



INSTALLATION QUICK START GUIDE ELECTRIC FLOOR HEATING CABLES





This document provides basic guidelines for installing **Electric Floor Heating Cables**. Any questions? Please contact ProLux Materials LLC Email: <u>support@proluxmaterials.com</u> <u>www.proluxmaterials.com</u>





Important: First test is required prior to installation - Refer to Page 9 for complete Test guide.

Homeowner										
Name a	nu ema	11								
Installation address										
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Conduc	tor Resi	stance Test:								p
See label attached to										
heater										
Continuity Test										
Conductor and Ground Screen:										
Infinity (I) or Overload (OL)										
Insulation resistance:					I		I		I	
2 Mega Ohms or more at										
1,000V										
Floor sensor resistance Test:					1					
Тетре	rature	Resistance	Temp	k-Ohms	Temp	k-Ohms	Temp	k-Ohms	Temp	k-Ohms
degC	degF	k- Ohms								
10	50	18.1								
15	59	14.8								
20	68	12.1								
25	// 0C	10.0								
3U 80 8.3										
Tested by: Name										
Signature										
Date										

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1. SYSTEM DESCRIPTION

Floor heating cables are used to warm interior floors.

They are NOT to be used for exterior applications such as snow melting or roof and gutter applications. Floor heating cables must NOT be fitted in walls or ceilings.

1.1. Heating cable:

- Cold lead the wire that runs through the wall from the thermostat to the heated section.
- *Cold lead splice* the joint between the cold lead and the heated section.
- *Heater wire* the wire that runs in the floor and generates heat when the system is energized.
- End splice –a joint at the end of the heating section. (not shown)

1.2. Cable Strapping

- Aluminum Cable Strapping, with tabs at 1" intervals, is recommended for installations where cables are spaced at 3" or 4" intervals. (see section 3 in this Guide)
- Strapping may be purchased separately if not supplied with the heating cable or additional is required.

1.3. Thermostats

- A thermostat with dual sensors (air and floor) and a built-in GFCI is recommended. Installation of a secondary, backup floor sensor is advisable.
- Various models are available; from WiFi-enabled intuitive programmable units with color touchscreen interfaces to basic, simple control.

1.4. Floor sensor

- A floor sensor is supplied with the thermostat.
- Installation of a secondary (backup) floor sensor is advisable. Additional sensors are available separately.

1.5. Installation monitor

 Continuously monitors the heating cable and sounds an alarm if any damage occurs during tiling.



Heating cable

Cold lead



Strapping



Programmable,

Touchscreen





Nonprogrammable



Programmable,

Non-touch

Floor sensor



Installation monitor

2. CHECK AND PREPARE THE SUB-FLOOR

- Floor heating cables may be installed over any sub-floor that is approved for tile, stone, and laminate applications.
- Where floors have previously been covered with vinyl, stick down carpeting, or parquet wood blocks, all traces of these coverings need to be removed as well as all traces of adhesive or bitumen.
- Carefully inspect the sub-floor and make sure it is clean, free of sharp edges, nails, and any other materials that may damage the heating cable.
- The sub-floor must also be dry, level, smooth, and structurally sound.
- Concrete or insulated concrete floors must be completely dry, level, and smooth. (Concrete can take up to 6 weeks to cure).
- Any leveling of the floor must be completed prior to the installation of the heating cable.
- If self-leveling underlayment is to be used to cover the heating cable (see section 8 of this Guide) then any cracks or holes in the sub-floor must be filled and sealed before installation of the heating system.





2.1. For Timber Sub-floors

When installing heating cables on a timber sub-floor it is essential that standard precautions to stabilize the sub-floor are taken to prevent sub-floor movement (for example, overboard with a suitable surface for tiling, e.g. with 3/4" plywood (R-value 0.93) or 1/4" cement backer board (R-value 0.13)).

2.2. For Concrete Subfloors

For optimum performance, it is recommended that concrete sub-floors be covered by an insulating underlayment (available separately). Please contact us for information and pricing.

This will minimize heat loss and ensure quicker heat up time. The heating cable can be laid directly onto an uninsulated concrete floor if it is insulated from below. If not insulated from below, the heat loss and operating costs will increase.

2.3. Typical Floor Section

- a) Floor finish (tile or stone)
- b) Thinset or self-leveling underlayment
- c) Heating system
- d) Sub-floor



3. MARK UP THE HEATED AREA ON THE FLOOR

- Mark up the floor using chalk, felt-tip marker, or tape.
- Show any fixtures such as showers, bathtubs, toilets, vanities, and counters.
- The heating cable must NOT be installed under these types of fixtures. DO NOT run the heating cables into or under closets or confined areas where the heat could build up.
- Also, mark the location of any heating / HVAC vents or any other heating appliance.
- Identify the location of the thermostat.
- Mark out the perimeter of the heated area, ensuring that the heating cable will be installed at a *minimum* distance of:
 - 8" from heating vents or any other heating appliance.
 - 6" from the center of a toilet drain.
 - 4" from the kick space under a vanity, shower, bathtub, counter, or doorway.
 - 4" from any combustible surfaces.
 - 3" from the walls (if not made of combustible material).

LUXHEAT FLOOR HEATING CABLE - WIRING LAYOUT



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(It is not necessary to heat the floor all the way to the walls as it is not typical that people will stand that close to the wall. In addition, the heat will radiate out an additional 2" from where the cable is embedded.)

	Cable d	Spacing between wires (inches):								
Power	Resistance	Current	Length	2.6 3.0		3.5	4.0			
(Watts)	(Ohms)	(Amps)	(feet)	Power density (W/sqft):						
				14.0	12.0	10.3	9.0			
		Approximate coverage								
				(square feet)						
120-volt rated										
120	120	1.0	40	8.6	10.0	11.7	13.3			
180	80	1.5	60	12.9	15.0	17.5	20.0			
240	60	2.0	80	17.1	20.0	23.3	26.7			
300	48	2.5	100	21.4	25.0	29.1	33.3			
360	40	3.0	120	25.7	30.0	35.0	40.0			
420	34	3.5	140	30.0	35.0	40.8	46.7			
540	27	4.5	180	38.6	45.0	52.4	60.0			
600	24	5.0	200	42.9	50.0	58.3	66.7			
720	20	6.0	240	51.4	60.0	69.9	80.0			
840	17	7.0	280	60.0	70.0	81.6	93.3			
960	15	8.0	320	68.6	80.0	93.2	106.7			
1080	13	9.0	360	77.1	90.0	104.9	120.0			
1200	12	10.0	400	85.7	100.0	116.5	133.3			
	240-volt rated									
480	120	2.0	160	34.3	40.0	46.6	53.3			
600	96	2.5	200	42.9	50.0	58.3	66.7			
720	80	3.0	240	51.4	60.0	69.9	80.0			
840	69	3.5	280	60.0	70.0	81.6	93.3			
960	60	4.0	320	68.6	80.0	93.2	106.7			
1080	53	4.5	360	77.1	90.0	104.9	120.0			
1200	48	5.0	400	85.7	100.0	116.5	133.3			
1440	40	6.0	480	102.9	120.0	139.8	160.0			
1680	34	7.0	560	120.0	140.0	163.1	186.7			
1920	30	8.0	640	137.1	160.0	186.4	213.3			
2160	27	9.0	720	154.3	180.0	209.7	240.0			
2400	24	10.0	800	171.4	200.0	233.0	266.7			

Decide the Cable Spacing

- 3" (12 W/ft²) is the standard spacing and recommended for most floor heating applications.
- 4" (10 W/ft²) spacing may be used for low heat loss applications and milder climates where the required heat load is less.
- 2.6"(14 W/ft²) spacing may be used for high heat loss applications such as a non-insulated concrete basement floor or bathroom with a large exterior wall.

Refer to the table on the previous page for the approximate coverage (sqft) at these wire spacings.

For 2.6" spacing mark the cable layout on floor and use 1" Duct tape to secure the cable to the floor instead of Cable Strapping.

- If installing more than one heating cable in a single room, position them in such a way that no part of the cables cross over one another.
- Any one heating cable must not be installed in such a way that it is in more than one room.
- Determine the direction of the cable runs and plan the cable routing around the fixed objects.
- Consider where the cable should end, and include an overflow area in which to place any excess cable if necessary as the cable must NOT be cut or shortened.
- Ensure that the cold lead does not cross over or under the heating cable or itself.
- Mark the location of the strapping guides. Center straps are required when the distance between end straps is more than 4-ft. Center straps should be 3to 4-ft apart.
- For walls or obstructions with angles or curves, the strapping can be cut into smaller sections and installed as shown in diagram 2:



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4. TEST THE SYSTEM PRIOR TO INSTALLATION

IMPORTANT: Do NOT test system by connecting to power. Heating Cables MUST be embedded in thinset or self-leveling underlayment when energized.

- Check that the rated voltage of the heating cable is the same as the supply voltage for the installation (120V or 240V).
- Measure the total available heated area on the floor and check that the coverage of the heating cable (per the table supplied) is the same or slightly *less* than the area you intend to heat (see table on page 7 of this Guide).
- This is critical as the heating cable CANNOT be CUT or SHORTENED.

4.5. Tests to be conducted on the heating cable:

These tests MUST be performed at each of these stages:

- a. Before the heater is installed,
- b. After the heater has been installed, BEFORE tiling,
- c. After the Tiles (or other floor covering) has been installed, and
- d. Before the Thermostat is hooked up.

Record all results on the Test Log at the front of this guide and retain, together with proof of purchase, as these documents will be required in the event of a claim.

a. Conductor Resistance Test:

(This test is to check the integrity of the heating element itself.)

Set your multimeter to resistance (Ohms) measurement and take an Ohms reading between the two power leads (L and N). If the reading is not within +/- 10% of the value on the label attached to the heater then check that the multimeter is set correctly or test with another multimeter. If the readings are consistently outside the +/- 10% range then the heater has been damaged and must NOT be installed.

b. Conductor and Ground Screen Continuity Test:

(This test checks whether there is continuity between heating conductors and the ground screen.)

- The heating wire is protected by a ground screen, and the insulation of the heating wires prevents any contact between the heating conductors and the ground screen. To check the integrity of the insulation, test for continuity between the ground screen and the power leads. Any continuity means a FAILURE of the insulation.
- Set your multimeter to 'continuity' and test between the ground screen and one of the two power leads (L or N).
- If there is NO continuity the test is *successful*, and the multimeter will show 'OL' (overload) or 'I' (infinity) depending on the instrument used. Otherwise, if the test fails, neither 'OL' nor 'I' will be displayed and the buzzer warning tone will sound.





c. Insulation resistance:

(This test is to detect any small breaks in the insulation of the heating wires, which may have gone undetected by the Conductor and Ground Screen Continuity Test.)

- A megohmmeter (sometimes referred to as a 'megger tester') is used for this test a regular multimeter used for the other tests is not usually capable of performing the Insulation Resistance Test.
- We recommend you buy or rent a megohmmeter tester or hire a qualified electrician to conduct these tests for you.
- Set the megger tester to 1,000 Volts and test between the ground screen and one of the power leads. The resistance measurement must be 2 MegaOhms (i.e. 2,000,000 Ohms) or greater. Then test between the ground screen and the other power lead the resistance must also be 2 MegaOhms or greater. To avoid an electric shock from the megger tester do NOT touch the test probes when conducting the test or for 5 minutes afterward.

d. Floor Sensor Resistance Test:

(This test is to verify the accuracy of the floor sensor/s.)

- The resistance of the floor sensor(s) changes with a change in temperature, which enables the thermostat to 'read' the temperature of the floor.
- Set the multimeter to measure resistance and test between the two leads of the floor sensor wire. Compare values with the table of expected values based on the temperature of the sensor at the time the test is conducted. (see the Test Log in this guide)

If any tests FAIL or you are not sure of the results please DO NOT continue with the installation but contact your supplier for instructions before proceeding.





5. INSTALL THE HEATING CABLE

- It is important to uncoil the cable properly to prevent twisting and pig tailing. Insert a rod into the spool hub and let the spool unreel. Unreel the power leads of the cable up to the factory splice and feed it up the wall into the thermostat junction box through a recognized UL listed conduit.
- The cold lead splice MUST be mounted on the floor and MUST NOT be installed in the wall.
- To protect the cold lead splice (which is slightly larger in diameter than the cold lead or heating wire) cut a channel into the floor to ensure recess of the splice into the floor.
- For a wood floor use a router or wood chisel. For a concrete floor, use an appropriate masonry chisel or power hammer. Remove any debris to avoid damage to the cable.
- Secure the cold lead splice into the chiseled channel with hot glue. DO NOT USE SCREWS OR STAPLES TO SECURE THE COLD LEAD SPLICE.
- IMPORTANT: THE COLD LEAD SPLICE MUST BE FULLY EMBEDDED IN THE MORTAR. In addition, the cold lead splice must not be bent. No portion of the cold lead splice should enter into a wall.
- Beginning at the cold lead splice, run the heating cable into the first end strap. Pull the cable around the end strap, maintain light tension on the cable while seating it under, and all the way into, the tabs.
- Lace the heating cable back and forth while maintaining light tension. Do not pull too tight, but just enough to prevent the cables from moving and touching one another.
- Apply strapping at 4-ft intervals to ensure cables do not move when covered with thinset or self-leveling underlayment.
- DO NOT space cable closer than 3" when using cable strapping.
- DO NOT pull the cable too tight. It is only necessary to create enough tension to keep the cable from shifting or lifting when applying the thinset or self-leveling underlayment.
- Once all the heating cable is installed, lightly press the tabs on the strapping to secure the cable to the strapping.
- DO NOT use a tool, but press lightly by hand.
- It is not necessary to clamp the heating wire very firmly apply only enough pressure for the tabs to hold the cable in place.











6. INSTALL THE FLOOR SENSOR(S)

- The floor sensor must be positioned halfway between two heating wires to accurately read the floor temperature.
- Place the end of the sensor at least 12", but preferably 24" or more, into the heated area.
- Cut or chisel a small channel into the floor to recess the tip of the sensor.
- Secure the tip in position with glue or duct tape.
- Installation of a second, backup sensor is recommended. The second sensor should be placed so that the tip of the sensor is at least 12" away from the tip of the primary sensor, and keep the sensor wires at least 6" apart wherever possible on the floor.
- If local codes require conduits to be used in the wall between the floor and the thermostat wall box, then the floor sensor wires must be in a separate conduit to the cold lead(s).
- Use a fish tape or lead wire to pull the sensor wires and the cold leads from the heating cable into the wall box where the thermostat will be situated.
- The floor sensor cable must not touch or cross the heating cables.





7. ATTACH AN INSTALLATION ALARM

- Attach an Installation Alarm to alert the installer in case of damage to the heating wire. Contact the supplier immediately if you suspect that damage has occurred. DO NOT proceed with the installation.
- Installation alarms may be purchased separately if required.
- To connect the Installation Alarm, connect the yellow or red wire from the heater to L1, and connect the black wire from the heater to L2. Connect the bare (ground/earth) wire to E. Switch on the Installation Alarm. The alarm will sound and the red light will illuminate if a problem is detected.
- The installation alarm is not a fixture but is removed when the thermostat is hooked up.



8. COVER THE HEATING SYSTEM WITH THINSET OR SELF-LEVELING UNDERLAYMENT

Before applying thinset or self-leveling underlayment over the heating system perform the tests referred to in Section 4 on page 9 of this Guide.

If any tests FAIL or you are not sure of the results please DO NOT continue with the installation but contact your supplier for further instructions.

There are two recommended methods of covering the heating cable, described below:

8.1 Using Thinset

- Working with a width of approx. 12 to 18" at a time, apply polymer-modified thinset on top of the heating system so that the heating wire and strapping are both completely covered.
- Spread well and evenly to ensure that there are no air pockets. Use a plastic notched trowel or similar.
- Take care not to damage the heating cable.
- Once the covering layer of thinset has cured, use a notched trowel to comb a second layer of thinset to set the tiles.

8.2. Using Self-leveling Underlayment

- Cover the entire heating system with suitable self-leveling underlayment. This underlayment will find its own level, and once cured will provide a suitable flat surface, which is ready to receive a layer of thinset mortar before laying the tiles.
- This method is recommended when installing laminate and vinyl flooring.





Take Care When Tiling!

- Do not dislodge or damage the heating element while laying the tiles.
- Do not cut tiles on top of the heater.
- Ensure that each tile is solidly embedded in the thinset, avoiding air gaps and voids.
- The heating system should not be used to aid in the curing of the thinset.



Do NOT switch on the heating system until the Thinset or Self-leveling underlayment has cured. Check the manufacturer's specifications for time required.

9. INSTALL THE THERMOSTAT

- Perform the tests referred to in Section 4 on page 9 of this Guide and note the results on the Test Log as previously.
- Verify that the power supply is turned **OFF**.

All electrical connections must be made by a qualified electrician, according to the electrical and building codes applicable where the heater is installed.

- Check that the total load (amps) of the heating system does not exceed the rated load of the thermostat.
- Follow the thermostat manufacturer's instructions.
- Connect the power supply wires to the LINE terminals on the thermostat.
- Connect the heater load wires (yellow and black for 120V heaters, red and black for 240V heaters) to the LOAD side of the thermostat.
- Connect the ground (or earth)(bare) wire from the heater to ground on the supply side.
- Connect the floor sensor wires to the terminals on the thermostat marked C and D. (Terminals A and B are only used when a separate Power Module is fitted in the system.)
- If a secondary (backup) floor sensor has been installed in the floor DO NOT connect it to the thermostat, but tape the ends of the wires together and secure the wire in the wall box so they can be connected to the thermostat if ever required.





TROUBLESHOOTING GUIDE

Should you experience any problems with your installation not warming your floor surface, please carry out the following tests before contacting our technical support team.

MY FLOOR DOES NOT HEAT UP

1. Basic Checks

1.1 Ensure the thermostat connections are correct and the circuit breaker is in the "ON" position.

1.2 Check the thermostat settings and ensure that the sensor application is set correctly.

Note: Thermostats often have their sensor application set to 'Dual' as a default, meaning it will try to measure the air and floor temperature. If this is the case, an external floor sensor must be connected, or the default setting changed to read the air temperature only.

1.3 Heaters are rated at either 120V or 240V. Ensure that your heater rating matches that of the supply circuit. *Note: A heater rated for 240V will not work effectively on a 120V supply circuit.*

2. Testing the system

Using a multi-meter, carry out the following tests. This is best done by a professional.

2.1 Test the house supply circuit – Set the multi-meter to voltage AC and test for voltage. The supply should be 120V or 240V, depending on the circuit. Again ensure that the heater rating matches the supply.

2.2 Test the heater cable – Set the multimeter to Ohms. We suggest using the 200 Ohm setting. When testing between live and neutral, the cable should measure within +5 /-10% of the resistance noted on the cable rating plate. If the cable measures 'open circuit', or the Ohm reading continues to run, it is most likely a damaged cable and will require a professional to locate and repair the damage.

2.3 Test external floor sensor – Set the multimeter to Ohms. We suggest using the 200 kOhm setting. Test the resistance across the sensor wires, and compare to the manufacturer's sensor ratings. *Note: 10 kOhm sensors measure between 8-12 kOhms at temperatures between 68-86* °*F*.

2.4 Test the thermostat – Set the multi-meter to voltage AC and measure the voltage at the thermostat points. First, check the voltage at the supply points, and secondly test the voltage at the load points.

Note: The voltage across both sets of points should measure the same, or within a few volts.

Before completing this test, make sure that the thermostat settings and sensor applications are correct, and that the thermostat is in 'Heating Mode'.

Note: Air / Floor temperatures can affect the resistance readings of the heating cable and floor sensor.

GFCI SWITCH IS TRIPPED

Reset the GFCI control on the thermostat or circuit breaker. If the GFCI continues to trip, check the circuit breaker and thermostat wiring. If the system continues to trip, it is possible that the insulation surrounding the heater wire has been damaged. Call a professional to locate and repair the damage.

Note: floor heating must be on a dedicated circuit. Verify that there is only one GFCI on the circuit. Note: **DO NOT** connect the heaters in series. Multiple heaters must only be connected in parallel. The combined amperage must not exceed the rating on the thermostat – refer to the thermostat for maximum amp rating.

25 YEAR LIMITED WARRANTY

ProLux Materials LLC offers a **25-year** limited warranty on all LuxHeat floor heating cables and mats, for any fault arising from manufacturing defects only. There is no other warranty, express or implied. The warranty period starts at the date of purchase of the LuxHeat product.

The 25-year limited warranty applies to LuxHeat floor heating cables and mats only - thermostats and any other components or accessories supplied with the LuxHeat floor heating cable or mat are covered by the manufacturer's warranty of the component or accessory, not by ProLux Materials LLC.

ProLux Materials LLC will either repair or replace (at its sole discretion) a product with a factory fault free of charge. ProLux Materials LLC does not accept any liability for any other costs related to the repair or replacement of the heating cable or mat, including, but not limited to, repair or replacement of the floor covering, labor, travel, and shipping.

This warranty is further subject to the following conditions:

- Documentary proof of date of purchase is submitted with any claim;
- The heating cable or mat is installed in accordance with all guidelines and instructions as published by ProLux Materials LLC;
- The installation complies with all local and national wiring regulations and codes as well as any other applicable statutory requirements;
- The heating cable or mat is electrically grounded and protected by a Ground Fault Circuit Interrupter (GFCI);
- The heating cable or mat is connected to an electrical supply of its rated voltage only.

The warranty does NOT cover:

- Faults arising from incorrect installation;
- Faults arising from incorrect specification and/or application of the heating system.
- Faults arising from damage to the cable from outside causes, such as other suppliers, third-party contractors, including (but not limited to):
 - Cracking of floors or sub-floors through expansion and contraction or any other reason
 - Drilling or driving screws or nails and the like into the floor
 - \circ $\;$ Damage caused from accidental cutting or any other work on the premises
 - Electrical surges caused by lightning or any other cause.
 - Repair or attempted repairs or any modification to the heating cable or mat that have not been expressly authorized beforehand by ProLux Materials LLC.

Submitting a claim:

All claims must be in writing and submitted either by email to <u>support@proluxmaterials.com</u> or mailed to the registered business address of ProLux Materials LLC at the time of submitting the claim.

ProLux Materials LLC

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