

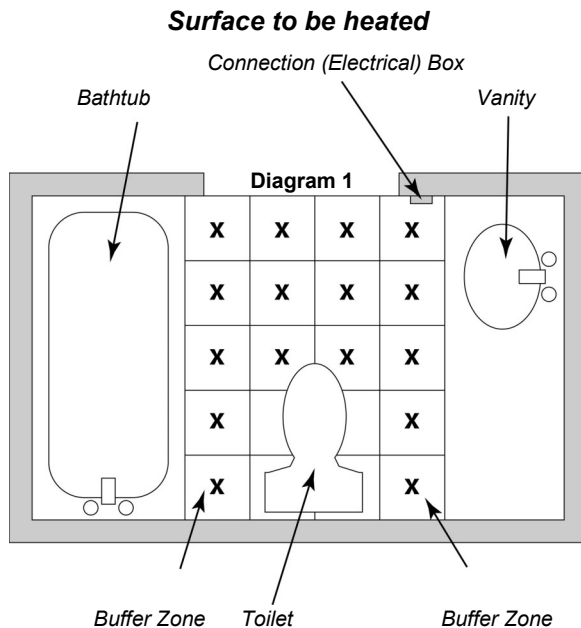
Whether you're a contractor, architect, builder or homeowner, creating the perfect indoor environment has always been a challenge. ThermaRay, the world's #1 name in thermal comfort systems introduces you to the ultimate solution: **ThermaRay's Floor Warming System.**

Please take the time to read this installation guide carefully before you begin. Remember, accurate measurements are the key to success for a proper installation.

FLOOR WARMING SYSTEM Installation Guide

FLOOR SURFACE VERIFICATION

- ThermaRay's Floor Warming System can be installed on plywood, concrete, existing tiles, or any compatible floor surface.
- ThermaRay's Floor Warming cable can be used with uncoupling membranes and other anti-fracture membranes.
- ThermaRay's Floor Warming System is ideal under most floor coverings such as: natural stone, ceramic, marble, granite, or any other hard surface flooring. It can also be installed under engineered wood floor or laminates, cork or natural wood. Check with a ThermaRay representative for any flooring compatibility concerns.
- Natural wood floors must be maintained per manufacturers recommendations for humidity levels and moisture content of the wood and floor temperatures are not to exceed 85 degrees.
- Your floor surface should be clean, free of protruding nails, screw heads, grease, plastering dust, or any other materials that may damage the cable and/or affect the floor adhesive.
- Please refer to the adhesive manufacturer's directions for any other necessary preparations of the floor surface.



Example: 16 sq. ft. use Model FW12

In this example each square is a 12" tile. There are 16 tiles or 16 square feet. You use the model number that comes closest but doesn't exceed the square footage. The correct model is a FW12. An FW12 will cover between 12 and 17 square feet. Since the spacing strips allow for great flexibility, you can increase the wire coverage from two inch spacing to three inch spacing or vice-versa. Changing the spacing can be done at any point during installation.

IMPORTANT

The heating cable cannot be cut, overlapped, crossed, modified, nor can the spacing between the cables be altered other than that determined by the selected ThermaRay spacing strip i.e., 50 mm (2"), 75mm (3") or 100 mm (4") on center.

NOTE: Cable cannot be at 25 mm (1") on center spacing.

The difference between heat and comfort.

NECESSARY TOOLS

Measuring tape, snipper (Scissors or Utility Knife), hot glue gun, ohmmeter, and a SmartRooms Installation Detector (S.I.D. - Optional) to verify the integrity of the cable and to test for grounding). Keeping S.I.D. connected during installation will allow you to detect problems immediately. Otherwise, check ohm readings regularly to verify continuity and grounding throughout the install, after the installation is complete and during the installation of the thinset or self leveling and the flooring surface.

PLANNING

In order to minimize time and error, measure the real surface of the floor to be heated (**See Diagram 1**), then compare your measurement with the selected cable. The selected cable (**See Diagram 6**) should be 5% smaller in surface area than the total area of the floor to be heated. This will create a buffer zone which can be used to accept any excess cable if necessary. You start and finish at the connection box (**See Diagram 1**). There will be a white floor lead wire and a black floor lead wire in the connection (electrical) box. Therefore, you must plan your layout to finish and end at the electrical box.

Caution: ThermaRay's warming cable is an electrical product and should be installed according to the electrical code. The installation should be done by a duly qualified person where required by law.

The use of approved ThermaRay Floor Warming thermostat is recommended. This thermostat has a ground fault circuit interrupter (GFCI) and is designed to provide maximum benefit and protection for you and your floor warming system. The use of comparable thermostats are acceptable without GFCI where not required by code and with GFCI where required by code.

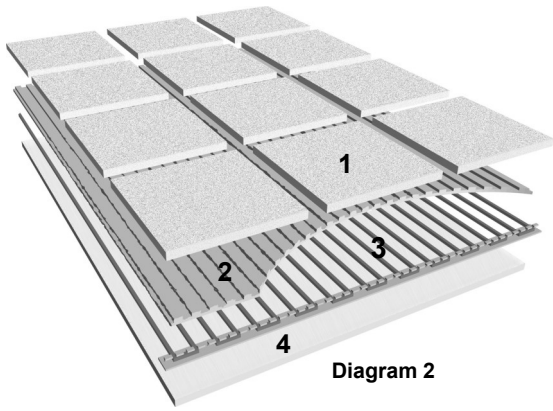


Diagram 2

Most floor coverings may be used with your ThermaRay floor warming system. Hard surface tile, marble, ceramic and stone as well as engineered wood floors or laminates, cork and natural wood.

Please contact the flooring manufacturer to ensure their flooring is compatible with floor warming systems.



Diagram 3

Ohms

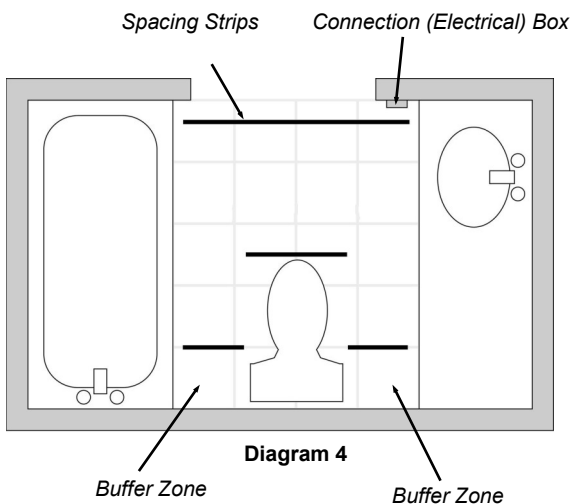


Diagram 4

Buffer Zone

Buffer Zone

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1. Floor covering
2. Adhesive (Thinset or self-leveling mortar)
3. ThermaRay Heating system (Cable) with Spacing Strips
4. Sub-floor or uncoupling / anti-fracture membranes

NOTE: Cables must be embedded in a cementitious mortar material suitable for direct contact with heating cable. Use a premium latex modified mortar. Please refer to the specific mortar manufacturers directions in regards to floor warming installation.

IMPORTANT

ThermaRay's warming cable can be installed at:

- 13 to 25 mm (1/2 to 1 inch) from any underside of a counter, steps, fixed furniture, patio doors, baths, or showers.
- 5 cm (2 inches) from any walls.
- 15 cm (6 inches) from toilet / faucets.
- 20 cm (8 inches) from any other heating system installed at the base of the wall or in the floor.
- It is not necessary to install under permanent furniture (counters, vanities, kitchen islands, built in cabinets, etc.) or where the air does not flow freely. It adds cost and does not appreciably assist in warming the space and can also create hot spots that may damage the system.
- Furniture and appliances can be placed over the heating system as long as the cable is embedded in a cementitious material such as thinset or self-leveling mortar with a PSI rating in excess of 2000 psi.
- Area rugs and mats can be used, but it is recommended that they Not have rubber backing. Rubber is an insulator and may affect the overall efficiency of the system and the heat may break down the rubber backing of the rug or mat.
- Do Not affix anything to the floor (i.e. door stopper).

INSTALLATION

Now that you have checked your floor and have determined that your heated cable matches your floor dimensions, you are ready for the installation.

Step 1:

Determine where the connection box will be installed. Then open the carton and test the ohms to ensure they match the ohms label on the wire (**see Diagram 3**). At the end of each cable is a 2.1 metre (7 foot) cold lead to make the appropriate electrical connections.

Step 2:

Fix the cable to the floor using the spacing strip starting at the connection box. (**see Diagram 4**). Attach the green clip from S.I.D. to the steel braid. Leave on during installation. Attach the black and red clips to the non-heating lead wire. (See S.I.D. instructions for further detail.)

Note: ThermaRay's spacing strip is the only approved product for spacing the cable on the floor. Install the spacing strip to the floor as the installation progresses. If necessary, to secure the spacing strip, you can use staples or construction adhesive.

Step 3:

Respect the distance between cables and apply a slight tension to the cable to ensure that the cable is always parallel (**see Diagram 5**). You may want to use glue or tape on the cables in between the spacing strips to keep the wire from floating up when applying thinset or pouring a self leveling mortar material.

Step 4 :

All heating portions of the cable including the hot to cold feed connections must be installed on the floor and not in the wall. There will be a colored tape on the cable spool once you have reached the half way point of the installation.

Step 5:

Allow sufficient space for the cable return. The cable starts and ends at the connection box. Once all the cable has been installed, test the cable to verify the ohms (**see Diagram 3**) and for grounding. This is done by connecting one lead from the ohmmeter to the wire and the other lead to the stainless-steel braid. Any reading other than a 1 or 0 means the cable has been damaged. To verify continuity, touch probe of the ohm meter to each lead wire. The ohm reading should be in the same range as marked on the tag. S.I.D. can also be used.

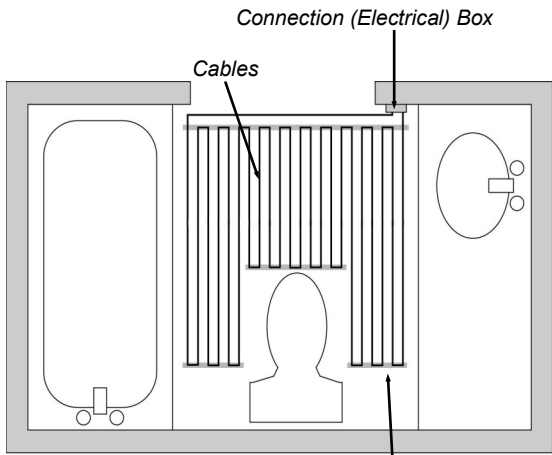


Diagram 5
Spacing Strips

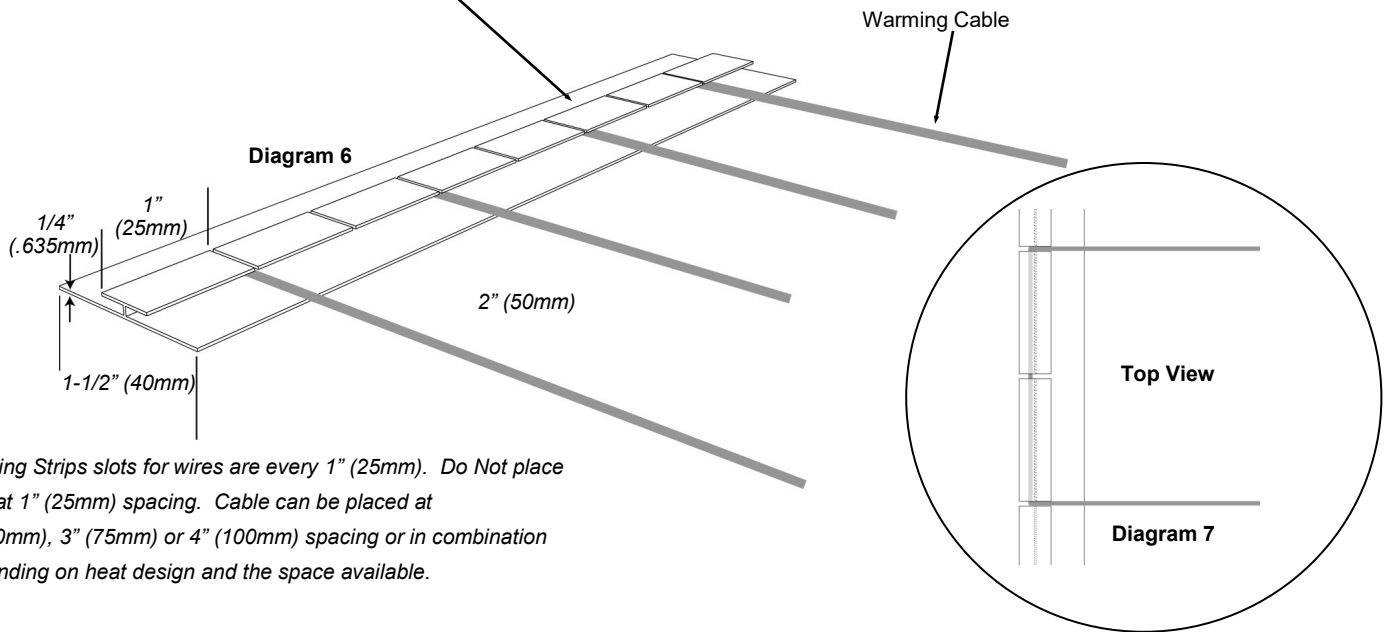
NOTE:

If the installation requires many cables, each run of the cable should be carefully planned to ensure that the spacing between the cables is always respected (See Diagram 6).

Step 6

Install the probe wire of the Comfort Controller between the warming cables at a distance of 30 to 60 cm (1 to 2 feet) within the heating zone (see Diagram 7). You may anchor the probe with glue, staple (rounded) or tape.

Note: Do Not cross the probe wire over the warming cable. The probe should be placed between the cables and not near any other heating or cooling source. Rugs, mats or furniture over the sensor could affect the floor temperature reading.



Spacing Strips slots for wires are every 1" (25mm). Do Not place wire at 1" (25mm) spacing. Cable can be placed at 2" (50mm), 3" (75mm) or 4" (100mm) spacing or in combination depending on heat design and the space available.

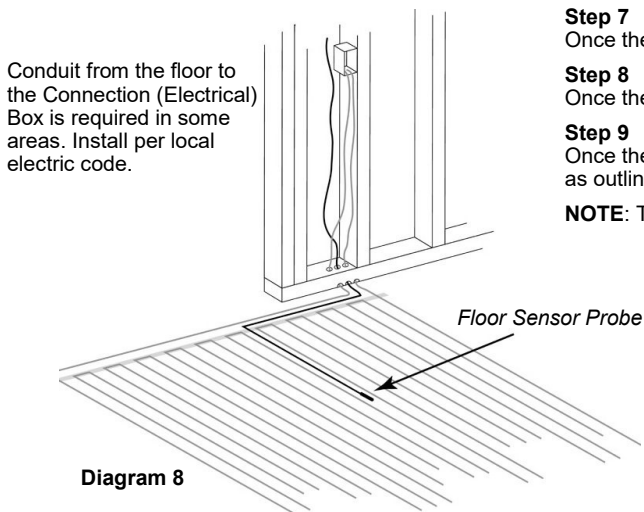


Diagram 8

Step 7

Once the adhesive or self-levelling cement has been applied, test the cable as per step 5.

Step 8

Once the tiles are installed, test the cable again as outlined in step 5.

Step 9

Once the grout is applied (the tile installation should now be complete) test the cable again as outlined in step 5.

NOTE: The stainless-steel braid must be grounded to the electrical ground feed wire

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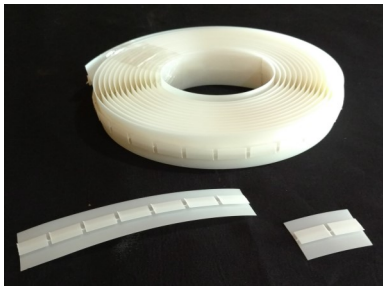
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ThermaRay Floor Warming Cable Kits



Floor Warming Cable Spool



25' Roll of Spacing Strip



Conforms to UL SUB 1683
Certified to CSA STD C22.2 No 130

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Model #	Watts	Voltage	Cable Length Feet	Coverage in Square Feet On Center Spacing Options		
				2"	2 2/3"	3"
FW12-120	140	120	69	12	15	17
FW18-120	215	120	108	18	23	27
FW23-120	275	120	137	23	29	34
FW36-120	440	120	220	36	45	54
FW41-120	500	120	245	41	51	61
FW52-120	625	120	311	52	65	78
FW65-120	785	120	392	65	81	98
FW75-120	900	120	450	75	94	113
FW84-120	1000	120	500	84	105	125
FW12-240	150	240	73	12	15	18
FW23-240	280	240	138	23	29	35
FW36-240	430	240	215	36	45	54
FW46-240	550	240	276	46	58	69
FW65-240	780	240	390	65	81	98
FW82-240	990	240	493	82	103	123
FW104-240	1250	240	622	104	130	156
FW117-240	1400	240	700	117	146	175
FW134-240	1600	240	800	134	168	200
FW150-240	1800	240	900	150	188	225
FW167-240	2000	240	1000	167	209	250
FW184-240	2200	240	1100	184	230	275

Available in all Voltages

SS25 - Spacing Strip - 25' (7.6 Meters)

T120/240-FPDG - Floor Sensing Programmable / Digital Thermostat with 5 mA GFCI Protection

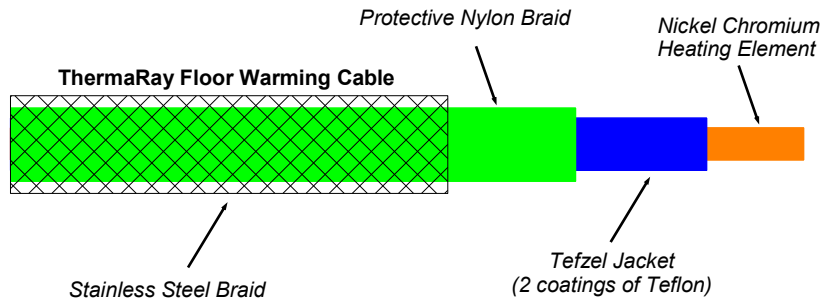
T120-FPD - Floor Sensing Programmable / Digital Thermostat

T240-FPD - Floor Sensing Programmable / Digital Thermostat

T120-FPD - Floor Sensing Non-Programmable / Digital Thermostat

T240-FPD - Floor Sensing Non-Programmable / Digital Thermostat

24v Stats Available - In tandem with relays and/or transformers



Revised January 30th, 2017