Installation Manual

Electric Floor Heating Cable & Controls

3.7TCWarmth

Contents

⚠ WARNING

Shock and fire hazard

If the 3.7TCWarmth 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.

· A **GFCI type and UL/CSA Listed** thermostat must be used.

· 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 system 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 heating cable 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 3.7TCWarmth 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 3.7TCWarmth 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:

The Thermostat Installation and Operation Manual

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

Warmth Technology Inc.
5265 Steeles Ave. W
North York, ON
M9L 2W2 CANADA
Tel: 289 622 1504
www.warmthtech.ca
info@warmthtech.ca

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 3.7TCWarmth system performs reliably.

Pay special attention to the following:

·Instructions marked  Important

·Safety warnings identified as ⚠ WARNING

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 ±10%. If you get a different reading, contact Warmth Technology Inc. at 289 622 1504.

Also, measure the resistance between the white, black and shielding/ground wire. Both should read infinity. If you get a different reading, contact Warmth Technology Inc. at 289 622 1504.

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 the box, after installation, after thin set cement or self-leveler application and after final surface installation). Please refer to WARRANTY CARD.

1.4 Limited Warranty

For a period of twenty five (25) years from the date of purchase Warmth Technology Inc. warrants that the 3.7TCWarmth heating cable is free from defects in material, design and workmanship. The extended warranty is only valid if the WARRANTY CARD has been properly completed and mailed, and the installation is in accordance with the installation instructions.

For warranty and safety purposes, The 3.7TCWarmth must only be connected to Warmth Technology Inc. thermostats which have GFCI approval.

2 3.7TCWarmth System

2.1 Specifications

Cable Construction:	Twin conductor
Rated Voltage:	120V,240V
Output:	3.7W/ft±10%
Bending radius:	6D
Cable Diameter:	1/5"(4.9-5.1mm)
Conductor Insulation:	fluoropolymer
Outer Insulation:	PVC
Max. Ambient Temp.:	85℉(30℃)
Min. Installation Temp.:	40℉(5℃)
Cold lead	2-wire 16 AWG plus ground braid; 10ft (3m) length

Important

· Read the instructions carefully before installing 3.7TCWarmth system.

· Remember to measure the resistance four times.

· Do not install 3.7TCWarmth in walls or ceilings.

· The cable must be embedded in mortar, thinset, concrete or similar material.

· The minimum installation temperature is 40℉ (5℃).

· 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 3.7TCWarmth.

· 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 3.7TCWarmth 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 and 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.

For example, in Figure 3, the area of the bathroom is 96 ft^2. When you subtract the area of the vanity, shower and toilet, the total heated area is only 74 ft^2.

Step 2: Determine the power supply voltage

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

Important

Operating the 240V cable at 208V reduces the power output to approximately 2.25W/ft. (25% reduction)

Step 3: Plan the design

Determine the optimum floor heating Cable 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 3.7TCWarmth, and the 10-foot floor temperature sensor. Please refer to Figure 4.

Important

The predetermined 3.7TCWarmth spacing must be maintained to ensure proper floor heating. Do not change the 3.7TCWarmth heating cable spacing when you lay out the cable or the floor may have cold spots.

Figure 3: Measure and design the heated area

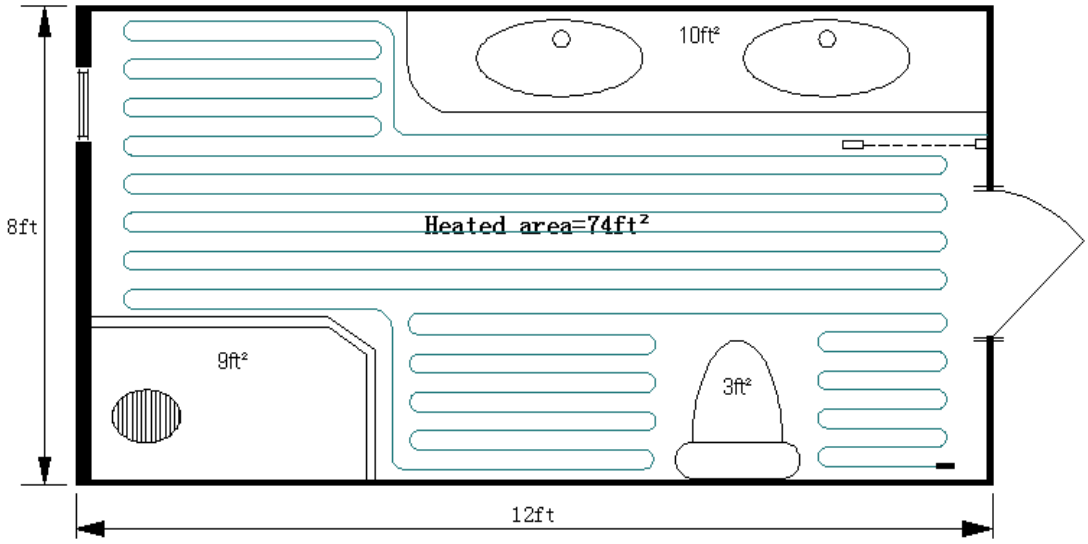
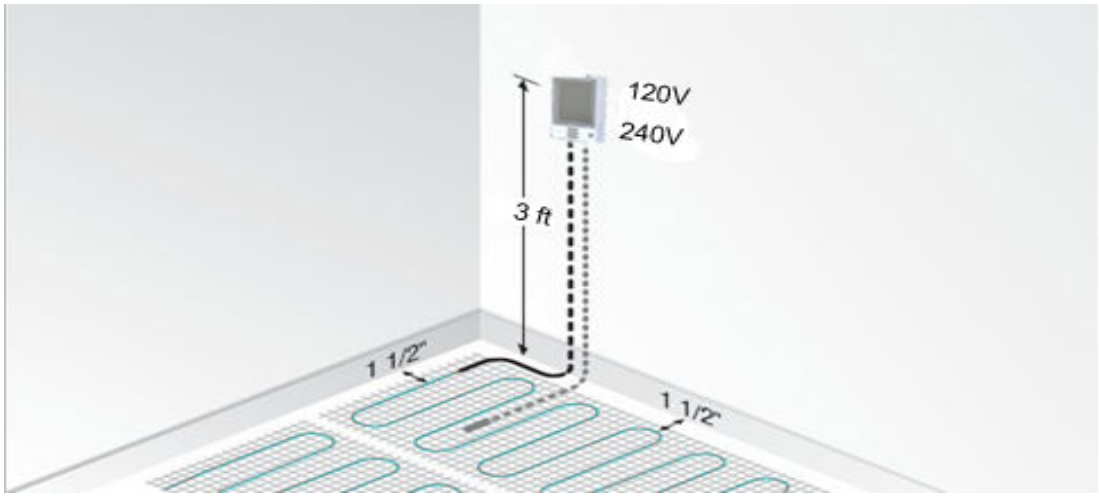


Figure 4: Typical cold lead and floor temperature sensor



3.2 Confirm Your Product Selection

Select an appropriate length of cable. The cable's standard heating area (see table below) must be smaller than the actual area to be heated. Example: if the area to be heated is 74 ft^2, select the 70 ft^2 3.7TCWarmth system.

3.3 Confirm Your Thermostat Selection

A thermostat must be used, please contact Warmth Technology Inc.

For warranty and safety purposes, The TCWarmths must only be connected to Warmth Technology Inc. thermostats which have GFCI approval.

Please refer to "APPENDIX A" and the "Thermostat Installation and Operation Manual" for how to install the thermostat.

Table 1: 120V Product Selection

Catalog Number	Length		Area (sq.ft)		Voltage	Power Output	Amps	ohms
	ft	m	3.6" spacing	4.8" spacing		W		
TC1V-0060-3.7	16.5	5.1	5	7	120V	60	0.5	240
TC1V-0120-3.7	33.0	10.1	10	13	120V	120	1	120
TC1V-0180-3.7	49.5	15.1	15	20	120V	180	1.5	80
TC1V-0240-3.7	66.0	20.1	20	26	120V	240	2	60
TC1V-0300-3.7	82.5	25.1	25	33	120V	300	2.5	48
TC1V-0360-3.7	99.0	30.2	30	40	120V	360	3	40
TC1V-0420-3.7	115.5	35.2	35	46	120V	420	3.5	34.3
TC1V-0480-3.7	132.0	40.2	40	53	120V	480	4	30
TC1V-0540-3.7	148.5	45.3	45	60	120V	540	4.5	26.7
TC1V-0600-3.7	165.0	50.3	50	66	120V	600	5	24
TC1V-0720-3.7	198.0	60.4	60	80	120V	720	6	20
TC1V-0840-3.7	231.0	70.4	70	92	120V	840	7	17.1
TC1V-0960-3.7	264.0	80.5	80	106	120V	960	8	15
TC1V-1080-3.7	297.0	90.5	90	119	120V	1080	9	13.3
TC1V-1200-3.7	330.0	100.6	100	132	120V	1200	10	12
TC1V-1320-3.7	363.0	110.6	110	145	120V	1320	11	10.9
TC1V-1440-3.7	396.0	120.7	120	158	120V	1440	12	10
TC1V-1560-3.7	429.0	130.8	130	172	120V	1560	13	9.2
TC1V-1680-3.7	462.0	140.8	140	185	120V	1680	14	8.6
TC1V-1800-3.7	495.0	150.9	150	198	120V	1800	15	8

Table 2: 240V Product Selection

Catalog Number	Length		Area (sq.ft)		Voltage	Power Output	Amps	ohms
	ft	m	3.6" spacing	4.8" spacing		W		
TC2V-0120-3.7	33.0	10.1	10	13	240V	120	0.5	480
TC2V-0180-3.7	49.5	15.1	15	20	240V	180	0.8	320
TC2V-0240-3.7	66.0	20.2	20	26	240V	240	1	240
TC2V-0300-3.7	82.5	25.1	25	33	240V	300	1.3	192
TC2V-0360-3.7	99.0	30.2	30	40	240V	360	1.5	160
TC2V-0420-3.7	115.5	35.2	35	46	240V	420	1.8	137.1
TC2V-0480-3.7	132.0	40.2	40	53	240V	480	2	120
TC2V-0540-3.7	148.5	45.3	45	60	240V	540	2.3	106.7
TC2V-0600-3.7	165.0	50.2	50	66	240V	600	2.5	96
TC2V-0720-3.7	198.0	60.4	60	79	240V	720	3	80
TC2V-0840-3.7	231.0	70.4	70	92	240V	840	3.5	68.6
TC2V-0960-3.7	264.0	80.4	80	106	240V	960	4	60
TC2V-1080-3.7	297.0	90.6	90	119	240V	1080	4.5	53.3
TC2V-1200-3.7	330.0	100.6	100	132	240V	1200	5	48
TC2V-1440-3.7	396.0	120.8	120	158	240V	1440	6	40
TC2V-1680-3.7	462.0	140.8	140	185	240V	1680	7	34.3
TC2V-1920-3.7	528.0	161.0	160	211	240V	1920	8	30
TC2V-2160-3.7	594.0	181.0	180	238	240V	2160	9	26.7
TC2V-2400-3.7	660.0	201.2	200	264	240V	2400	10	24
TC2V-2640-3.7	726.0	221.2	220	290	240V	2640	11	21.8
TC2V-2880-3.7	792.0	241.4	240	317	240V	2880	12	20
TC2V-3120-3.7	858.0	261.6	260	343	240V	3120	13	18.5
TC2V-3360-3.7	924.0	281.6	280	370	240V	3360	14	17.1
TC2V-3600-3.7	990.0	301.8	300	396	240V	3600	15	16

4 Installation

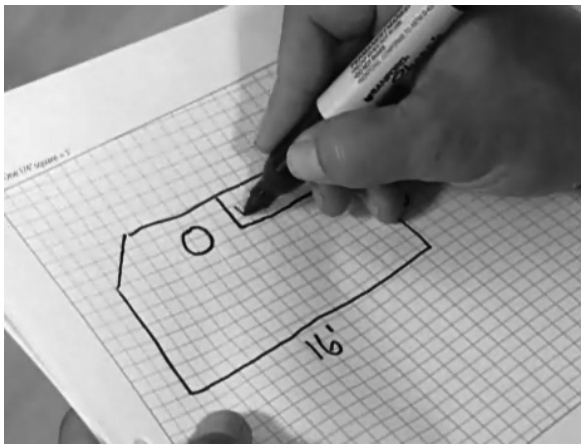
Important Tools and materials required

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

- ·Scissors
- ·Wire strippers
- ·Nail Plate
- ·Tape measure
- ·Utility knife
- ·Multimeter
- ·Membrane or Metal strapping
- ·Screwdriver

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 tools for your specific floor.
Follow these steps to ensure a successful 3.7TCWarmth installation.

Install with Membrane



Step 1: PLAN LAYOUT

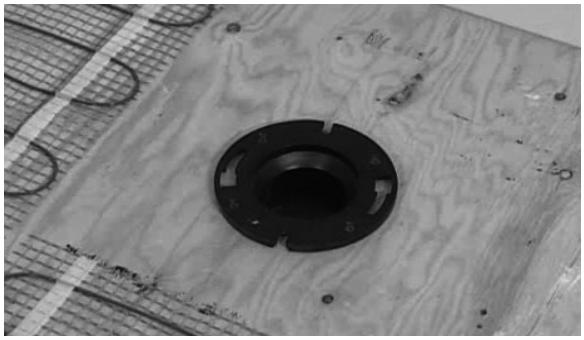
Make a sketch layout or a floor plan of the room; include all permanent furnishings such as toilets, bathtubs, appliances, cabinetry, etc. Indicate all dimensions required to determine the available floor area and the position of the thermostat.

Important

Warmth Technology Inc. recommends that the installation is documented with photos to note the location of connections and the sensor.

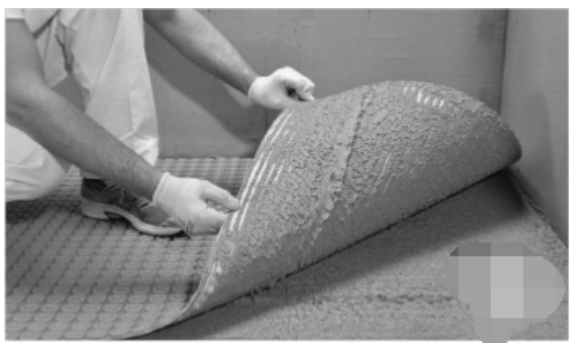
Step 2: TRANSFER LAYOUT TO FLOOR

Draw an outline of the layout on the room floor including a foot print of all furnishings that are not yet installed.



Step 3: 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 4: LAYER THE MEMBRANE

Apply a compatible adhesive to the substrate using a suitable trowel. Cut the membrane for suitable size and uncoupling it. Lay the membrane on the adhesive. Press the membrane evenly with a roller or a plastic flat trowel. Check coverage of membrane, in case of partial coverage increase the amount of adhesive or its fluidity. Then lay the next sheet of membrane, making sure to

align it with the previous one without overlapping. Align the square reliefs to facilitate the installation of the heating cables.

Warning

If heavy mechanical loads are foreseen (frequent passages), it is recommended to protect the laid membrane with wooden planks to ensure proper bonding.

Step 5: MEASURE THE RESISTANCE (THE FIRST TIME)

Use a digital ohm meter to measure the resistance of the 3.7TCWarmth and compare it to "Table1 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 3.7TCWarmth

DO NOT RUN THE HEATING CABLES UNDER WALLS, CABINETS, FURNITURE AND APPLIANCES!

Place the cable so that the connection point and the temperature sensor are in their intended positions and bring the power lead cable to the thermostat or connection box.
Begin laying the 3.7TCWarmth heating cable on membrane according to the layout developed in Step 1.

DO NOT CUT OR SHORTEN THE HEATING CABLE!

Do not expose it to any mechanical stress. Avoid walking on the heating cable. **Wear only shoes with soft soles.**

Be careful not to damage the cables, particularly during installation.

It is highly recommend to take photographs of the installed 3.7TCWarmth before installing the flooring.

NEVER exceed 15 watts per square foot.

NEVER cross heating cables.

Step 7: LAYING THE SENSOR

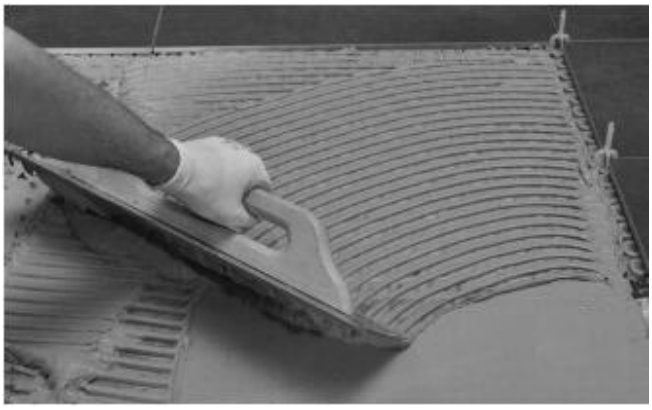
Install the floor temperature sensors exactly in the center between two cables and at a distance of at least 2 ft (60cm) from the wall.
Do not cross sensor cables with heating cables.
It is recommended to install a second temperature sensor as a backup in case the primary fails throughout the life of the installation.

Record the exact position of the sensors.

Step 8: MEASURE THE RESISTANCE (THE SECOND TIME)

Please refer to Step 5.

Step 9: Embed the floor heating cable in mortar



For tiling applications, proceed with the installation of the tiles by covering the heating cables with a layer of thinset cement as directed by the tile manufacturer. Ensure that the thinset mortar covers the entire heating cable as the tiles are installed.

For engineered wood or laminate floor coverings, it is recommended to consult the flooring manufacturer for maximum temperature allowance (use a thermostat with a floor temperature limiter).

Ensure that all moisture in the self-leveling cement has been fully eliminated in accordance with the drying times recommended by the cement manufacturer (consult the manufacturer for exact drying time).

If using 3.7TCWarmth in wet places, waterproofing is necessary.

Important

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

Step 10: MEASURE THE RESISTANCE (THE THIRD TIME)

Please refer to Step 5.

Step 11: 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.

Step 12: 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 National 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 13: MEASURE THE RESISTANCE (THE FOURTH TIME)

Please refer to Step 5.

Step 14: 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 15: ENJOY THE COMFORT OF 3.7TCWarmth

The 3.7TCWarmth 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. Resistance Test

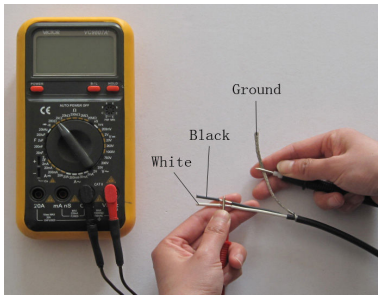
Important

For the extended 25-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 times (Please refer to 4 installations) during the installation process.

5.1 Insulation Resistance Test

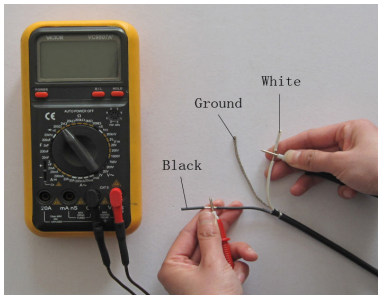
This test ensures that the insulating jackets of the cable are not damaged. A low value indicates the cable has been damaged and must be replaced.



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 Warmth Technology Inc. at 289 622 1504.
3. Record these readings on the WARRANTY CARD.

5.2 Heating Cable Resistance Test

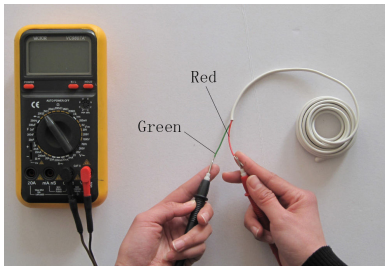
This test measures the resistance of the 3.7TCWarmth and is used to determine circuit integrity.



1. Set your 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 ±10%. If you get a different reading, contact Warmth Technology Inc. at 289 622 1504.
4. Record these readings on the WARRANTY CARD.

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 Warmth Technology Inc. at 289 622 1504.
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 cables or other appliances connected on the same circuit. The 3.7TCWarmth may require a dedicated circuit. See the Product Selection "Table 1 or Table 2" of this manual.
	Ground-fault tripped in the 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 Warmth Technology Inc. at 289 622 1504.
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.
Installation instructions not available		Download the latest version of 3.7TCWarmth system Installation Instructions from www.warmthtech.ca

Extended Warranty

For a period of twenty five (25) years from the date of purchase Warmth Technology Inc. warrants that the 3.7TCWarmth 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 3.7TCWarmth heating cable has to be inspected by or submitted to Warmth Technology Inc. or an authorized 3.7TCWarmth dealer. Failure to comply with all of the foregoing will void this extended warranty. Warmth Technology Inc. will, when the customer has

documented that a defect in the 3.7TCWarmth was present at the date of delivery, repair or supply a new 3.7TCWarmth at Warmth Technology Inc. option. All claims shall be made within the extended warranty period. Warmth Technology Inc. shall not be liable for any claims made later than ten years from date of purchase.

Warmth Technology Inc. shall not be liable for any consequential and secondary costs or damages linked to the defect or replacement of the 3.7TCWarmth. Warmth Technology Inc. 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.

THE FOREGOING WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ON THE PART OF WARMTH TECHNOLOGY INC.. WARMTH TECHNOLOGY INC. DISCLAIMS ANY WARRANTY, EXPRESS OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WARMTH TECHNOLOGY INC. NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON, FIRM OR CORPORATION TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH SALE OR PRODUCT. WARMTH TECHNOLOGY INC. SHALL NOT BE HELD RESPONSIBLE FOR DAMAGE TO PERSON OR PROPERTY, CONSEQUENTIAL LOSS, LOSS OF PROFIT, LOSSES ON GOODS IN STORE, OR THE LIKE WHICH MIGHT ARISE OUT OF THE FAILURE OF THE EQUIPMENT DELIVERED, IRRESPECTIVE OF THE CAUSE (INCLUDING FAULTY MANUFACTURE).

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

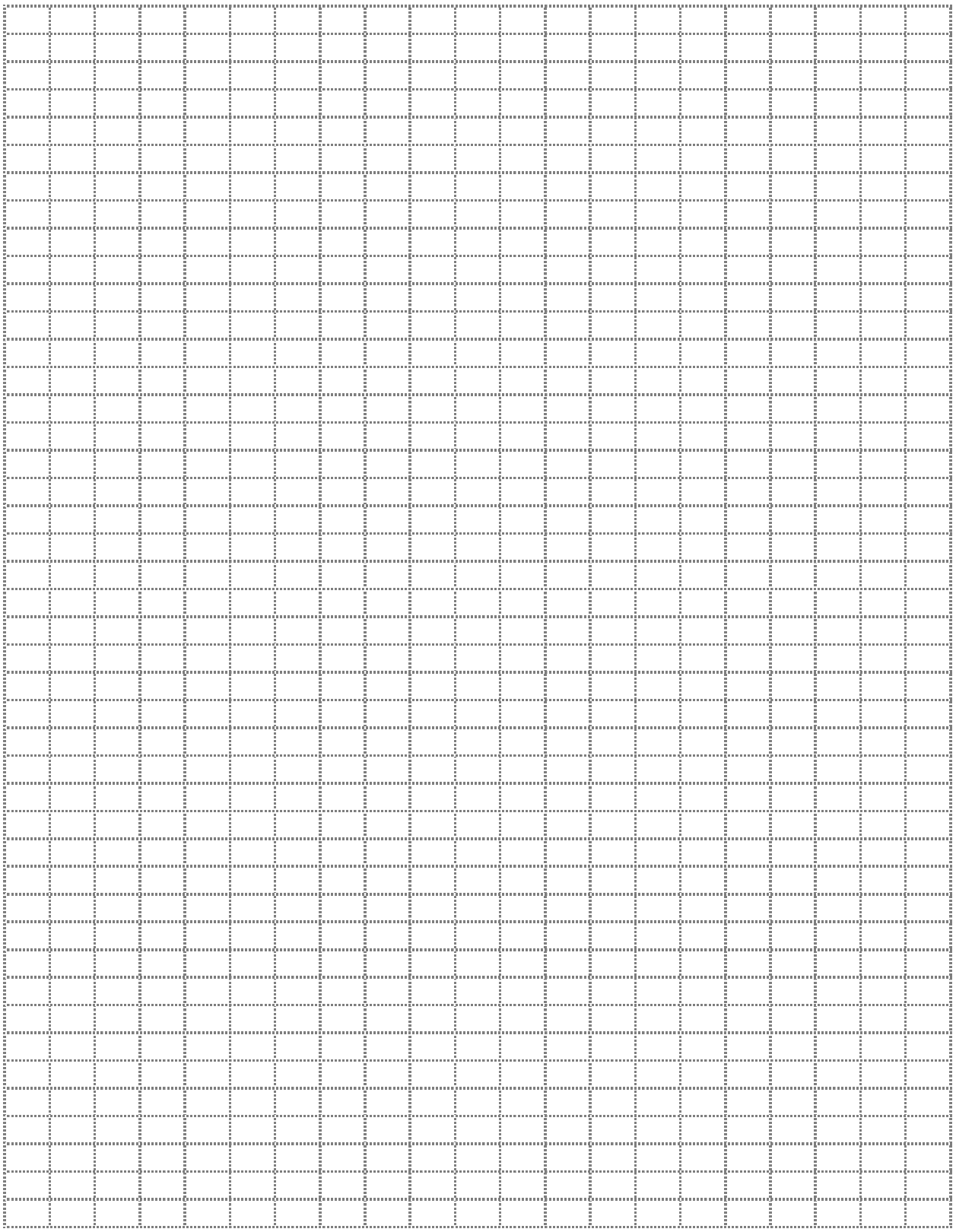
Our Customer Service department will provide you with an authorization number and advise you on the next steps to complete your warranty claim.

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. Warmth Technology Inc. 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.

Warmth Technology Inc. **www.warmthtech.ca** **info@warmthtech.ca**
Address: 5265 Steeles Ave. W, North York, ON, M9L 2W2 CANADA
TEL: 289-622-1504

Floor Layout



Warmth Technology Inc. 5265 Steeles Ave. W, North York, ON, M9L 2W2•Tel:289 622 1504•info@warmthtech.ca•www.warmthtech.ca

WARRANTY CARD
Electric Floor Heating Cable

Cable Catalog Number			
Batch Date		**Power (Watts)**	
Volts		**Coverage Area(ft²)**	

Date of Purchase		**Supplier Name**	

Date of Installation	
Address of Installation	

	Insulation Resistance Test	**Heating Cable Resistance Test**	**Sensor Resistance Test**
Out of Box			
After Installation- Before Final Surface			
After Thin-Set Cement or Self-Leveler Application			
After Final Installation			

Electrician Details

Name	
Signature	