

POWER TECH®

HEAT MAT

Heat Mat System Installation Manual



Floor Heating System

HEAT MAT

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Important Safeguards & Warnings

WARNING: Shock & Fire Hazard

If the Heat Mat System is damaged or not installed properly, fire or shock could occur resulting in serious personal injuries or damage to property. You must carefully follow the warnings and instructions contained in this manual.

- It is important that this equipment is installed only by qualified electricians who are familiar with the proper sizing, installation, construction and operation of floor warming systems and the hazards involved. The installation must comply with all national and local electrical codes. If you are unfamiliar with these requirements, contact an electrician.
- The Heat Mat System is designed for under floor heating purposes only. Be sure that the floor is not penetrated by nails, screws, or similar devices that can cause damage on first installation or during subsequent floor repairs in the future.
- If the Heat Mat System is damaged, it must be replaced. Do not attempt to splice or repair any part of the system.

1 General Information

1.1 Use of the Manual

This Manual describes the Heat Mat floor heating system – how to design the room, select the product, and install the system. It is important to thoroughly review this manual and the following document prior to installation:

For additional information regarding any aspect of the Heat Mat System, contact:


Power Technologies

7400 East Slauson Avenue
Commerce, CA 90040-3300
Phone: (800) 200-6677
Fax: (323) 728-8995

1.2 Safety Guidelines

The safety and reliability of any floor heating system depends on proper design, installation, and testing. Incorrect installation or mishandling of the product can cause damage to the heating cable, system components and property, and can create a risk of fire or shock. The guidelines and instructions contained in this guide are important. Follow them carefully to minimize these risks and to ensure that the Heat Mat system performs reliably.

Pay special attention to the following:

- Instructions marked  Important
- Safety warnings identified as  WARNING

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1.3 Remember to Measure Resistance

The resistance should be measured between the two conductors, white and black. Compare this resistance reading to the resistance specified in the Product Selection “Table 1 or Table 2”. The value should be within $\pm 10\%$. If you get a different reading, contact Power Tech® at (800) 200-6677. Also, measure the resistance between the white, black and shielding/ground wire. Both should read infinity. If you get a different reading, contact Power Tech® at (800) 200-6677. Please refer to “5 Commissioning” for instructions on how to measure the resistance.



Important: measure the resistance four times during the installation process

Remember to always measure, verify and record the actual resistance throughout the installation process (out of box, after installation, after thin set cement or self-leveler application and after installation of floor tiles).

1.4 12-Year Limited Warranty

For a period of twelve (12) years from the date of purchase Power Tech® warrants that the Heat Mat heating cable is free from defects in material, design and workmanship. The extended warranty is only valid if the warranty certificate has been properly completed and mailed, and the installation is in accordance with the installation instructions.

2 Heat Mat System

2.1 Heat Mat Specifications

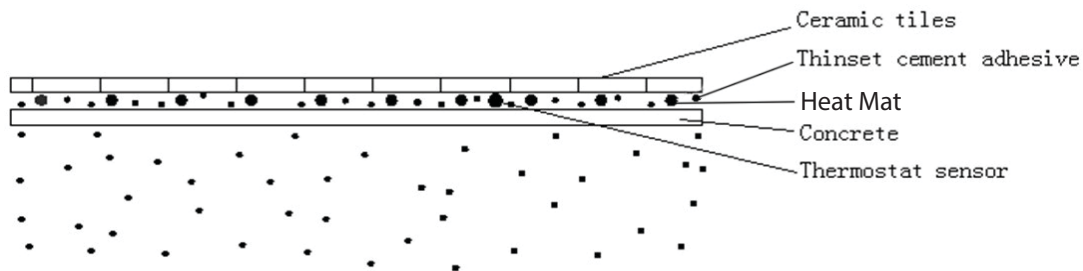
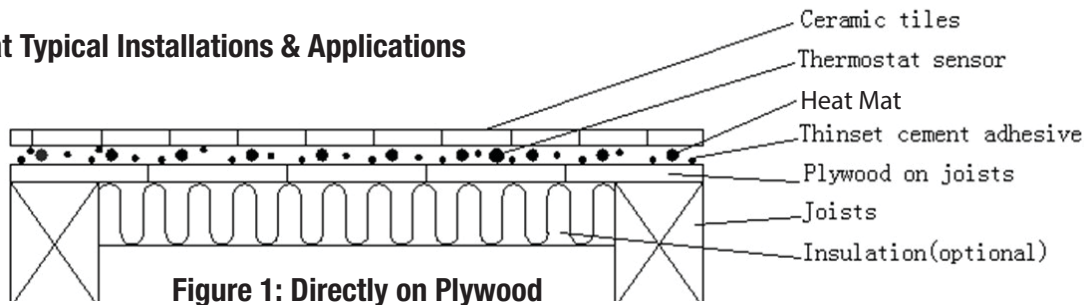
Cable Construction:	Twin Conductor
Rated Voltage:	120V
Output:	12W/ft ² (130W/m ²) $\pm 10\%$
Cable Spacing:	3" (76.2mm)
Cable Diameter:	1/8"-1/6" (3.2mm-4.2mm)
Conductor Insulation:	fluoropolymer
Maximum Ambient Temperature:	85°F (30°C)
Minimum Installation Temperature:	40°F (5°C)
Cold lead:	2-wire 16Awg plus ground braid; 10ft (3m) length

2.2 Thermostat Specifications

Functions:	On/Off control, digital display, 7-day programmable
Supply Voltage:	120V $\pm 15\%$, 50/60 Hz
Maximum Switching Current:	15 Amps
Ground Fault Circuit Interrupter:	Rated Class A, 5mA
Temperature Control Range:	40 to 104°F (5 to 40°C)
Ambient Range:	32 to 104°F (0 to 40°C)
Floor Temperature Sensor:	2-wire, 10-foot lead wire
Heat Mat and Thermostat Package Includes:	
<ul style="list-style-type: none"> • Heat Mat Floor Heating Grid With A 10 Ft. Cold Lead • Solid State, Digital Thermostat Sold Separately • Floor Temperature Sensor Cord With A 2 Conductor 10 Ft. Grid Wire 	

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2.3 Heat Mat Typical Installations & Applications



Alternative method: self-leveling cement is recommended for large surfaces and the following floor materials: engineered wood, laminate, floating floors, vinyl, linoleum and carpet.

WARNING

Consult the manufacturer for information on special installation requirements for wood, laminate, vinyl or linoleum flooring.



Important

- Read the instructions carefully before installing Heat Mat System.
- Remember to measure the resistance four times.
- Do not install Heat Mat in walls or ceilings.
- The cable must be embedded in mortar, thinset, concrete or similar material.
- The minimum installation temperature is 40°F (5°C).
- **The heating cable cannot be cut to length, crossed over itself, or installed too close.**
- It is recommended to use copper wire only.
- Remember to check that the supply voltage matches the voltage of the Heat Mat.
- Remember to place the labels as written in this instruction.
- Only for indoor installation.
- Metal structures or materials used for the support of or on which the Heat Mat is installed must be grounded in accordance with CSA Standard C22.1, section 10 and the NEC.

Please consult the factory for any other questions or advice.

3 Floor Heating Design & Product Selection

3.1 Design the Installation

Step 1: Measure the heated area

Determine the heated area of the floor where there are no permanent fixtures or furniture such as showers, toilets, vanities or cabinets. Measure the heated area of the floor.

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3.2 Confirm Your Product Selection

Confirm that your Heat Mat is no larger than the heated area. Following the example from figure 3., if the heated area is 74ft², select the 70ft² Heat Mat system.

Table 1:120V Product Selection

120V	Heated Area		Mat Dimensions		Watts (12W/sq ft.)	Amps	ohms
Catalog Number	sq. ft.	m ²	in.*ft.	m*m			
WJ0101201	10	0.93	20*6.1	0.5*1.9	120	1.0	120.0
WJ0151201	15	1.39	20*9.1	0.5*2.8	180	1.5	80.0
WJ0201201	20	1.86	20*12.2	0.5*3.7	240	2.0	60.0
WJ0301201	30	2.79	20*18.3	0.5*5.6	360	3.0	40.0
WJ0401201	40	3.72	20*24.4	0.5*7.4	480	4.0	30.0
WJ0501201	50	4.65	20*30.5	0.5*9.3	600	5.0	24.0
WJ0601201	60	5.57	20*36.6	0.5*11.1	720	6.0	20.0
WJ0701201	70	6.50	20*42.7	0.5*13.0	840	7.0	17.1
WJ0801201	80	7.43	20*48.8	0.5*14.9	960	8.0	15.0
WJ0901201	90	8.36	20*54.9	0.5*16.7	1080	9.0	13.3
WJ1001201	100	9.29	20*61.0	0.5*18.6	1200	10.0	12.0

Table 2:240V Product Selection

240V	Heated Area		Mat Dimensions		Watts (12W/sq ft.)	Amps	ohms
Catalog Number	sq. ft.	m ²	in.*ft.	m*m			
WJ0202402	20	1.86	20*12.2	0.5*3.7	240	1.0	240.0
WJ0302402	30	2.79	20*18.3	0.5*5.6	360	1.5	160.0
WJ0402402	40	3.72	20*24.4	0.5*7.4	480	2.0	120.0
WJ0502402	50	4.65	20*30.5	0.5*9.3	600	2.5	96.0
WJ0602402	60	5.57	20*36.6	0.5*11.1	720	3.0	80.0
WJ0702402	70	6.50	20*42.7	0.5*13.0	840	3.5	68.6
WJ0802402	80	7.43	20*48.8	0.5*14.9	960	4.0	60.0
WJ0902402	90	8.36	20*54.9	0.5*16.7	1080	4.5	53.3
WJ1002402	100	9.29	20*61.0	0.5*18.6	1200	5.0	48.0
WJ1102402	110	10.22	20*67.1	0.5*20.4	1320	5.5	43.6

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For example, in Figure 3, the area of the bathroom is 96 ft². When you subtract the area of the vanity, shower and toilet, the total heated area is only 74 ft².

Step 2: Determine the power supply voltage

The available supply voltages include 120V, 208V or 240V.



Important

Operating the 240V cable at 208V reduces the power output to approximately 9W/sq.ft. (25% reduction).

Step 3: Plan the design

Determine the optimum floor heating mat layout for your heated area to ensure coverage. Select a spot for the thermostat in the wall above the heated area where it can be reached by the 10-foot cold lead on the Heat Mat, and the 10-foot floor temperature sensor. Please refer to figure 4.



Important

The predetermined Heat Mat spacing must be maintained to ensure proper floor heating. Do not change the Heat Mat heating cable spacing when you lay out the cable or the floor may have cold spots.

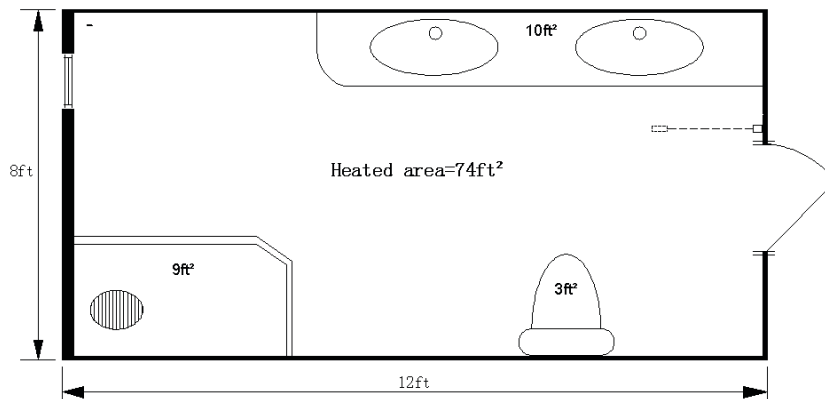


Figure 3: Heated Area Example

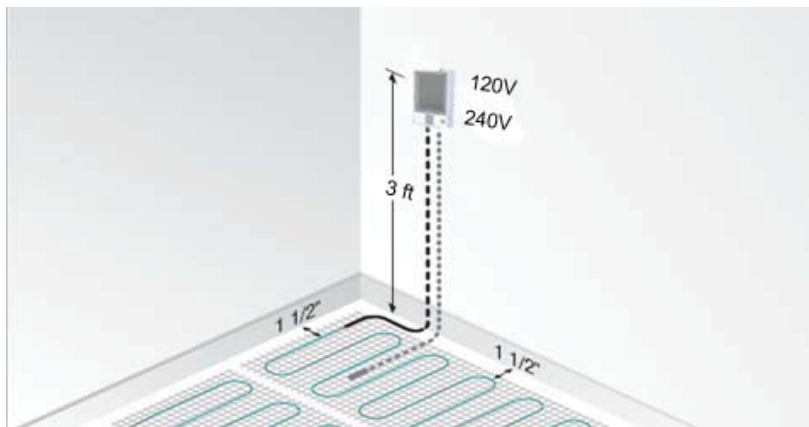


Figure 4: Typical Cold Lead & Floor

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4 Installation



Important

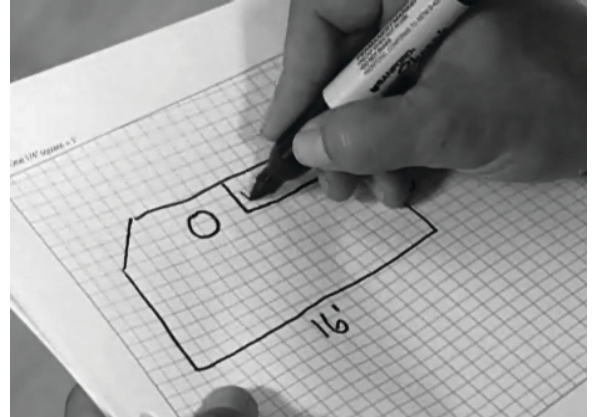
You will require the following items to install and test the floor heating system.

- Scissors
- Utility Knife
- Wire Strippers
- Tape Measure
- Screwdriver
- Multimeter

You will also need the appropriate tools and materials to install your particular floor. These will likely include products like self-leveling mortar, thin-set mortar, backer board, tile, a notched trowel, and any other steps to ensure a successful Heat Mat installation.

Step 1: PLAN LAYOUT

Make a sketch layout or a floor plan of the room; include all permanent furnishings such as toilets, bathtubs, appliances, cabinetry, etc. Indicate all dimensions required to determine the available floor area and the position of the Thermostat.

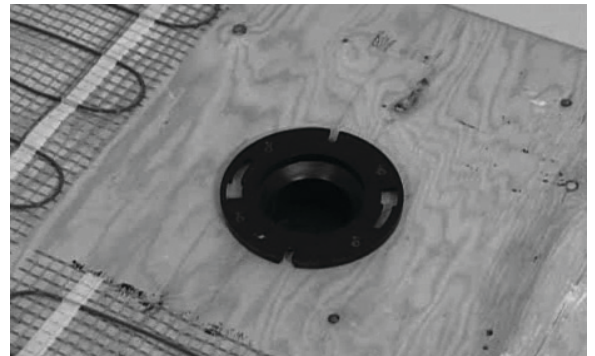


Important

Power Tech recommends that the installation is documented with photos to note the location of connections and the sensor.

Step 2: TRANSFER LAYOUT TO FLOOR.

Draw and outline of the layout on the room floor including a foot print of all furnishings that are not yet installed. Unroll the first few feet of the Heat Mat. The starting point of the cable must be placed within 10 ft. from the thermostat.



Important

Mark the position of the connection point between the power lead and the blue Heat Mat heating cable. **This connection must be concealed in thinset or self-leveling cement.** When using a floor temperature sensing thermostat, mark the sensor position in the middle of 2 heating cables, about 10 in. (25cm) away from the wall (within the heated area), as close as possible to the thermostat.

Step 3: INSTALL SENSOR

If using a floor temperature sensing thermostat, install the sensor now, either in conduit tube, or directly to the subfloor. It is recommended that the sensor be installed in conduit tube. This will allow



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the sensor to be easily replaced in the unlikely event of failure. The sensor and/or tube needs to be installed between the thermostat wall box and the sensor position. The conduit tube must be partially countersunk into the subfloor. Cut a channel approximately 5/16" deep x 5/16" wide in the floor and wall up to the thermostat for the sensor conduit. The conduit has to go from the thermostat and minimum of 10" away from the wall towards the middle of the floor.



Important

The sensor conduit must be centered in the cable loop (between two blue heating wires). Use duct tape to close the end of the conduit so that thinset can't penetrate the conduit. Use duct tape to hold the sensor conduit into the groove to prevent it from floating up when the mortar or thinset is poured. If the sensor is installed directly in the mortar bed, use duct tape to secure the subfloor.

Step 4: PREPARE SUBFLOOR SURFACE

Clean and vacuum the floor thoroughly and remove dust and debris from the floor that may damage the heating cable. Ensure that the subfloor is secure and stable. Carefully fill in all cracks to prevent any potential damage to the new tiles resulting from shifts in the subfloor.



Step 5: MEASURE THE RESISTANCE (THE FIRST TIME)

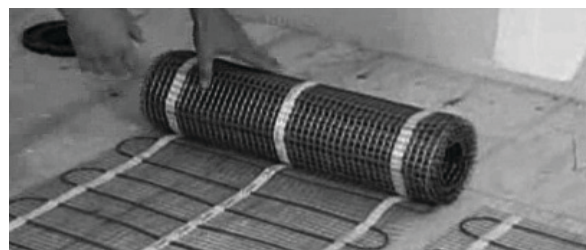
Use a digital ohm meter to measure the resistance of the Heat Mat and compare it to "Table 1 or Table 2". Record the measured resistance on the warranty card. Documenting the resistance at each stage of installation is required for warranty purposes. Also, measure the resistance between the white, black and shielding/ground wire. Both should read infinity. Please refer to "5 Commissioning" for instructions on how to measure the resistance.

Step 6: BEGIN LAYING THE Heat Mat

An adhesive has been added to the bottom of the mat which will prevent the mat from moving during installation. Start by placing the mat such that the connection point and the temperature sensor are in their intended positions and bring the power cable to the thermostat or connection box.

Begin unrolling the Heat Mat evenly across the floor outside the areas that you marked previously. The adhesive on the mat is made such that the mat may be moved several times before it loses its adhesiveness. When you reach the next wall, cut the mesh, turn the mat, and begin rolling in the desired direction.

NEVER CUT OR SHORTEN THE BLUE HEATING CABLE!

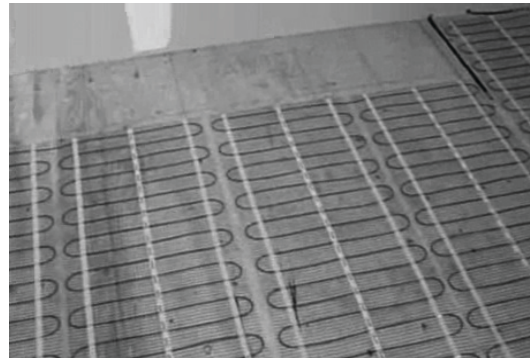
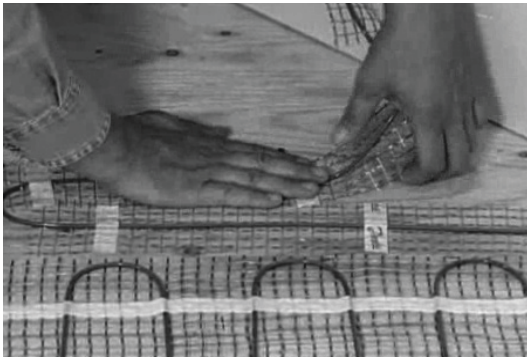


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Ensure that the Heat Mat is in full contact with the subfloor at all times. Avoid walking on the heating mat. If this is not possible, **use shoes with soft soles.**

When approaching obstacles (toilets, cabinets, etc.) carefully remove some of the blue heating cable from the mat and lead the cable around the obstacle. In some cases pieces of the mesh will be cut away entirely. Use hot melt glue or a thin strip of tape to secure the loose cable the floor. **It is highly recommended to take photographs of the installed Heat Mat before installing the flooring.**



Step 7: MEASURE THE RESISTANCE (THE SECOND TIME)

Please refer to Step 5.

Step 8: INSTALL FLOOR COVERING

ENSURE THAT THE SENSOR CONDUIT HAS BEEN PROPERLY INSTALLED BEFORE PROCEEDING (see Step 3).

In the case of tiles, proceed with the installation of the tiles by covering the heating cables with a layer of thin-set cement as directed by the tile manufacturer. Ensure that the thin-set mortar covers the entire height of the heating cable as the tiles are installed. In the case of a wood, engineered or laminate floor covering, it is recommended that the flooring manufacturer be contacted. For wooden floors, a minimum of 3/16" of self-leveling cement over the heating cable is recommended. Ensure that all moisture in the self-leveling cement has been fully eliminated in accordance with the drying times recommended by the manufacturer (consult the manufacturer for exact drying time).



Important

The system must not be turned on until the thinset cement has fully dried. A minimum of two weeks is recommended.

Step 9: MEASURE THE RESISTANCE (THE THIRD TIME)

Please refer to Step 5.

Step 10: Install the tile

To install the tile, apply a layer of acrylic or latex modified thin-set using the ridged side of your trowel. Tile and grout the floor using best industry practices and in accordance with instructions provided by the manufacturer of the tile.

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Step 11: CONNECT POWER SUPPLY AND THERMOSTAT

The connection of the power supply and the thermostat must be done by a qualified electrician in accordance with the Nation Electrical Code (NEC) and the Canadian Electrical Code (CEC). The electrician should connect the floor sensor to the thermostat, take the final resistance reading and record it on the warranty card, see Step 13.

Note: You need to mark the appropriate circuit breaker reference label indicating which branch circuit supplies the circuits to those electric space heating cables.

Step 12: MEASURE THE RESISTANCE THE FOURTH TIME

Please refer to Step 5.

Step 13: RECORD INFORMATION AND AFFIX LABELS

It is important for the homeowner to mail in the certificate immediately after installing the system (cable and thermostat). Failure to do so could void the manufacturer’s warranty. The warranty is subject to the guarantee conditions listed on the warranty certificate.

Keep a copy of the warranty card for your reference.

Step 14: ENJOY THE COMFORT OF Heat Mat

The Heat Mat heating system is now ready to use. Increase the floor temperature gradually and adjust it until it reaches a comfortable level depending on the type of room and your personal preferences.

5 Commissioning



Important

For the extended 12-year limited warranty to apply, you must perform these tests, record the results on the warranty card, and retain a copy of the record.

You must perform the Insulation Resistance Test, the Heating Cable Resistance Test, and the Sensor Resistance Test four (4) times (please refer to 4 installation) during the installation process.

5.1 Insulation Resistance Test

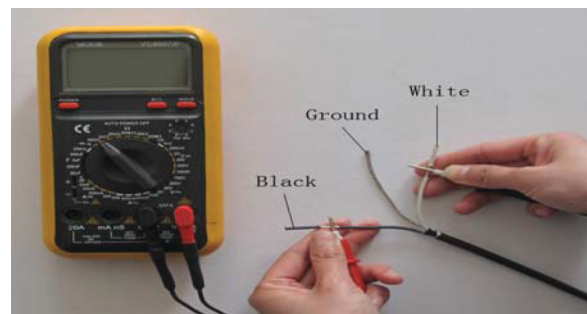
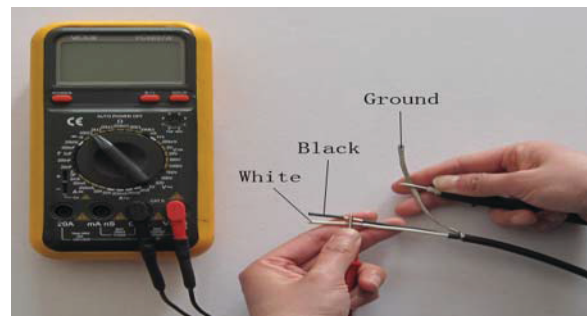
This test ensures that the insulating jackets of the mat are not damaged. A low value indicates the cable has been damaged and must be replaced.

1. Connect the ground wire to the black lead and both power wires to the red lead of the multimeter.
2. Make sure the meter reads “Open” or “OL”. If you get a different reading, contact Power Tech® at 888-999-5566.
3. Record these readings on the warranty card.

5.2 Heating Cable Resistance Test

This test measures the resistance of the Heat Mat and is used to determine circuit integrity.

1. Set you multimeter to the 200 or 2000 ohm range.
2. Connect the multimeter leads to the black and white cold lead wires.
3. Compare this resistance reading to the resistance specified in the Product Selection “Table 1 or Table 2”. The value should be within $\pm 10\%$. If you get a different reading, contact Power Tech® at 800-999-5566.
4. Record these readings on the warranty card.

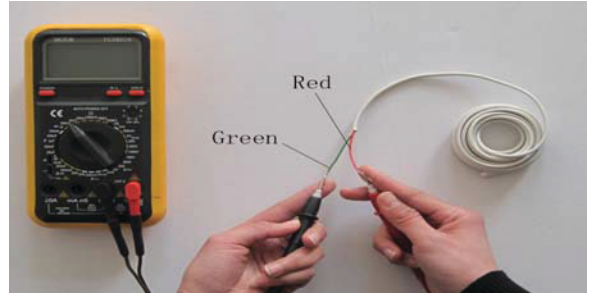


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5.3 Sensor Resistance Test

This test measures the resistance of the floor sensor and is used to verify the sensor integrity.

1. Set your multimeter to the 200K ohm range.
2. Connect the multimeter leads to the red and green lead wires.
3. Make sure the meter reads between 9-25K ohms.
If you get a different reading, contact Power Tech® at (800) 200-6677.
4. Record these readings on the warranty card.



6 Troubleshooting

Symptom	Probable Causes	Corrective Action
Floor doesn't heat.	No voltage.	Check circuit breaker.
	Circuit breaker tripped.	Ensure that there are not too many mats or other appliances connected on the same circuit. Heat Mat may require a dedicated circuit. See the product selection "Table 1 or Table 2" of this manual.
	Ground-fault tripped in thermostat.	Refer to Thermostat Installation and Operation Manual.
	Thermostat not turned on.	Refer to Section 4 of this manual and the Thermostat Installation and Operation Manual.
	Cable not connected to Thermostat.	Refer to Thermostat Installation and Operation Manual.
	Floor temperature sensor not connected.	Refer to Thermostat Installation and Operation Manual.
	Faulty sensor	Contact Power Tech® at (800) 200-6677
Floor warm all the time.	Clock not set correctly.	Refer to Thermostat Installation and Operation Manual.
Floor not warm enough.	Thermostat setting not set correctly.	Refer to Thermostat Installation and Operation Manual.

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EXTENDED WARRANTY

For a period of twelve (12) years from the date of purchase Power Tech® warrants that the Heat Mat heating cable is free from defects in material, design and workmanship. The extended warranty is only valid if the warranty certificate has been properly completed and mailed, and the installation is in accordance with the installation instructions.

The defective Heat Mat heating cable has to be inspected by or submitted to Power Tech® or an authorized Heat Mat dealer. Failure to comply with all of the foregoing will void this extended warranty. Power Tech® will, when the customer has documented that a defect in the Heat Mat was present at the date of delivery, repair or supply a new Heat Mat at Power Tech® option. All claims shall be made within the extended warranty period. Jiahong shall not be liable for any claims made later than twelve (12) years from date of purchase.

Power Tech® shall not be liable for any consequential and secondary costs or damages linked to the defect or replacement of the Heat Mat. Power Tech® will be liable for any costs related to the dismantling of defective product and the installation of a new product; however such liability is limited to the amount of five (5) times the initial product costs for each damage/case.

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How to claim this warranty

Contact the company's Customer Service department and provide the following information:

- 1) Nature of the manufacturing defect
- 2) Date of purchase and, if already installed, date of installation
- 3) If installed, name of electrician and flooring installer
- 4) Resistance readings taken by installer
- 5) Proof of purchase and serial number from product label

Our Customer Service department will provide you with an authorization number and advise you on the next steps to complete your warranty claim.

Disclaimer:

This warranty gives you specific legal rights and you may also have some legal rights which may vary from state to state or province to province. Power Tech® hereby disclaims, and it is as a condition of the sale, that there are no implied warranties. Some states and provinces do not allow limitations on an implied warranty so the above limitation may not apply to you.

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