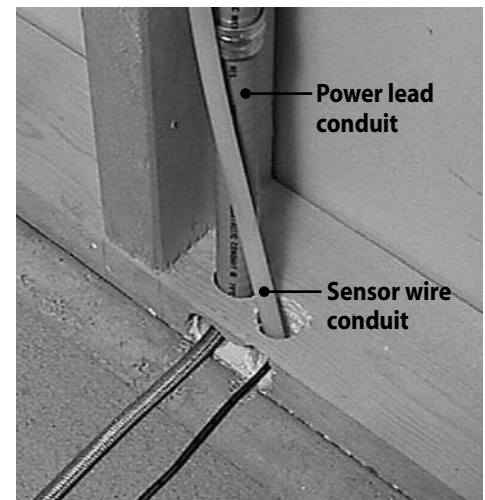
It is recommended that the system be installed on its own dedicated circuit, directly from the circuit breaker panel. However, small systems may be able to tap into an existing circuit. Make sure there is adequate capacity for the mat(s) as well as any appliances (such as a hair dryer) that might use the same circuit. The mat(s) should not be installed on a circuit with another GFCI (breaker or outlet), lighting, or fans (exhaust fan, hot tub, etc.) due to possible interference problems which can cause the GFCI on the control to false-trip.

Install 12-gauge insulated electrical wire to the control boxes following all local codes. Leave 6" to 8" of extra wire at the control box, but do not energize the circuit.

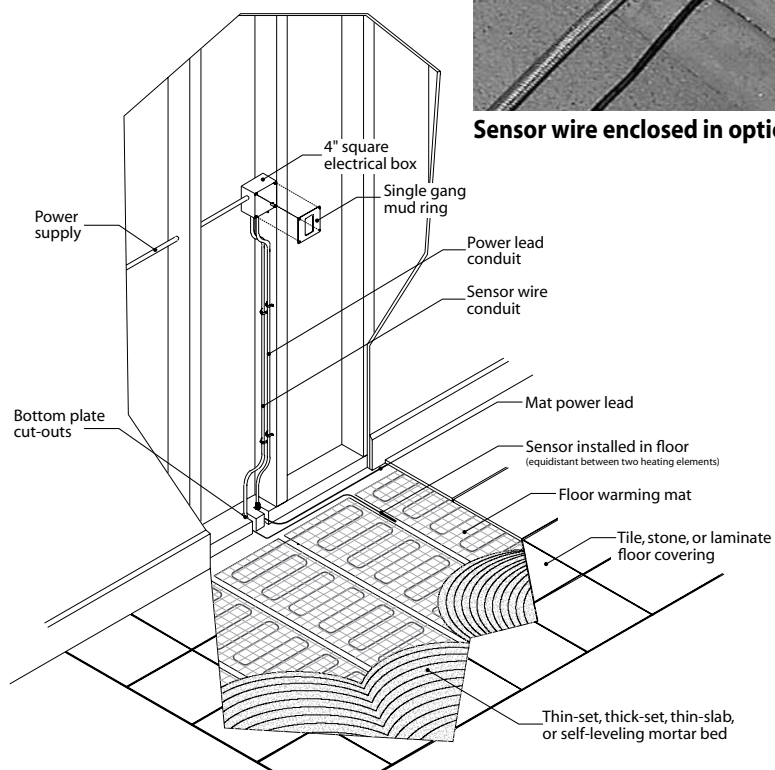
Remember: The heating wire must **never** be cut shorter. The power leads may be cut shorter, if necessary, but never removed completely. Multiple mats are to be connected in parallel not in series (see Appendix).



Conduit enclosing armored power leads.



Sensor wire enclosed in optional conduit.



General layout of the Premier installation. For details, consult this manual or call toll-free at 800-276-2419, and ask for the Design Department.

PART 3: Install the Mat

Select Type of Construction

The cross sections on these pages depict types of construction (slab vs. frame floor) and applications commonly used in the installation of the mat. Choose the best installation detail for your particular construction and application.

Insulation. In new slab construction, it is highly recommended that foam insulation be installed under and around the slab to prevent loss of radiant heat into the surrounding soil.

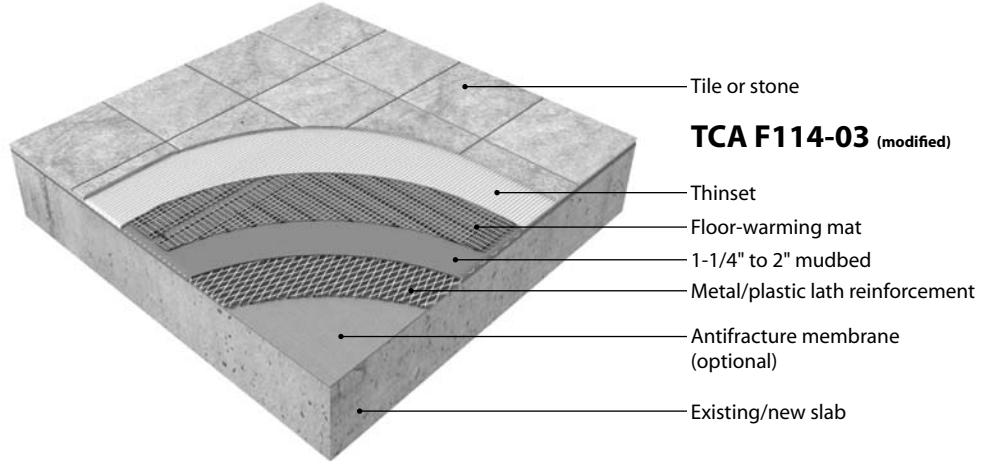
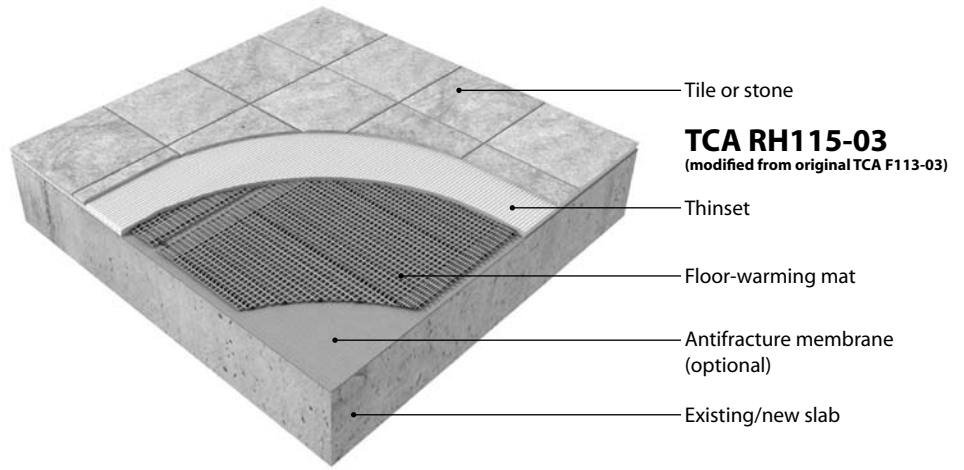
In existing construction where insulation under the slab is absent, it is strongly recommended that a 1/2" layer of cork be attached to the slab prior to the installation of the mat.

SLAB

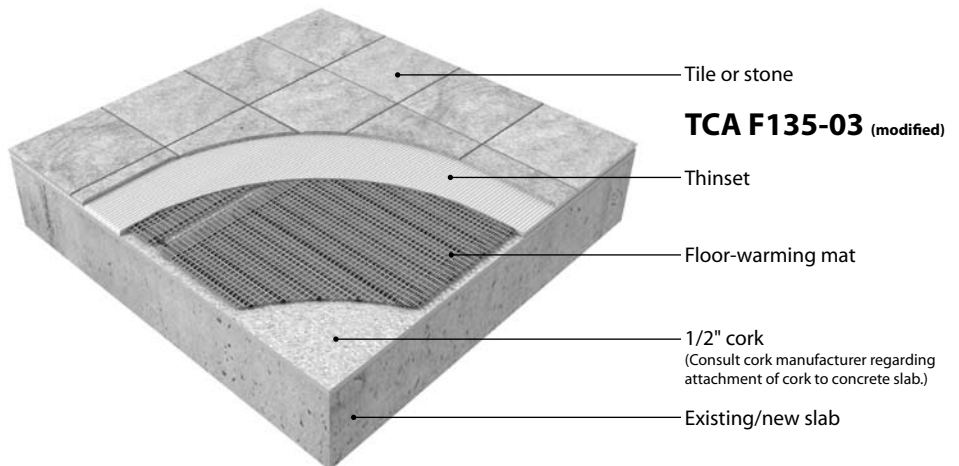
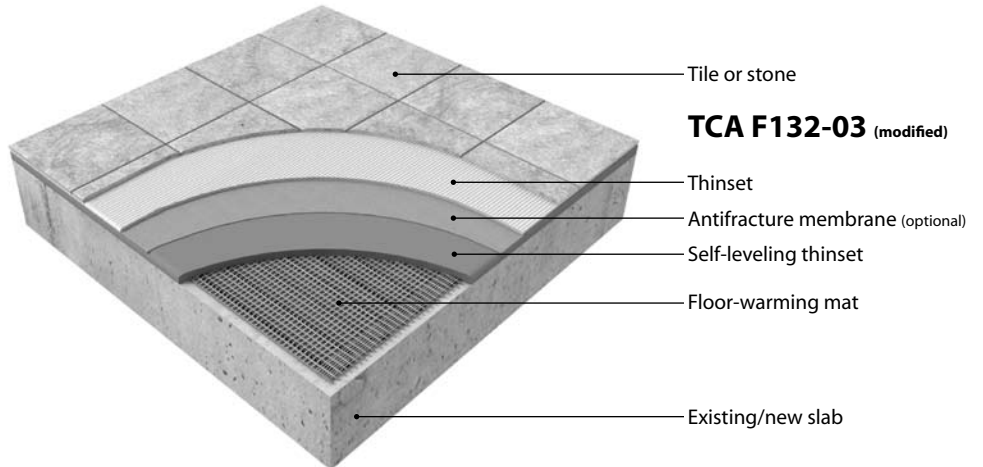
The cork possesses a minimal R value that will help keep the radiant heat at the floor surface. Consult the cork manufacturer regarding proper attachment of the cork to the concrete slab.

Antifracture membrane. While optional, it is recommended that an antifracture membrane (crack isolation membrane) be installed directly to the slab or the self-leveling mortar layer underneath the tile. This flexible layer reduces the chance of minor stress and fracturing in the slab from being transmitted upward to the tile.

Reinforcement. To further strengthen the floor, consider laying a 1-1/4" to 2" mudbed, reinforced with metal or plastic lath, directly onto the optional antifracture membrane. Then install the mat(s).



Construction & Applications



In framed-floor construction, the two primary concerns are insulation and floor rigidity. Without proper insulation, radiant heat leaks into the joist spaces. And unless the plywood subfloor is properly reinforced, stresses in the subflooring can cause unsightly cracking in the tile floor.

Insulation. The use of insulation in the joist spaces dramatically enhances the performance and efficiency of the floor-warming system. Insulation with an R value of 19 will be sufficient for most regions, while in more temperate areas R-11 will suffice.

Do not install rigid insulation layers directly above or below backer board or mortar. If possible, install insulation as shown in the diagrams at right.

Reinforcement. There are several options for strengthening the subfloor:

FRAMED FLOOR

Construction & Applications

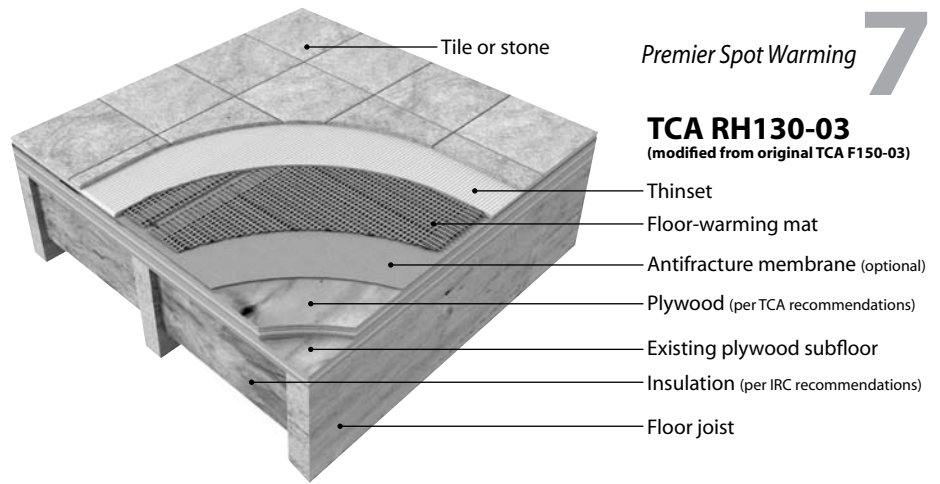
1. Add 3/4"-thick plywood on top of the existing subfloor.

2. Pour a 1/4"-1/2"-thick layer of self-leveling mortar over the existing subfloor, then install the mat on top of the mortar layer.

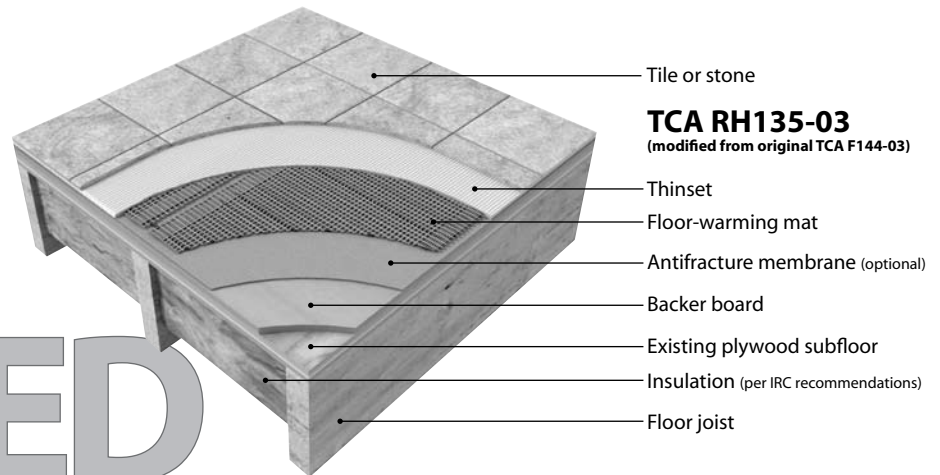
3. Install a quality cementitious backer board or fiber cement underlayment over the subfloor. Then lay the mat and tile.

Antifracture membrane. While optional, it is recommended that an antifracture membrane (crack isolation membrane) be installed to reduce the chance of minor stress and fracturing in the subflooring from being transmitted upward to the tile. If an antifracture membrane is used, install the mat above the membrane, unless otherwise recommended by the membrane manufacturer.

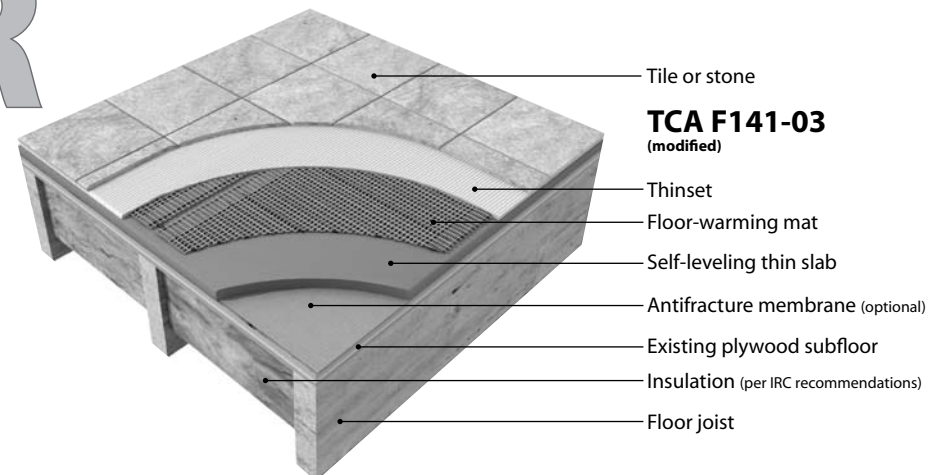
In place of an antifracture membrane, an uncoupling system can be installed to prevent deflection in the subfloor from affecting the tile surface.



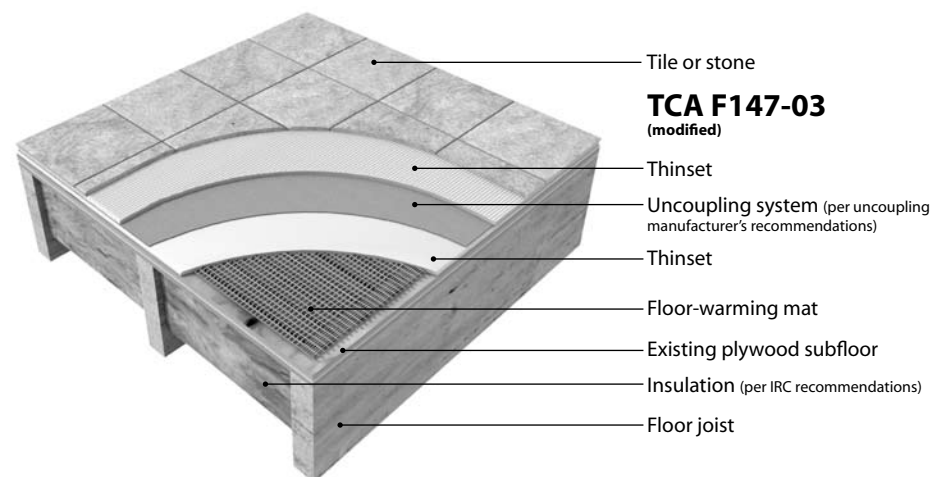
TCA RH130-03
(modified from original TCA F150-03)



TCA RH135-03
(modified from original TCA F144-03)



TCA F141-03
(modified)



TCA F147-03
(modified)

Mortar Beds

The mats can be installed in three types of mortar beds: thin-set or thick-set mortar beds 3/8" to 1" thick, and self-leveling mortar beds 1/4" to 1/2" thick.

Thin-set Mortar Beds. If the mat will be placed directly onto the slab, or if backer board or plywood reinforcement is used on a plywood subfloor, first install the mat then apply the thin-set mortar bond coat directly over the mat and lay the tile.

Thick-set Mortar Beds. If a thicker mortar bed is used to strengthen the floor, the mat can be installed under either the mortar bed (also known as "dry-set") or under the mortar bond coat directly below the tile or stone. In a thick-set application, the mat is generally installed above the mortar bed, but before the thin-set bond coat. Thick mortar beds of this type require the use of a reinforcing mesh or lath. If plastic lath is used instead of the typical metal lath, the mat can be installed before pouring the self-leveling mortar bed.

CAUTION:

If metal lath is used in the mortar bed, do not allow the mat to come in direct contact with the lath.

Damage to the heating wire could result.

Self-leveling Mortar Beds. Self-leveling mortar beds are appropriate if installing non-masonry floor coverings such as engineered wood, vinyl, laminate, or carpet. Attach the mat to the slab or subfloor, then pour a 1/4"-1/2"-thick layer of self-leveling mortar over the mat according to manufacturer's specifications. Install the floor coverings after the mortar has cured.

Regardless of the type of mortar bed used in any particular application, always secure the mat to the floor first, then cover it with the mortar or cement. Never attempt to lay or work the mat into a previously-poured layer of wet mortar.

It is strongly recommended that tile and stone flooring be installed according to manufacturer's recommendations, TCA guidelines, and ANSI specifications. Follow industry and manufacturer's recommendations

when installing non-masonry floor coverings, such as hardwood, vinyl, laminate, or floating floors.

Other Considerations

Expansion joints. In slab or mortar applications, do not install the mats through an expansion joint unless an appropriate antifracture membrane is installed per Tile Council of America (TCA) recommendations. If not using an antifracture membrane, install the mats right up to the joint, if necessary, but not through the joint.

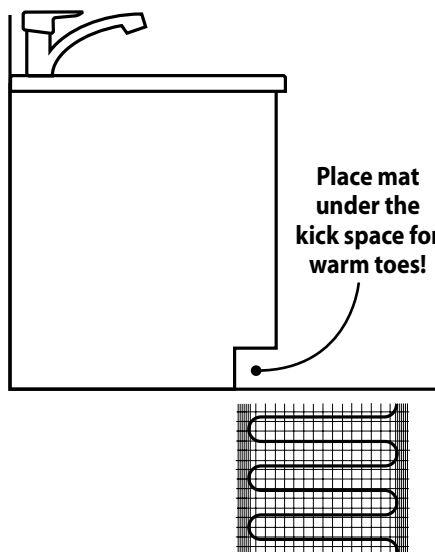
Mosaic tile. When laying mosaic tile, first embed the heating mat in the appropriate mortar bed as shown in the diagrams on the previous pages, and allow to cure per manufacturer's instructions. Then thin-set the mosaic tile according to typical practice.

REMEMBER:

If in doubt about any aspect or phase of the installation, consult with building professionals and/or the manufacturer regarding specific installation details before beginning.

Prepare the Floor

The floor must be completely swept and damp-mopped to remove all nails, wood fragments, dirt, and other construction debris. Make absolutely sure there are no objects on the floor or fasteners penetrating the floor that might damage the heating wire.



Study the Factory-supplied Items and the Design

Make sure all the correct materials have been purchased. A general list of materials is found at the beginning of this manual.

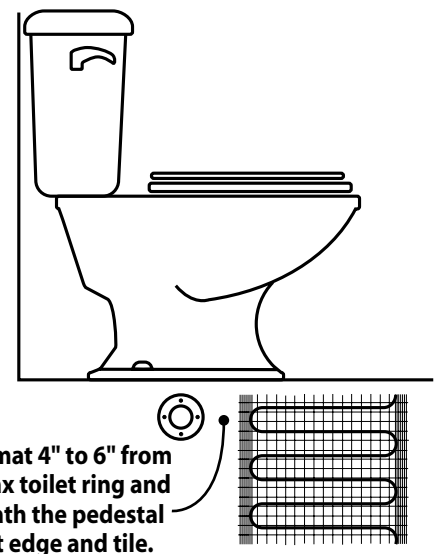
Study the design carefully before installation. Determine exactly which areas of the floor will be heated. Use the grid on the back of this manual to help determine where the mat(s) will go. Review the location of the control and where the mat begins and ends, as well as the general layout pattern.

Next, roll out the mat to make sure it fits the space allocated and the power leads reach the electrical box. Install the mat 4" to 6" away from walls, showers, tubs, and wax toilet rings, but install right up to vanities and counter areas, especially kick spaces. Heat will radiate only about 1-1/2" to 2" from the heating wire. The mat may be installed close to the wall, if needed, but never where a baseboard nail may damage the heating wire.

REMEMBER:

NEVER install mats under cabinets or other built-ins, or in small closets. Excessive heat will build up in these small spaces, and the mat can be damaged by the fasteners (nails, screws, etc.) used to install the built-ins.

NEVER cut or shorten the heating wire to make it fit the space. This will cause dangerous overheating and will void the warranty!





Use the LoudMouth™ Monitor

It is highly recommended that the LoudMouth be connected to the mat while it is being installed. The LoudMouth monitors the mat during the entire installation process, and sounds an alarm should the heating wire be accidentally cut or damaged. This invaluable device will prevent a damaged heating wire from being buried below hardened mortar, tile, or stone. Refer to the Appendix regarding how to connect the LoudMouth to one or more mats.

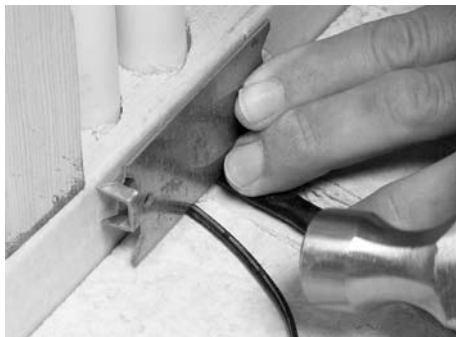
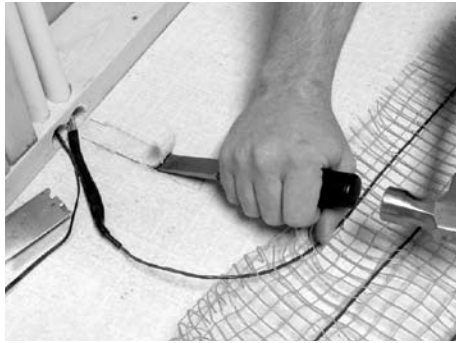
Install the Power Leads and Sensor Wire

In new construction, feed a steel fish tape, spare wire, cord, or string through the conduit installed earlier, and pull the power leads back through the conduit up to the electrical box. If using the floor-sensing control, feed the sensor wire down from the electrical box to the floor, but do not place the sensor wire and power leads in the same conduit.

If remodeling, cut or drill holes into the bottom plate directly below the electrical box near the floor to run the power leads and sensor wire together. Drop a weighted string through the electrical box hole to the holes below. Locate the string and pull it through the holes near the floor. Attach the power leads to the string with electrical tape and then pull them back through the wall up into your electrical box. Follow this same procedure to install the sensor wire. Follow all applicable codes.

Because the factory connection at the power leads as well as the factory end splice at the far end of the heating wire are thicker than the mat, a groove will need to be chiseled into the floor to accommodate the thickness of these items. This will prevent potential "high spots" in the floor.

With the mat rolled out and positioned onto the floor, use a pencil to mark where the power leads will lay along the floor over to the wall. Once the groove for the factory connection has been chiseled out and cleared of debris, lay the connection into the groove and apply a bead of hot glue to hold the power leads and connection in place. Allow the hot glue to cool before proceeding. (The groove for the



Chisel a groove into the floor, and lay the connection into the groove. Apply a bead of hot glue. Let cool. Install a steel nail plate where the leads enter the bottom plate to protect them against damage from baseboard nails or screws.

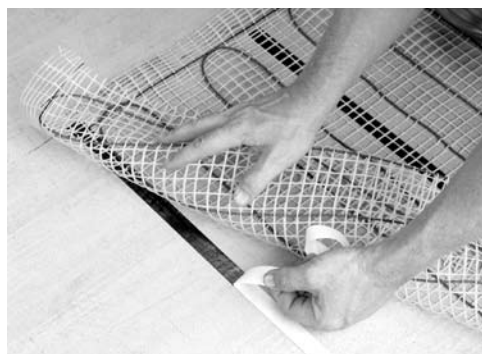
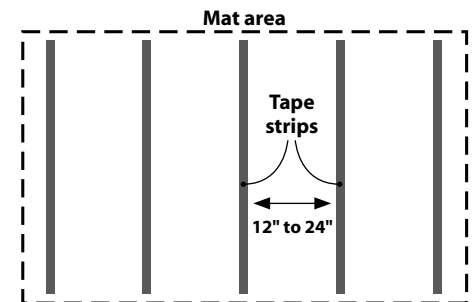
end splice will need to be made after the mat(s) are in their final position and secured to the floor.)

Make sure to protect the power leads where they enter the electrical box against damage. If needed, you may use the insulated electrical staples provided to secure the power leads to studs, but do not overdrive the staples, or accidentally damage the wires. Install steel nail plates where the power and sensor leads enter the bottom plate to protect them against baseboard nails or screws.

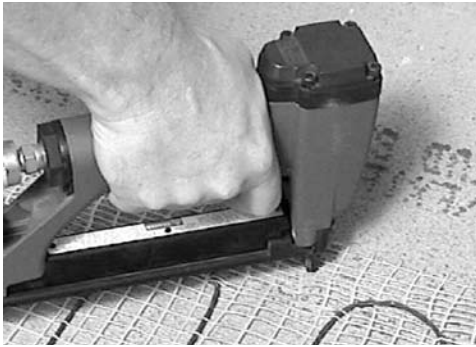
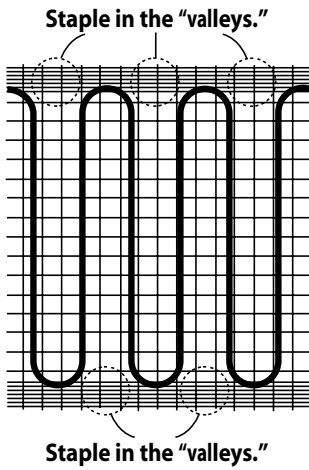
Secure the Mat to the Floor

There are three commonly-used methods for securing the mat to the floor:

Double-sided tape. A roll of double-sided tape is supplied with each mat. Clear the floor of all dirt and dust to ensure good adhesion of the tape to the floor. Unroll the double-sided tape and adhere to the floor strips that will span the width of the mat, spacing the strips every 12" to 24" along the length of the area where the mat will lay. (To help remove the paper backing, fold a corner of the tape onto itself). Press firmly on the paper side of the tape to make sure it sticks to the floor. Then pull off the paper backing and press the mat firmly onto the tape.



Using double-sided tape is one of three common methods used to secure the mat to the floor.



If using a pneumatic stapler, staple in the "valleys" between the heating wires.

Pneumatic staples. If stapling the mat to the floor, it is recommended that 3/8" x 1/4" chisel point staples be used. Initially attach the mat every 2 to 3 ft. on either side of the mat, stapling in the "valleys" between the heating wires. By stapling in the "valleys," it will be easier to pull up and reposition the mat, if necessary. When satisfied with the layout, go back and put in a staple every 12" to secure the mat. **Proceed slowly and be very careful not to staple the heating wire.**

Quick-set. Place the mat into position on the floor. Use the double-sided tape to hold the mat in place,

then trowel small patches of quick-set to the corners and edges of the mat. When dry (follow manufacturer's instructions), the mat will be permanently adhered to the floor.

Note: Regardless of the method used to attach the mat to the floor, make sure to stretch the mat tightly and pull out the slack as it is being secured to the floor. The tighter the mat, the easier it will be to apply thin-set over it.

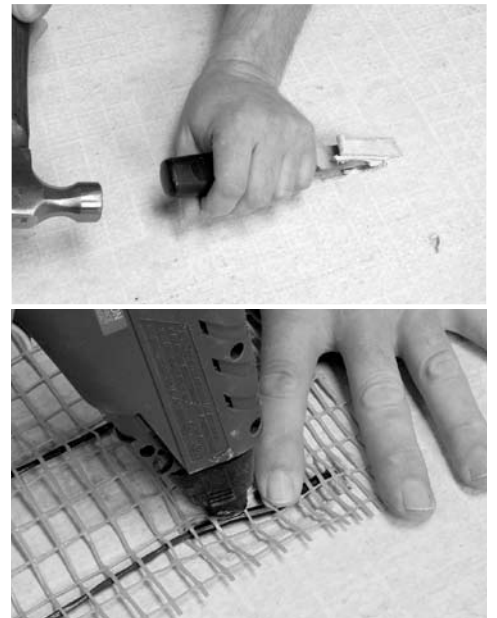
Mat turns and fill-ins. In order to warm the maximum amount of floor area, it will be necessary to make the mat(s) fit odd-shaped spaces, fit into corners, and work around angles, built-ins, and floor penetrations. To accomplish this, the mat fiber mesh is carefully cut and the turns made. See the following pages for cautions, tips, and layout ideas.

Recess the end splice. With the mat secured to the floor, use a pencil to mark the spot where the end splice will be recessed. Chisel out the groove for the end splice, and hot glue the splice into the groove. Let cool before proceeding.

Install the Floor Sensor

Like the factory connection and end splice, the floor sensor tip will also need to be recessed into the floor. With the mat positioned and secured to the floor, locate the precise spot where the sensor will go and "thread" the sensor 6"-12" into the weave of the mat mesh, making sure to place the sensor tip exactly between two of the heating wires. Installing the sensor tip too close to either of the heating wires will send an exaggerated temperature reading to the control.

At the spot where the sensor tip will



Chisel a groove into the floor for the end splice. Lay the splice into the groove and hot glue into place. Let cool before proceeding.

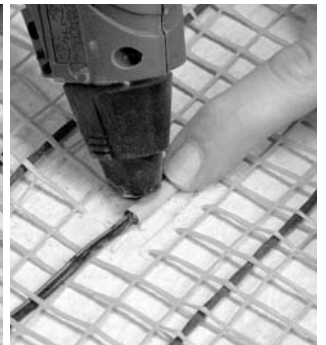
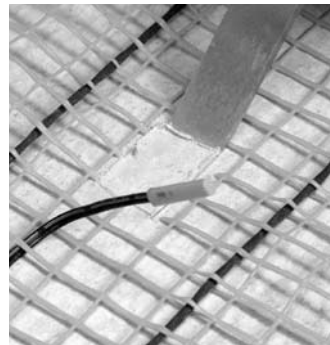
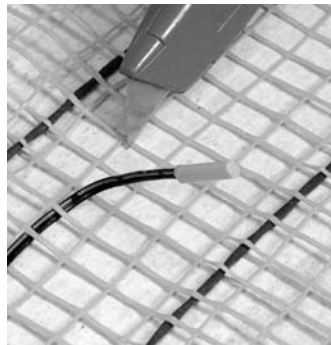
be recessed into the floor, use a utility knife to cut out a small amount of the fiber mesh. Chisel out a shallow pocket for the sensor. **Be very careful not to damage the heating wire or the sensor wire with the utility knife or chisel.** Hot glue the sensor tip into the pocket chiseled out for it.

Take a resistance reading! With the mat(s) secured to the floor and the sensor tip installed into the floor, conduct another resistance check of both the mat and the sensor with a digital ohmmeter, and record these readings in the Mat and Sensor Resistance Log (page 4). Failure to take and record these readings will void the warranty!

If the flooring will not be installed immediately, cover the mat with corrugated box material or plywood for short-term protection. Never leave the mat unprotected.

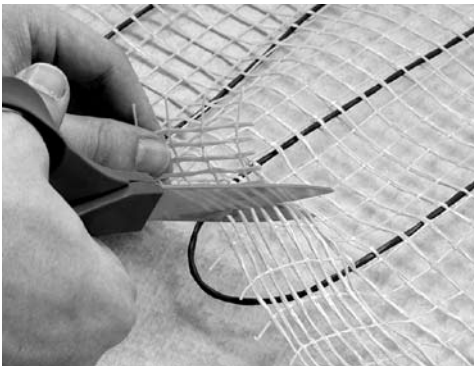


Trowel patches of quick-set to the corners and edges of the mat to secure it to the floor.

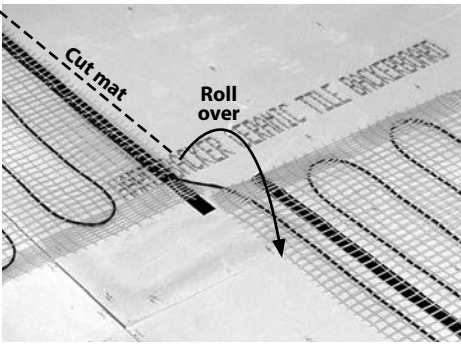


To recess the sensor tip into the floor, cut away the mat mesh and chisel out a shallow pocket for the sensor tip. Thread the sensor wire 6" to 12" into the weave of the mat and center the sensor tip exactly between two of the heating wires. Hot glue the sensor tip into place.

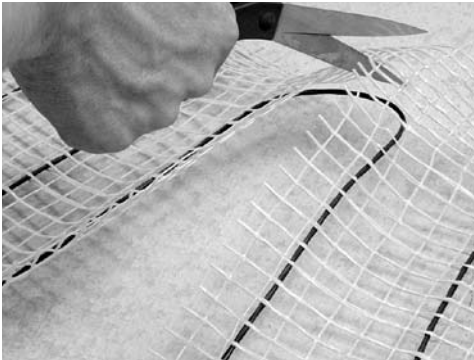
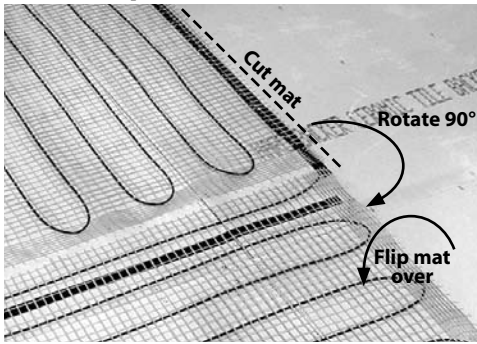
Mat Turns and Fill-in Techniques



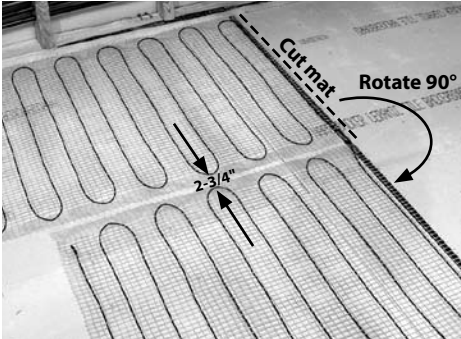
Roll-over Turn



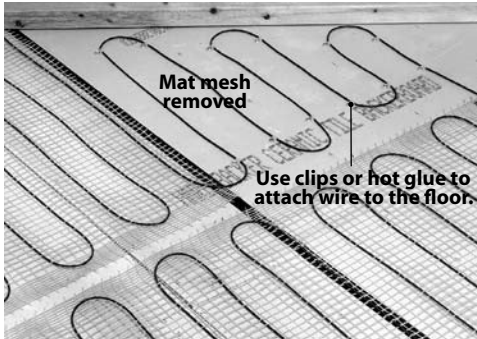
90° or Flip Turn



180° or Back-to-Back Turn



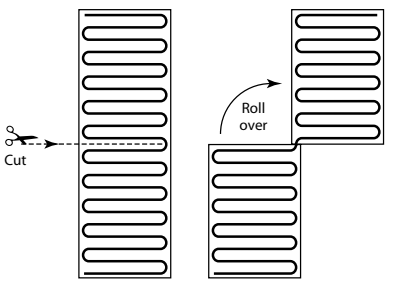
Fill-in Technique



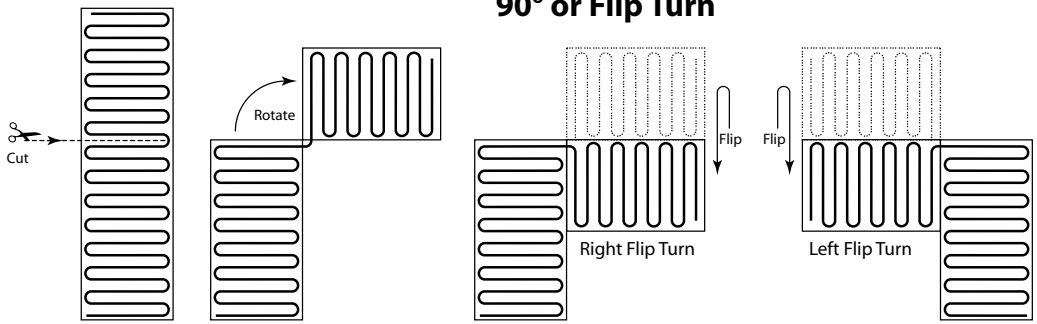
Carefully cut the woven mat mesh to effect turns. NEVER cut, nick, or otherwise damage the heating wire.

When making mat turns, make sure the mats are fastened to the floor such that the heating wires are no closer than 2-3/4" from each other. NEVER overlap or cross one heating wire or mat over another; dangerous overheating will occur.

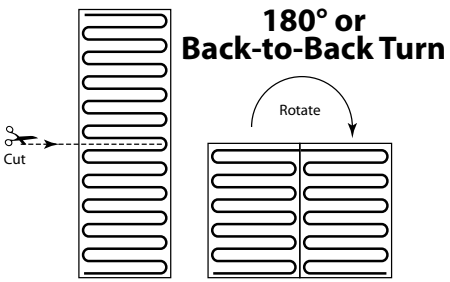
Roll-over Turn



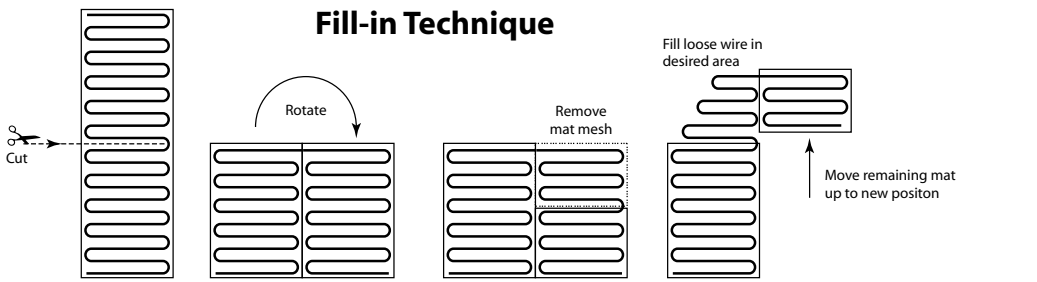
90° or Flip Turn



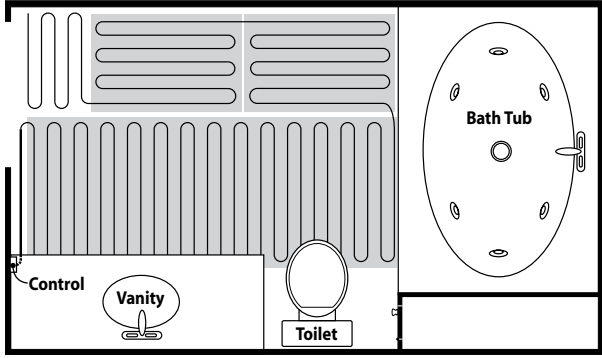
180° or Back-to-Back Turn



Fill-in Technique



Mat Layout Examples

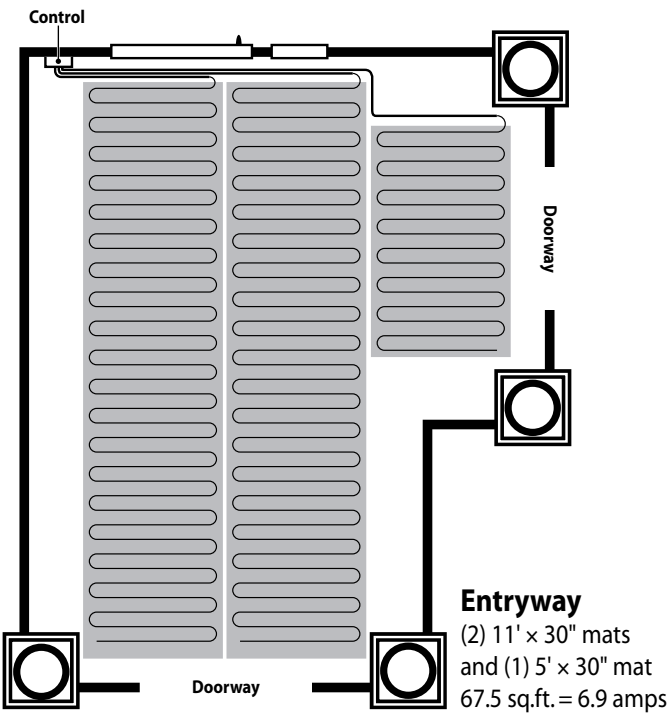


Small Bath
 (1) 11' x 30" mat
 27.5 sq.ft. = 2.8 amps

These drawings are only examples of mat layouts for various types of rooms. In the example of the utility room, one mat could be used in front of the washer and dryer to heat only the high-traffic area between doorways, or more of the floor could be heated with two mats (as shown). In the sun room, more or less coverage would be possible with the available mat sizes.

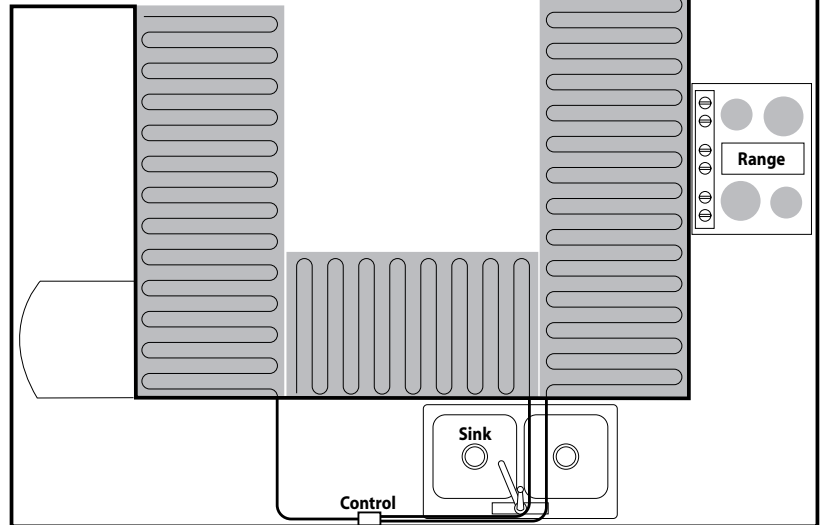
Note: Multiple mats are wired in parallel, not in series. All mat power leads must come back to the floor-sensing control, or go to a junction box with a length of 12-gauge electrical wire run back to the floor-sensing control. (All junction boxes must be located where they are accessible after all construction is finished.)

Purchasing a book or video discussing proper techniques for installing floor coverings is highly recommended.



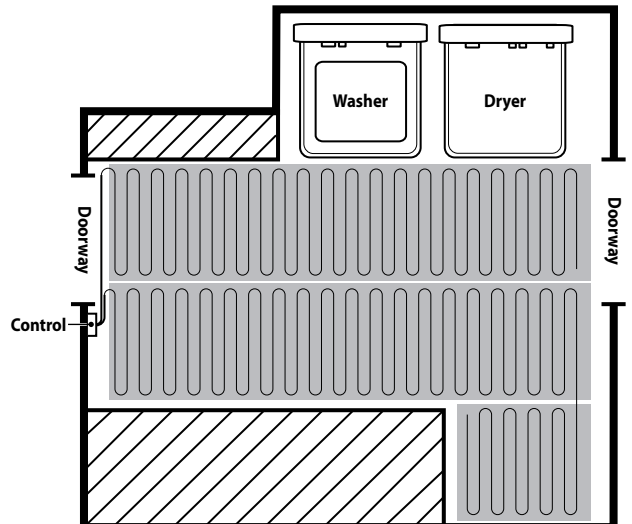
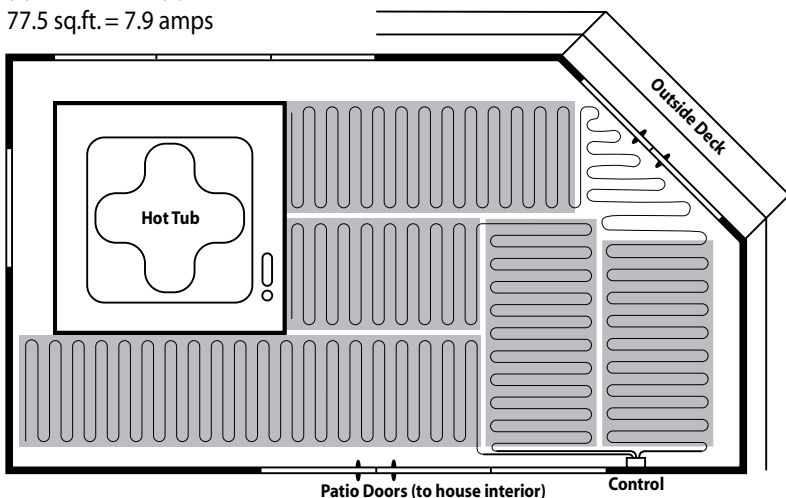
Entryway
 (2) 11' x 30" mats
 and (1) 5' x 30" mat
 67.5 sq.ft. = 6.9 amps

Kitchen
 (1) 5' x 30" mat, (1) 9' x 30" mat, (1) 11' x 30" mat
 62.5 sq.ft. = 6.4 amps



NOTE: Power leads are to be run under the subfloor, not through cabinets.

Sun Room
 (1) 9' x 30" and (2) 11' x 30" mats
 77.5 sq.ft. = 7.9 amps



Utility Room
 (1) 9' x 30" and (1) 11' x 30" mats
 50 sq.ft. = 5.1 amps

PART 4: Embed the Mat in Mortar

While embedding the mat, periodically check mat resistance to make sure the heating wire has not been damaged. If the mat has been damaged, locate the damaged area and quickly clean away all mortar materials, and call the factory (800-276-2419) for assistance. When finished tiling, take another resistance reading and record it in the resistance log (page 4).

Thin-setting Techniques

Consider using a plastic trowel to avoid possible damage to the mat.

One-step application. Directly apply the thin-set onto the mat with a $1/4" \times 3/8"$ notched trowel, and then lay the tile directly onto the thin-set.

Two-step application. Apply the thin-set onto the mat with the flat side of the trowel to fill in the voids of the mat. Then trowel more thin-set with the notched side and set the tile.

Back-butter. Apply the thin-set with the flat side of the trowel to fill the void areas of the mat. Then "back-butter" thin-set onto the underside of each tile with the flat side of the trowel, and set the tile.

Double-layer thin-set. Flat trowel thin-set over the entire mat. Let dry. Then trowel fresh thin-set on top of the dry layer, and set the tile. This technique is especially recommended when laying mosaic and other small tile (smaller than $6" \times 6"$).

Self-leveling mortar. Pour a layer of self-leveling mortar over the mat. Let dry. Then thin-set the tile, stone, or other floor covering over the mortar.

NEVER install nail-down hardwood flooring over the mat. Only floating or glue-down hardwood or laminate flooring is permitted.

NEVER allow the mat to come into direct contact with metal lath reinforcement; the heating wire could be damaged by the lath. The mat and metal lath must be embedded in separate layers of mortar. If using plastic lath or meshing, the mat can be embedded with the plastic lath in a single mortar layer.

One-step application



Trowel thin-set onto mat.



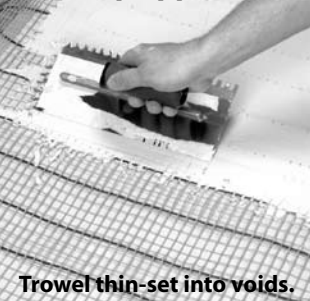
Set the tile.

WARNING!

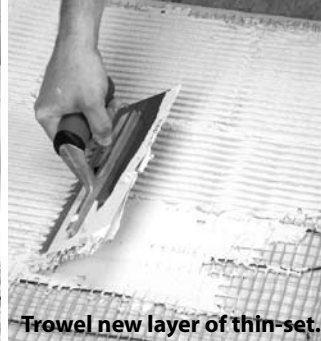
Do not snag the heating wire with the trowel.

NEVER clean the trowel by banging it on the mat. The heating wire, power lead, or sensor wire could be damaged or severed!

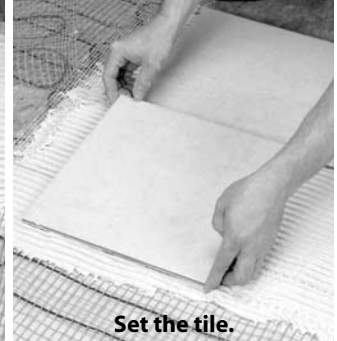
Two-step application



Trowel thin-set into voids.

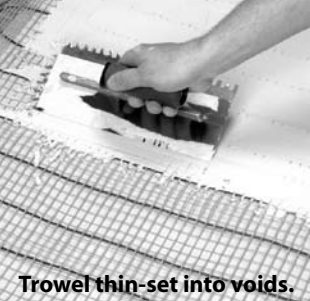


Trowel new layer of thin-set.



Set the tile.

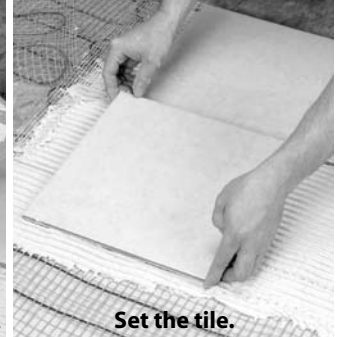
Back-butter



Trowel thin-set into voids.



Back-butter tile with thin-set.



Set the tile.

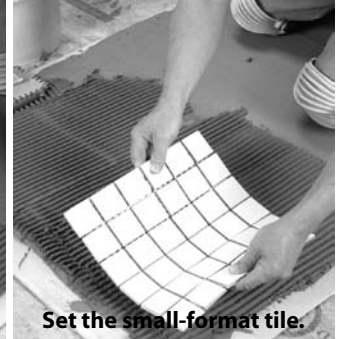
Double-layer



Trowel thin-set onto mat.



Trowel a second layer.

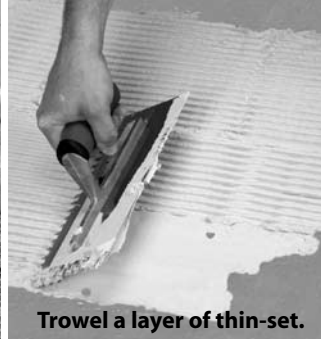


Set the small-format tile.

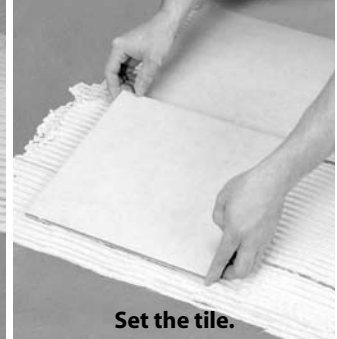
Self-leveling mortar



Pour mortar onto mat.



Trowel a layer of thin-set.



Set the tile.

PART 5: Final Wiring and Control

WARNING!

Make certain the power from the breaker box or electrical source is turned off before beginning work.

All electrical work should be performed by qualified persons, according to all national and local building and electrical codes. See the CAUTIONS described earlier in this manual. See the diagrams on the opposite page for guidance in making final electrical connections to the control.

In new construction, remember to install a mud ring over the face of the electrical box(es) if using a 4" square box. This must be done before sheet-rock and wall finishes are applied.

The following are typical wiring methods for making the final connections to the controls:

Make sure that the power leads and sensor wire have already been fed from the mat up the wall to the electrical box.

If not already done, install a 12-gauge insulated electrical wire to the control electrical box. Normally, this wire will be color-coded for connection where black is line voltage, white is neutral, and ground is either bare or green.

Make connections starting with the "line" wires on the control. Connect the black "line" wire from the control to the black wire of the incoming power. Connect the white "line" wire from the control to the white wire of the incoming power.

Now make the "load" connections. Connect the black "load" wire from the control to the black wire(s) coming

from the mat(s). Connect the white "load" wire from the control to the white wire(s) coming from the mat(s).

The green wire(s) from the mat(s) should connect to the bare or green ground wire of the incoming power. If using a metal electrical box, install a short piece of ground wire to connect also to the control electrical box.

Finally, insert the sensor wires into the proper terminals on the control.

Before placing the control into the electrical box, lightly tug on the wires to make sure all wires are secure in the wire nuts.

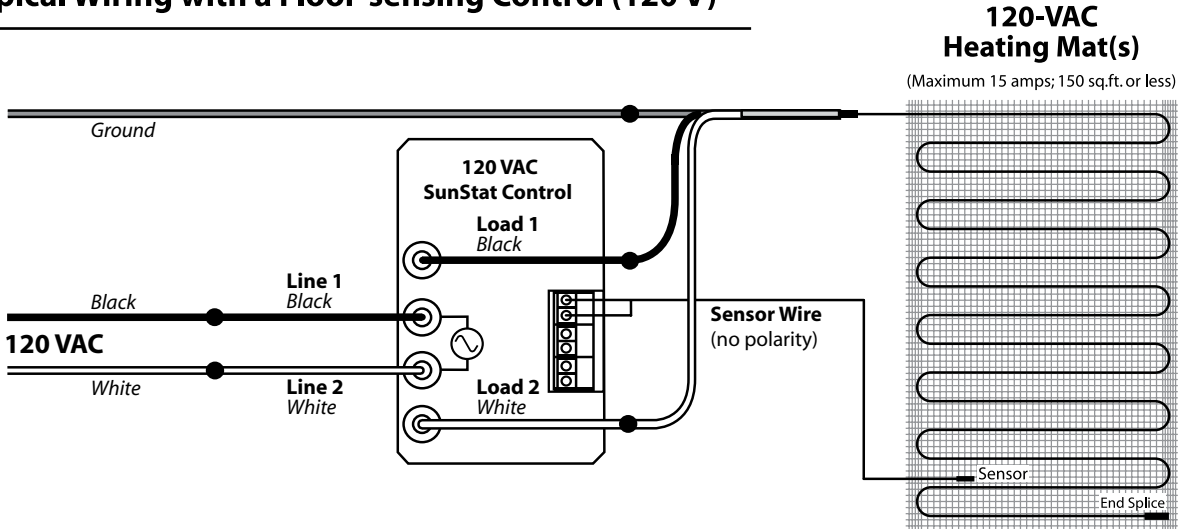
System Start-up

After the controls are installed, do not energize the floor-warming system except to conduct a brief 10-minute test of all components. Do not put the



The programmable SunStat™ with built-in timer eliminates the need for a separate programmable timer. Built-in clock displays time of day and day of week, a programmable temperature set-back on a timed schedule, on/off control, manual override, and built-in GFCI. Temperatures are displayed in either °F or °C. A hinged access panel opens to reveal the programming controls. A 15-ft. sensor wire and complete instructions are included with the control.

Typical Wiring with a Floor-sensing Control (120 V)

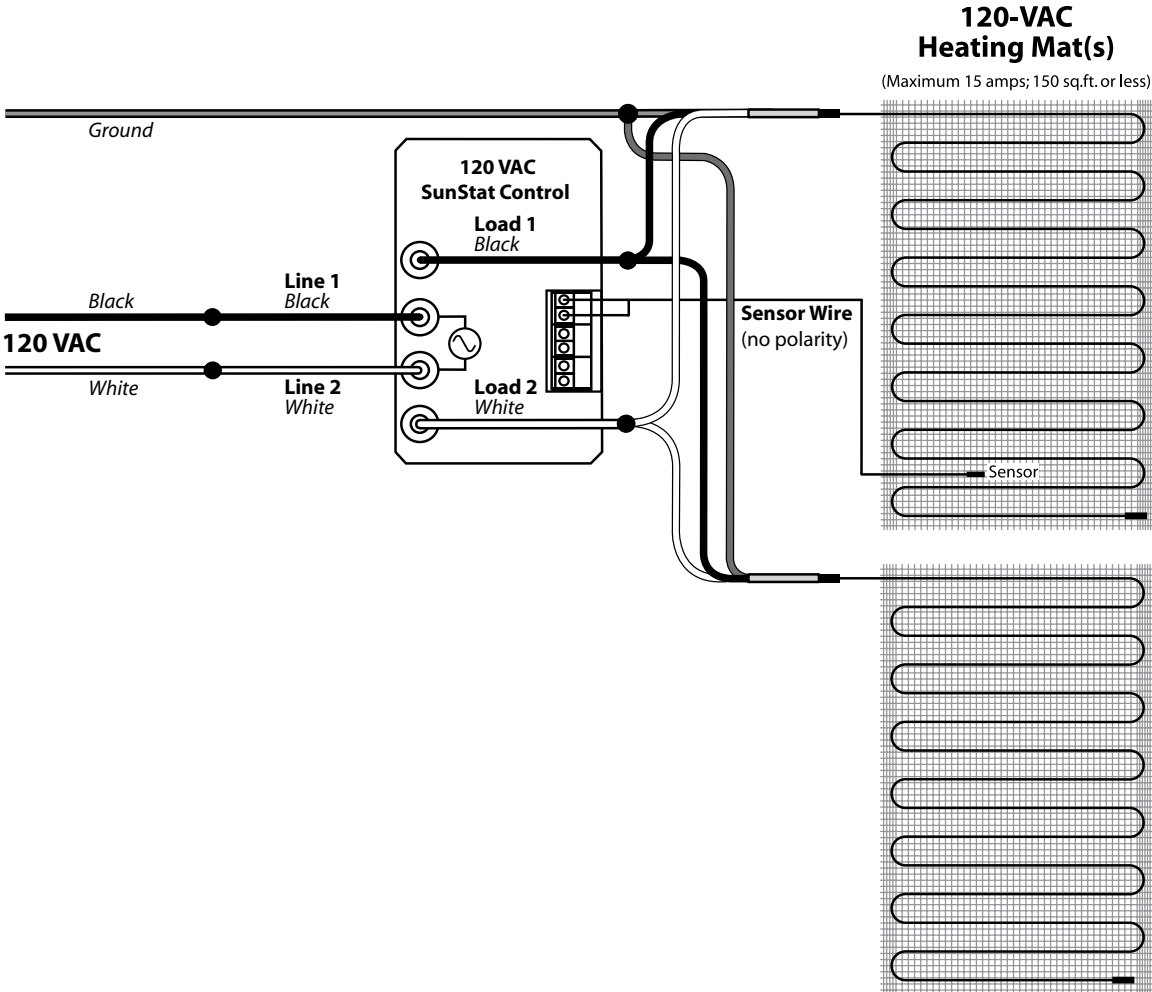


All electrical work must be done by a qualified person in accordance with local building and electrical codes, and the National Electrical Code (NEC), especially Article 424, Part IX of the NEC, ANSI/NFPA 70 and Section 62 of CEC Part I.

system into full operation until the cement materials are fully cured, which may take from 72 hours to 28 days, depending on the materials used and the individual manufacturer's instructions.

During this brief 10-minute test of the floor-warming system, the operation of the control's GFCI should be checked in accordance with the procedures given in the instructions that are included with the control.

If questions or problems arise concerning the mat, the related electrical components, or their proper installation, please call the factory at **800-276-2419**.



PART 6: Troubleshooting Guide

If not qualified to perform electrical installations, it is recommended that a qualified, licensed electrician be hired to install the floor-warming mat and related electrical components. If problems with the mat or the installation persist, please consult the troubleshooting guide below.

Any troubleshooting work should be performed with the power removed from the circuit, unless otherwise noted.

For additional assistance, call the manufacturer toll-free at 800-276-2419.

| Problem | Possible Cause | Solution |
|--|--|---|
| Mat resistance measurement is different than the nameplate label. | An analog ohmmeter (using a moving needle) was used to take the reading. | Obtain a digital ohmmeter and remeasure the resistance. |
| | If measurement is showing an open or short circuit, the heating wire has been damaged. | Record resistance between all wires. Contact the manufacturer. |
| | If measurement is just a little low or high, room temperature has affected the resistance. | Make the room temperature 75°–85°F, or check with the manufacturer. |
| Floor is not getting warm. | Mat has been damaged. | Measure mat resistance. Check for both open circuit and short circuit as detailed earlier in this manual. If damaged, record resistances between all wires and contact the manufacturer. |
| | GFCI has tripped. | Reset the GFCI on the control or circuit breaker. Remake and tighten all wiring connections. If it trips again, check for a short circuit in the mat as detailed earlier in this manual. If mat is damaged, record resistance between all wires and contact the manufacturer. If mat is not damaged, replace the GFCI control. |
| | Incorrect voltage supplied. | Measure voltage. Must have 120 volts out of control when heating. |
| | Concrete slab floor. | Surface temperatures rise slowly in a slab. If, after 5 to 8 hours of heating, the floor is not warmer to the touch, check for mat damage (see “Mat has been damaged” above). |
| | Mats are wired in “series” (or end-to-end). | Multiple mats must be connected in “parallel” (or black-to-black, white-to-white). |
| Floor heats continuously. | Sensor is loose or broken. | If the control has a floor sensor, pull the wires loose from the control and reinsert them. If the control still does not work, measure resistance across the sensor wires. For a FloorStat control the resistance should be between 17,000 ohms (at 55°F) and 8,000 ohms (at 85°F). See sensor wire resistance values on page 3. |
| | Incorrect wiring. | Make sure wire connections are correct. Consult the control instructions and/or the wiring diagram on page 15. |
| Control is not working correctly. | Incorrect programming. | Carefully read control instructions. |
| | Incorrect voltage supplied. | Measure voltage at control. Make sure it is 120 V. |
| | Sensor is disconnected or broken. | See “Floor heats continuously” above. |
| Control is not working at all. | No power is supplied. | Check circuit breaker. Measure voltage at the control. |
| | Defective control. | Return control to manufacturer for replacement. |

Appendix 1: Connecting Multiple Mats

NOTE: The thermostatic control is not shown in these diagrams in order to simplify them. These diagrams are given only as examples of how to properly connect multiple mats. Care must be taken not to overfill a box. Be sure to use wire nuts that are the correct size for the connections being made. Follow all codes for wiring. If in doubt, consult an electrician.

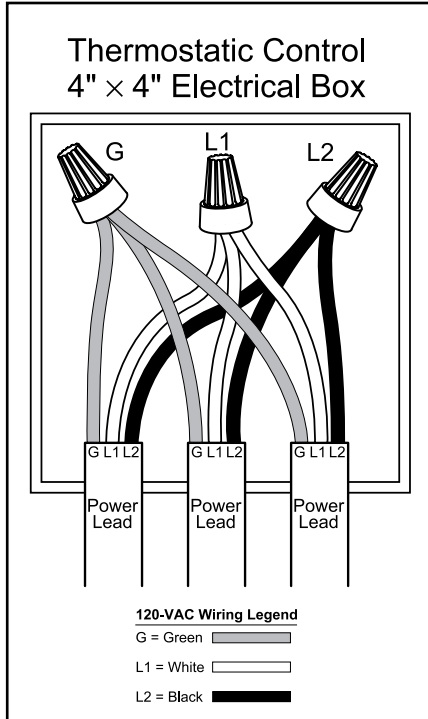


Illustration showing how to connect three mats at the thermostatic control electrical box.

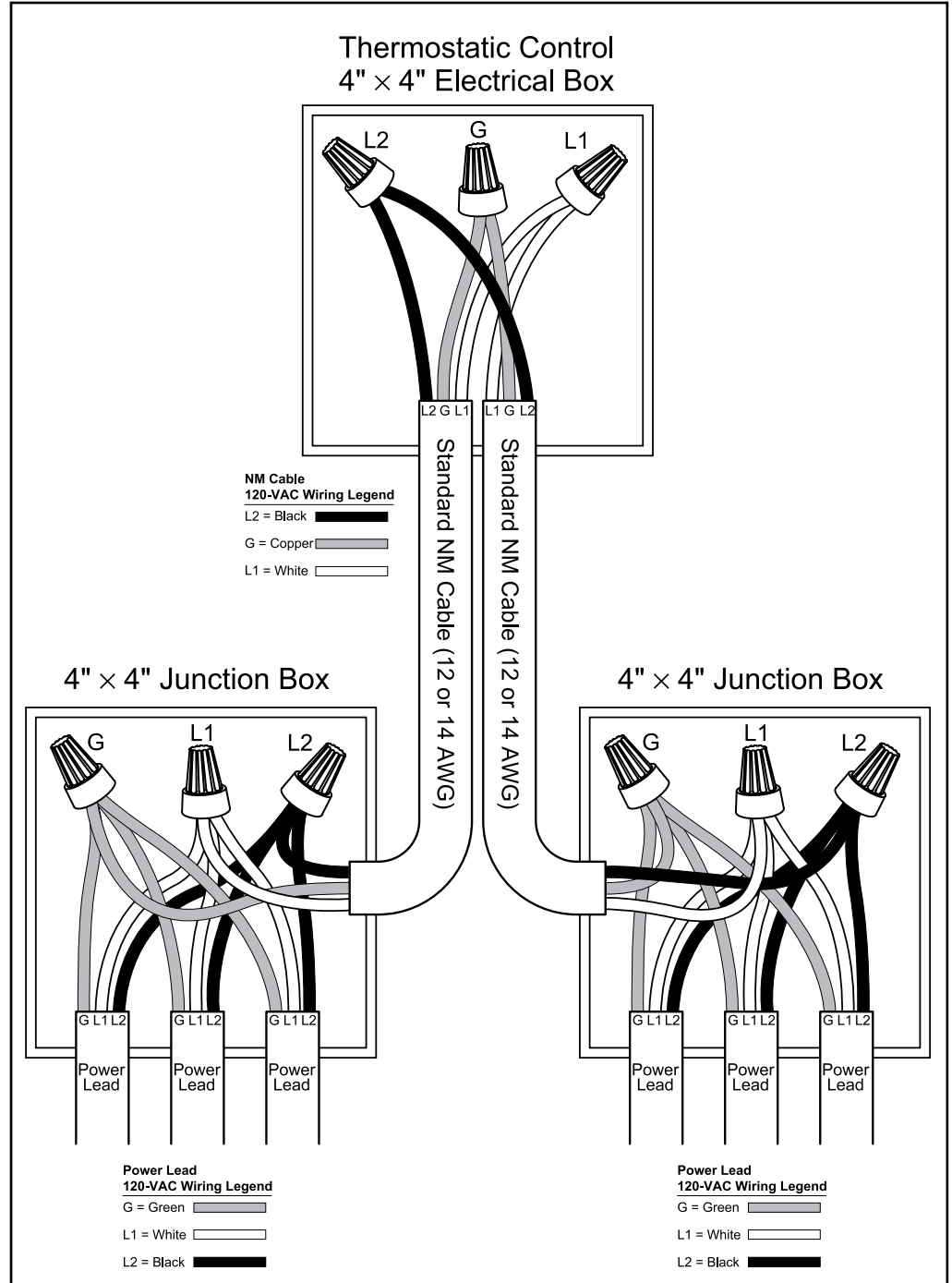
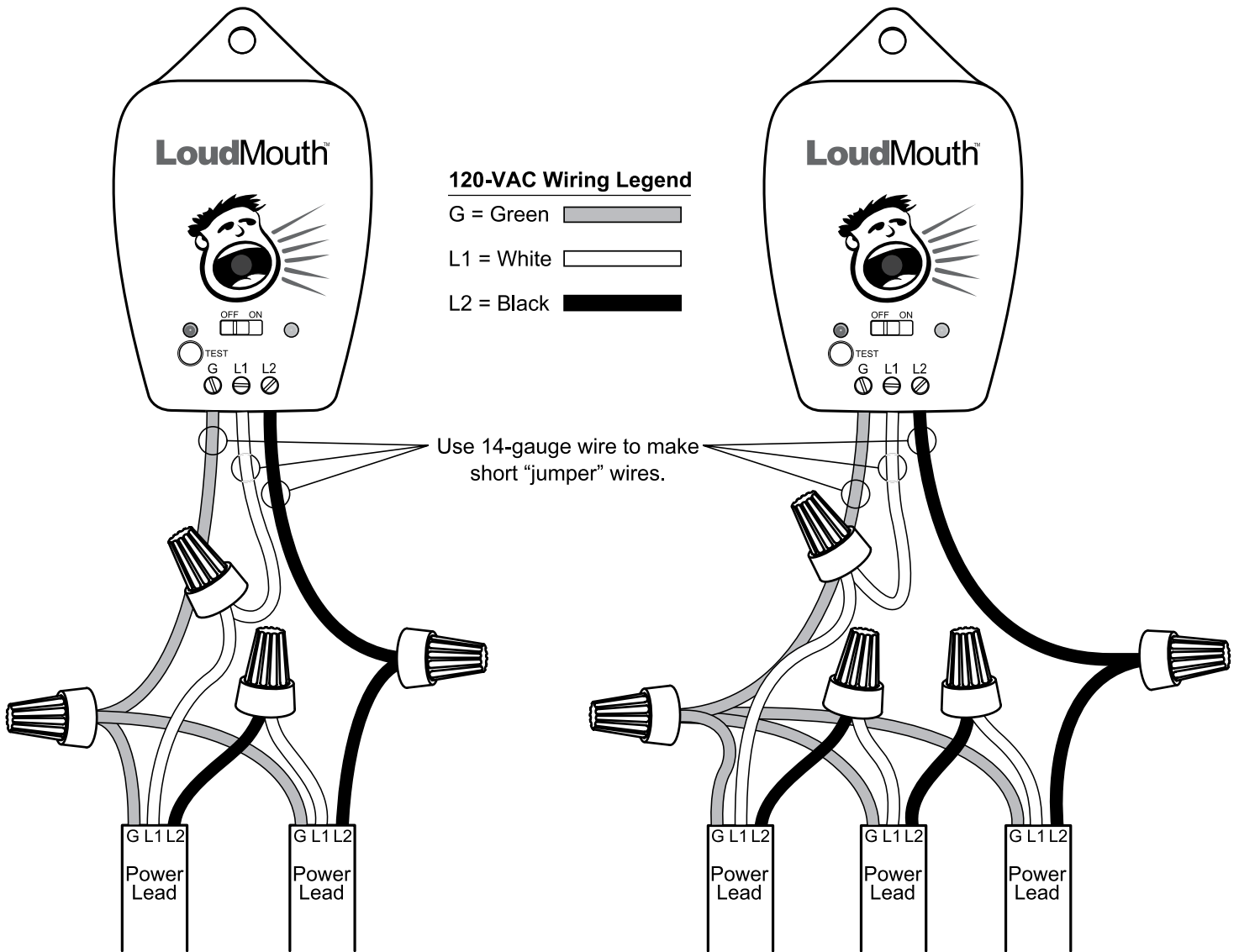


Illustration showing how to connect multiple mats at multiple junction boxes to the one thermostatic control electrical box.

Appendix 2: Connecting the LoudMouth™



Illustrations showing (left) how to connect the LoudMouth monitor to two mats, and (right) how to connect the LoudMouth to three mats. The LoudMouth can monitor no more than three mats simultaneously. Do NOT leave the power leads connected in "series" like this when making final wiring connections; the mats will not heat sufficiently.



25-Year Limited Warranty

Watts Radiant (the Company) warrants Premier Underfloor floor-warming mats (the Product) to be free from defects in materials and workmanship for twenty-five (25) years from the date of manufacture. Thermostats and controls sold by Premier are warranted, parts and materials, for one (1) year from the date of purchase. The sole remedy for controls is product replacement. This warranty is transferable to subsequent owners.

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

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, misapplication or modification, the Company will refund all or part of the manufacturer's published list price of the Product at the time of purchase in accordance with the following: 100% for the first ten (10) years, then prorated on a diminishing 25-year scale for the remaining warranty period.

For example:

- (1) Product found defective in the 5th year will receive the full manufacturer's published list price of the Product at the time of purchase;
- (2) Product found defective in the 15th year, with 10 years remaining in the warranty period, will receive 10/25ths of the manufacturer's published list price of the Product at the time of purchase.

In order to make a claim, you must:

- (a) Provide the Company with sufficient details relating to the nature of the defect, the installation, the history of operation, and any repairs that may have been made.
- (b) At the Company's discretion and at the owner's expense, ship the Product to the Company or the Company's local representative or distributor.
- (c) Provide proof that the Product was installed in accordance with the applicable Product Installation Manual and any special written design or installation guidelines by Watts Radiant for this project.
- (d) Provide proof that the Product was installed in accordance with the National Electrical Code (NEC) or the Canadian Electrical Code (CEC), and all applicable local building and electrical codes.
- (e) Provide a retail sales receipt or proof of purchase.

The following are not covered by this Limited Warranty:

- (a) Any incidental or consequential damage, including inconvenience, loss of time or loss of income.
- (b) Any labor or materials required to repair or replace the Product or control, not authorized in writing by the Company.
- (c) Any labor or materials required to remove, repair or replace flooring materials.
- (d) Any freight or delivery costs related to the Product, the control, or any related flooring or electrical products.

Watts Radiant assumes no responsibility under this warranty for any damage to the Product caused by any trades people, 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 toll-free phone number: 800-276-2419. 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.

WATTS RADIANT DISCLAIMS ANY WARRANTY NOT PROVIDED HEREIN, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY 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 REGULAR MATS TO 12 WATTS PER SQUARE FOOT, CABLES TO 15 WATTS PER SQUARE FOOT DEPENDING ON CABLE INSTALL SPACING, AND UNDERFLOOR MATS TO 10 WATTS PER SQUARE FOOT, AND AS SUCH, USERS MAY OR MAY NOT BE SATISFIED WITH THE FLOOR WARMTH THAT IS PRODUCED. WATTS RADIANT DOES WARRANT THAT ALL PRODUCTS WILL PRODUCE THE RATED OUTPUT LISTED ON THE PRODUCT 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: Incoming materials should be inventoried for completeness and for possible shipping damage. Any visible damages or shortages must be noted prior to accepting the material. Once the receiving personnel accept the material on their dock, they have relieved the freight company of any responsibility. Any discrepancy concerning type or quantity of material shipped, must be brought to the attention of Watts Radiant within 15 days of the shipping date entered on the packing slip for the order.

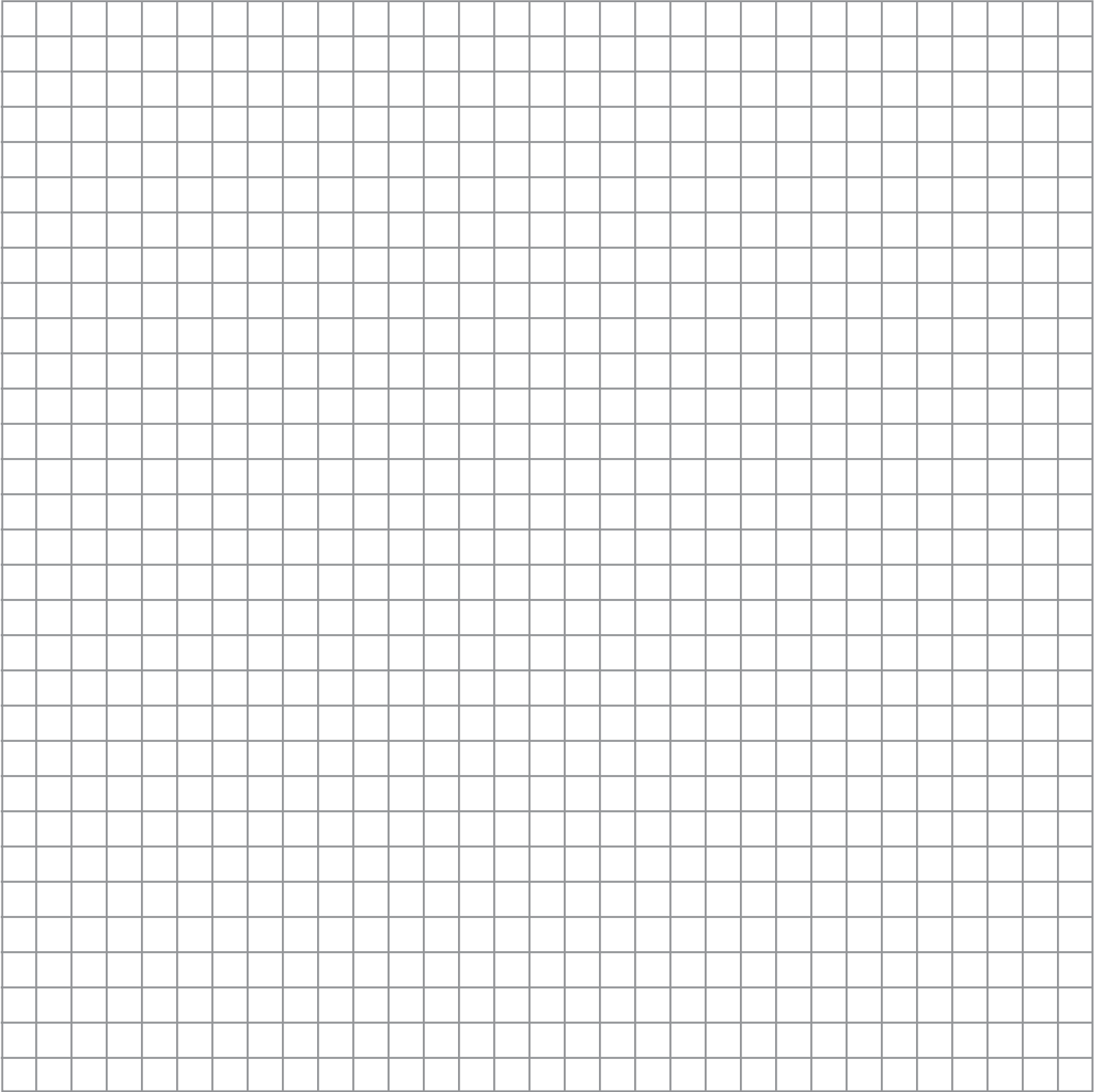
Return Policy: Watts Radiant items may be returned, if they are not damaged or used. There will be a 25% restock charge applied to items returned due to overstock or customer order error. All returned items must be in new condition. Products, controls or other parts that have a quality defect will be replaced (not credited) at no charge to the customer. If an item is shipped in error, there will be no restocking charge. All items returned, for replacement, credit or repair, must have a Returned Goods Authorization (RGA) number, or they will not be accepted. Please call our order desk for an RGA number. Products older than 180 days are excluded from these terms and conditions and may not be returned.

Products that have been damaged, or Products that have been cut, may not be returned. This includes Products that have had mortar or concrete materials applied to them. These Products cannot be repaired and cannot be resold; therefore, we cannot accept them.

Effective: October 1, 2007. This warranty applies to all Products purchased after this date.

Mat Layout Grid

Use this grid to draw a scaled layout of the room to be heated.



800-276-2419 (toll-free phone)
417-864-8161 (fax)
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