

# Installation Guide

## 6W Cable and Mesh

ThermalStorage Heating System for Burial in an Inner Embedded Concrete Slab



TM/MD

1 855 396-5600 - buywarmall.com - info@buywarmall.com

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## 1. ThermalStorage Heating System

This manual explains the process of installing the WarmAll cable (6CTS) and mesh or mat (6MTS), i.e., how to prepare installation and install the cable in the inner embedded concrete slab. It is of prime importance to entirely read and thoroughly understand this manual as well as the thermostat's manual before proceeding with installation. For further details, please contact WarmAll.

Any floor heating system's safety and reliability depend upon design of a plan for, installation of, and tests carried out on the cables. All instructions and guidelines contained in this manual are highly important. Please entirely read and thoroughly understand this manual, and retain it for future reference.

The heating cable system is designed for the sole purpose of heating under a floor. This system must be installed exclusively by certified professionals familiar with the floor heating system's dimensions, installation, construction, constraints, electrical hook-up, and operation, and aware of all associated risks.

## 2. Installation Conformity

Installation must be performed according to the manufacturer's instructions and the National Building Code of Canada, and in accordance with standards of a local electrical code in effect. Installation must comply with part 426 of the ANSI/NFPA 70 (American National Standards Institute / National Fire Protection Association) standard, NEC (National Electrical Code [NFPA 70]), and the Canadian Electrical Code (CEC) (CSA C22,1 Part 1). You must use a ground fault circuit interrupter (GFCI).

All building and electrical codes currently in effect must be complied with regardless of instructions provided in this manual. If any rules in any of these codes contradict any instructions in this manual, please immediately contact WarmAll.

All metal structures or materials used for supporting or installing the WarmAll heating system must be grounded in accordance with division 10 of CSA standard C22.1, and with the NEC.

It is recommended to install the ThermalStorage cable and mesh system with a temperature limiting device integrated into the control as well as a ground fault circuit interrupter (GFCI); CSA: EQUIPPED HEATING CABLE, IN SERIES TYPES G AND W IN CANADA AND TYPE C IN THE U.S.A.

This system can be used as a main heating source. The room's heat loss must be lower than the heating system's power. The thermostat can be set for the floor sensor or the room temperature. Refer to the thermostat's instructions for further information.

This product must be installed by a qualified person according to instructions in this installation manual and in conformity with either the Canadian Electrical Code (CEC), Part 1 or the U.S.A.'s National Electrical Code (NEC) as the case may be. All electrical connections must be performed by a qualified electrician in keeping with building and electrical codes currently in effect in your region.

This floor heating system, an electrical product certified for both dry and wet (shower) environments, must be installed in agreement with local electrical code and either Canadian (CEC) or National (NEC – U.S.A.) Electrical Code rules in effect in the municipality and either province or state where the system is to be installed.

You must also comply with requirements of and apply recommendations in the building code effective in the region where the system is to be installed. In addition, the NTCA and CTDA also issue useful installation recommendations that it is important to follow. This installation is of type C: buried floor heating.

### **Caution: Fire or Electrocutation Hazard**

If the floor heating system is not installed according to instructions or the cable is damaged, there is a likely risk of fire or electrocution.

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### Limited Warranties: 25 Years on the Cable and 5 Years on the Thermostat

WarmAll warrants the heating cable for 25 years. This limited warranty shall be valid only if the installer followed and applied the approved installation techniques and carried out all conductivity tests on the cable. Fill out the Test Log Sheet and the warranty form, and send everything to WarmAll.

**Please refer to the warranty document for all relevant information.**

### **3. Safeguards and Warnings – Important Information**

- Before handling the cable in any way, shut the system off.
- If the cable system is damaged, it must be replaced. In this case, do not attempt to connect or repair any part of the system.
- For interior applications only.
- The system must be connected to a dedicated electrical circuit fitted with a ground fault circuit interrupter (GFCI).
- If you use the cable with the metal floor guides, approved spacings are 5 and 6 inches (6 being the standard).
- Never power the cable if it is on the inductor.
- Never install on a 240-V or 208-V power supply any cable designed for a 120-V power supply.
- Never install the system under fixed furniture where no air circulates.
- Never install the cable on an expansion joint.
- It is important to comply with concrete drying times before energizing the system. Refer to the concrete manufacturer.
- Use copper connection cables.
- The thermostat must not be installed at any spot accessible from the bath or shower.
- Refrain from installing this product if the package seal on the box has been broken.
- The cable system must not extend or stick out of the room or area in which it is installed.
- Make sure the voltage provided matches that required for the Thermal Storage product.
- The cable cannot be overlapped, cut or modified.
- Never let the heating cable and floor sensor's cable cross each other.
- The cable's entire heating portion (including the joint) must be secured to the ground and covered with cement glue or a self-levelling coating.
- Never install the heating cable on or in any wall.
- Never submerge the cable.
- The sub-floor must meet or exceed requirements of the National Building Code or any other relevant rules and regulations in effect in your region for this type of installation.
- It is recommended to install a cable breakage detector all along the system's installation.
- The mechanical joint (junction between the cable's cold and hot parts) must not be bent or folded.
- The cable's heating portion and its hook-up to the connection cable must be completely buried in the concrete.

**CAUTION**  
**Never install the cable under a bulkhead, wall or wall partition.**

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It is important to contact the flooring manufacturer to make sure that you are meeting their requirements concerning heating cable installation. In addition, the installer has to follow and apply recommendations regarding any product installed under or over the heating cables.

### **3.1 Circuit**

This floor heating system must be powered by a dedicated electrical circuit. Our thermostat's maximum current load is 15 amperes at 120 or 240 volts. If the installation requires more than 15 amps, it is possible to add an expansion unit or a second thermostat.

The system can be installed:

- onto insulation, or
- onto plywood, or
- onto a concrete floor,
- then covered with concrete at least 1.5 inches thick.

## **4. Approved Installations**

### **4.1 3.81-Cm (1.5-In) Concrete Membrane**

The materials making up the subflooring in contact with the cable must have a service temperature of at least 90 °C (194 °F).

### **4.2 10.16- to 15.24-Cm (4- to 6-In) Concrete Slab**

- High-density thermal insulation
- Sprayed polyurethane foam thermal insulation with a service temperature of at least 70 °C (158 °F).

### **4.3 Shower**

The heating cable may be installed under a shower floor. The latter's surface tiles must be made of ceramic or natural stone. Additionally, a water-proof membrane must be installed under the surface tiles so the cable is kept dry. It is recommended to use an independent cable for this type of installation. In the U.S.A., the installation must adhere to standard NFPA 70 of the National Electrical Code (NEC) and/or other applicable codes, and must have received approval from local people in charge.

### **4.4 Heating Cable VS Impediments and Barriers**

- The heating cable must be installed at least 20.32 cm (8 in) away from any heat source.
- Install the cable only if the surrounding temperature is over 5 °C (40 °F).
- The cable must be installed at a minimum distance of 7.62 cm (3 in) from the base of any counter.
- The cable must be installed at a minimum distance of 15.24 cm (6 in) from any outside wall.
- The cable must be installed at a minimum distance of 15.24 cm (6 in) from any type of drain.
- The cable must be installed at a minimum distance of 25.4 cm (10 in) from a toilet drain.
- The cable must be installed at a minimum distance of 20.32 cm (8 in) from any ground-secured heating system or apparatus.

- The cable must be installed at a minimum distance of 7.62 cm (3 in) from any inside wall.
- The maximum length allowed for installing the cable on a straight line is 3.657 m (12 ft).
- There must be 5.08 cm (2 in) of space between the floor surface and any fixed furniture.

The thermal heating principle consists in heating up a concrete slab using an electrical cable. It is very economical since the system uses the power outside heavy-usage hours. The slab stores the heat, which the system redistributes to the room's human activity space all day long, thus providing efficient, reliable, comfortable heat.

The ThermalStorage system's advantages in comparison with other heating systems are numerous:

- low operating cost;
- easy, flexible installation combined with a single connection point;
- increased uncluttered floor area (no protruding heating units or boilers);
- freedom to decorate (no forced air heating ducts);
- silent, risk-free, efficient and effective operation;
- no cold spots or patches;
- energy-efficient;
- cuts back on dust and allergenic substances;
- increased comfort.

Versatile and easy to install, the ThermalStorage system is the optimal way of heating your residential, commercial or industrial building.

## CAUTION

ThermalStorage can be used as a sole heat source. It can thus become the only heating system in the entire building.

WarmAll strongly recommends consulting an engineer, architect or similarly qualified professional to make sure that the chosen ThermalStorage system is appropriate for the use you wish to make of it.

- The perimeter of the space to be heated must be insulated with rigid expanded polystyrene (e.g., Styrofoam) at least 5.08 cm (2 in) thick or an equivalent suited for underground installation. Urethane and polystyrene foams are unacceptable, since humidity curtails their insulation properties.
- If the system is to be installed on crushed stone, it is preferable to first lay insulation onto the crushed stone. Use high-thermal density insulation. Refer to the local building code for rules and regulations on insulation.
- If you wish to use a moisture barrier, install the mat/mesh, roller and cable system onto it.
- There must be no underground water at the construction site. The soil's natural humidity is acceptable. In case of doubt, please contact WarmAll.

### 4.5 Humid Environments

**Caution: This type of installation must first be approved by local authorities.**

- Never make any connection to or other modification on the cable in a humid environment.
- Never initiate any installation in a wet environment. The connection cable and the joint must be entirely covered with concrete in a dry environment at least 1 inch away from the humid environment.
- The control/thermostat must not be accessible from a humid environment.

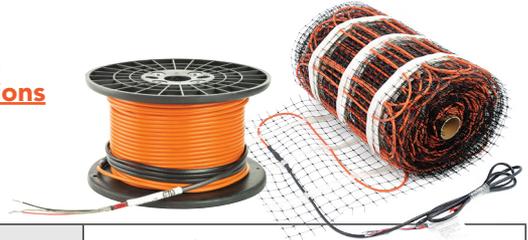
## 4.6 Flooring

The heating system is more effective when installed under a ceramic, stone or concrete flooring.

Should you decide to install carpeting, linoleum, hardwood or other material flooring, please first consult the manufacturer of these flooring products to obtain the appropriate recommendations and warranties.

Covering the Cable with Gypcrete

## 5. ThermalStorage 6W Cable and Mesh (mat) Specifications



Cable type:	Coaxial cable (parallel)
Voltage:	240 V
Power (cable):	5.5W/lin.ft. (18W/m)
Power (mat/mesh):	11W/ft <sup>2</sup> (118W/m <sup>2</sup> )
Heating element size (cable):	55 ft (16.8 m) at 680 ft (207.3 m)
Heating element size (mat/mesh):	12.5 ft (3.8 m) – 117.5 ft (35.8 m) length x 2 ft (0.6 m) width
Bend radius:	1.5 in (38.1 mm)
Cable diameter:	¼ in (6.35 mm)
Conductor insulation:	Fluoropolymer and XLPE
External insulation:	PVC
Maximum temperature:	220 °F (105 °C)
Minimum installation temperature:	40 °F (5 °C)
Connection cable:	10 ft (3 m) length

## Thermal storage cable for interior embedded concrete



	Model	Length		Covers (ft <sup>2</sup> )			Output		
		Ft.	M	4 po	5 po	6 po	Watts	Amps	Ohms
				16.5W	13.2W	11W			
240 V	6CTS-240V-015	30	9.1	10.0	12.5	15.0	165	0.7	349.1
	6CTS-240V-020	40	12.2	13.3	16.7	20.0	220	0.9	261.8
	6CTS-240V-025	50	15.2	16.7	20.9	25.0	275	1.1	209.5
	6CTS-240V-031	62	18.9	20.7	25.9	31.0	341	1.4	168.9
	6CTS-240V-038	76	23.2	25.3	31.7	38.0	418	1.7	137.8
	6CTS-240V-046	92	28.0	30.7	38.4	46.0	506	2.1	113.8
	6CTS-240V-055	110	33.5	36.7	45.9	55.0	605	2.5	95.2
	6CTS-240V-065	130	39.6	43.3	54.2	65.0	715	3.0	80.6
	6CTS-240V-076	152	46.3	50.7	63.4	76.0	836	3.5	68.9
	6CTS-240V-088	176	53.6	58.7	73.4	88.0	968	4.0	59.5
	6CTS-240V-101	202	61.6	67.3	84.2	101.0	1111	4.6	51.8
	6CTS-240V-115	230	70.1	76.7	95.9	115.0	1265	5.3	45.5
	6CTS-240V-130	260	79.2	86.7	108.4	130.0	1430	6.0	40.3
	6CTS-240V-146	292	89.0	97.3	121.8	146.0	1606	6.7	35.9
	6CTS-240V-161	322	98.1	107.3	134.3	161.0	1771	7.4	32.5
	6CTS-240V-177	354	107.9	118.0	147.6	177.0	1947	8.1	29.6
	6CTS-240V-192	384	117.0	128.0	160.1	192.0	2112	8.8	27.3
	6CTS-240V-207	414	126.2	138.0	172.6	207.0	2277	9.5	25.3
	6CTS-240V-222	444	135.3	148.0	185.1	222.0	2442	10.2	23.6
	6CTS-240V-237	474	144.5	158.0	197.7	237.0	2607	10.9	22.1
6CTS-240V-252	504	153.6	168.0	210.2	252.0	2772	11.6	20.8	
6CTS-240V-267	534	162.8	178.0	222.7	267.0	2937	12.2	19.6	
6CTS-240V-282	564	171.9	188.0	235.2	282.0	3102	12.9	18.6	
6CTS-240V-297	594	181.1	198.0	247.7	297.0	3267	13.6	17.6	
6CTS-240V-312	624	190.2	208.0	260.2	312.0	3432	14.3	16.8	
6CTS-240V-325	650	198.1	216.6	271.1	325.0	3575	14.9	16.1	

## Thermal storage mesh (mat) for interior embedded concrete



	Model	Length		Covers (ft <sup>2</sup> )		Output		
		Ft.	M	6 po		Watts	Amps	Ohms
				11W				
240 V	6MTS-240V-015	7.5	2.3	15.0		165	0.7	349.1
	6MTS-240V-020	10.0	3.0	20.0		220	0.9	261.8
	6MTS-240V-025	12.5	3.8	25.0		275	1.1	209.5
	6MTS-240V-031	15.5	4.7	31.0		341	1.4	168.9
	6MTS-240V-038	19.0	5.8	38.0		418	1.7	137.8
	6MTS-240V-046	23.0	7.0	46.0		506	2.1	113.8
	6MTS-240V-055	27.5	8.4	55.0		605	2.5	95.2
	6MTS-240V-065	32.5	9.9	65.0		715	3.0	80.6
	6MTS-240V-076	38.0	11.6	76.0		836	3.5	68.9
	6MTS-240V-088	44.0	13.4	88.0		968	4.0	59.5
	6MTS-240V-101	50.5	15.4	101.0		1111	4.6	51.8
	6MTS-240V-115	57.5	17.5	115.0		1265	5.3	45.5
	6MTS-240V-130	65.0	19.8	130.0		1430	6.0	40.3
	6MTS-240V-146	73.0	22.3	146.0		1606	6.7	35.9
	6MTS-240V-161	80.5	24.5	161.0		1771	7.4	32.5
	6MTS-240V-177	88.5	27.0	177.0		1947	8.1	29.6
	6MTS-240V-192	96.0	29.3	192.0		2112	8.8	27.3
	6MTS-240V-207	103.5	31.5	207.0		2277	9.5	25.3
	6MTS-240V-222	111.0	33.8	222.0		2442	10.2	23.6
	6MTS-240V-237	118.5	36.1	237.0		2607	10.9	22.1
6MTS-240V-252	126.0	38.4	252.0		2772	11.6	20.8	
6MTS-240V-267	133.5	40.7	267.0		2937	12.2	19.6	
6MTS-240V-282	141.0	43.0	282.0		3102	12.9	18.6	
6MTS-240V-297	148.5	45.3	297.0		3267	13.6	17.6	
6MTS-240V-312	156.0	47.5	312.0		3432	14.3	16.8	
6MTS-240V-325	162.5	49.5	325.0		3575	14.9	16.1	

## 6. Surface Preparation

Prepare the surface that will accommodate the concrete slab in compliance with construction standards in effect in your region. Identify the room(s) to be heated, partition locations, expansion joints, and any barrier or hindrance to be bypassed (bottom drain, column, fixed furniture, etc.).

The cable shall be fixed to the metal mesh. The latter shall be placed on cubes laid out at a maximum distance of 60.96 cm (24 in) between any two of them. The mesh's squares have to align with themselves, and the leaves are to overlap each other by one complete square. Firmly secure the leaves with each other every 30 cm (1 ft) using tie wraps. In order to maximize their performance, the cables should be positioned at 3.81 to 5.08 cm (1.5 to 2 in) from the surface.

### 6.1 Metal Mesh

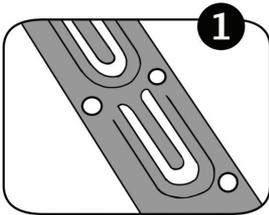
The metal structures used for securing the cables or onto which the latter are to be installed must be grounded in accordance with the Canadian Electrical Code (CSA C22.1, Section 10) and the National Electrical Code.



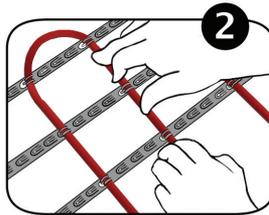
## 7. General ThermalStorage Installation Instructions

### 7.1 Mesh & Cables

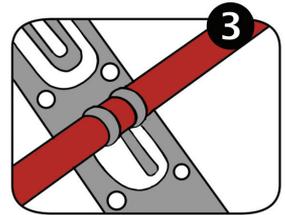
If you use the cable floor guides, follow the instructions below.



Secure the WarmAll guides to the ground (at a minimum distance of 1.829 m [6 ft] between them).



Install the cable at an ideal interval of 15.24 cm (6 in).



Attach the cable to the floor guide.

These plastic fasteners (tie wraps) may be useful to maintain the cables secured to the insulation before casting the concrete. Avoid using staples or a stapler to secure the cables in place.



## 7.2 Installation of the Heating Cable on the Concrete Reinforcing Bar

The cable must be installed with a regular 6-inch spacing throughout the area to be heated. Avoid tying the cable too tightly, or this could damage the cable.

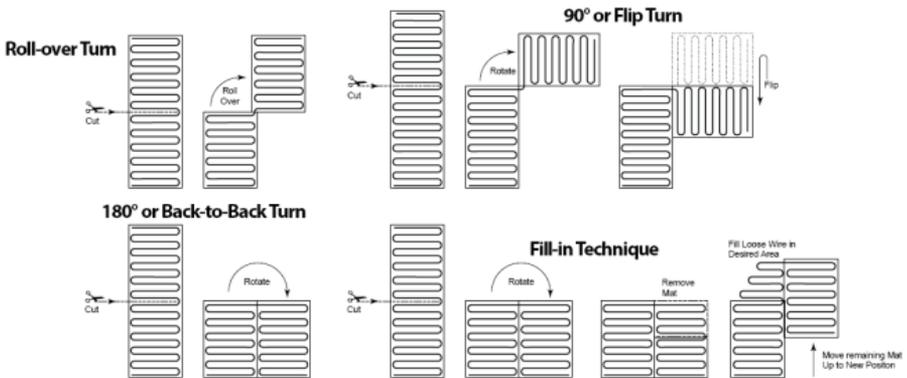
The spacing between the floor guides should be about 1.829 m (6 ft) or less.

Should there be reinforcing bars or a mesh grid, then the floor guides become unnecessary. The heating cables can be fixed directly onto the reinforcing bars or mesh grid using tie wraps.

A concrete metallic reinforcement structure is needed for installing the cable. The latter must be installed respecting a 15-cm (6-in) centre spacing. Thus it is highly important to install a metallic reinforcement structure or mesh grid that conforms with this spacing. For any other installation using a different spacing, please consult WarmAll to obtain its approval. The metallic mesh grid or reinforcement structure must be appropriately supported with cubes. We recommend a distance of 60.96 cm (24 in) between the supports. Make sure to align the mesh leaves, overlap them by one complete square, and secure them using tie wraps. Using protective tape, cover any imperfection in the metallic reinforcement structure in order to prevent any damage to the cable.

## 7.3 Mesh Modification

You can modify the mesh to bypass structural elements, such as a drain. If you cut the mesh's adhesive tape, numerous configurations can take shape. See the schematic below.



### **CAUTION: Do not attempt to cut, shorten or repair the heating cable.**

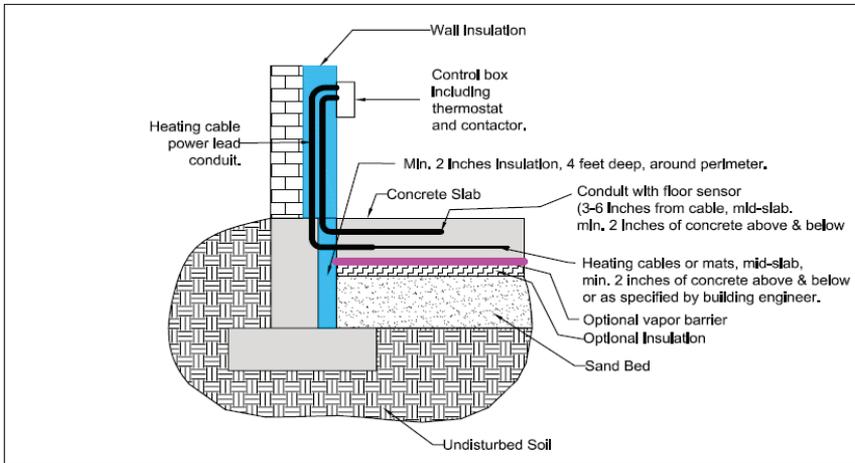
Start by fastening the mesh to the reinforcement structure with tie wraps. The cables must be secured, but not too tightly so: the mesh has to be able to move. Roll out the mesh up to the point where it has to turn; see the schematic above for suggestions.

Cut the adhesive tape with scissors and turn the roller so you can roll it out on the area beside the one you have just covered. Do not cut the cable!

The cable can be removed from the adhesive tape and left loose. This detail is highly important in curved spots, around drains, and close to other structural hindrances.

## Typical Installation Schematic

### CONCRETE INSTALLATION



## 8. Detailed ThermalStorage Installation in a Concrete Slab

### 8.1 Plan Design

Determine locations for all drains, piping, electrical conduits and structural elements. Make sure to keep the cable at least 15.24 cm (6 in) away from these elements. You must install all elements that will lie in the concrete slab before installing the cables, in order to prevent any damage to the cables.

Plan locations for the thermostat, sensors and their conduits. The starting point of the heating cable should be as close as possible to the thermostat's location.

### 8.2 Drafting the Installation

Using aerosol paint is a good means of drawing out your installation onto the insulation, plywood or concrete. Indicate the walls that will limit rooms and systems. Each room should have and use its own system. Also point out all fixed objects, heat sources, piping, electrical outlets, and other elements you will have to avoid installing the system too close to.

### 8.3 Floor Sensor and Conduit Installation

It is preferable to install floor sensors in rigid conduits: a rigid conduit not only protects the sensor, but also facilitates its replacement should it be or become defective.

Sensor and conduit must be installed according to the construction plan and connected at a later date. Please take the following precautions:

1. Make sure the conduit is sealed before casting the concrete.
2. You must install the conduit between the heating cables, usually in the centre of the concrete slab.
3. WarmAll recommends keeping the conduit as short as possible and bending it as little as possible in order to facilitate the sensor's installation.
4. Place the sensor in the tube until it sticks out of the conduit by about 2.54 cm (1 in).

- 
5. Sensor and conduit must both be at a distance of 7.62 to 15.24 cm (3 to 6 in) from the heating cables and surrounded by at least 5.08 cm (2 in) of concrete or sand.
  6. The floor sensor must be installed at least 1 m (3 ft 3.3 in) into the heated area.
  7. The floor sensor has a standard 3.657-m (12-ft) cable that can be extended using a 20 AWG cable.
    - There is a sensor in the cable packaging and another in the thermostat packaging.
    - Never install a sensor close to a heat or cooling source.
    - Check the sensor's operation using an appropriate device (consult the thermostat's instructions).
    - Never overlap a sensor with or set it at less than 5.08 cm (2 in) from a heating cable.
    - Both sensors must be installed at 2.54 cm (1 in) from the concrete surface.

**Secure the two sensors directly in the middle between two heating cables. This will ensure accurate captures and provide more accurate thermostat readings.**

**You must indicate this measure on the warranty card.**

#### **8.4 Cable Installation**

The cable and mesh are usually fixed to the reinforcement structure or the foundation grid. For further details, see section 8.4 in this manual. When installing the cable, you could need WarmAll tie wraps for cable and mat/mesh. The cables should be set approximately in the middle of the slab's thickness; but anyway, in all cases, there has to be at least 3.81 cm (1.5 in) of concrete above the cable.

The power cable up to the junction and a minimum length of 30.48 cm (12 in) of the power cable must be covered in concrete. The rest of the power cable must be in a conduit that reaches the thermostat or contactor. The power cable should be lengthened if necessary.

A word of advice: WarmAll recommends photographing the cable's location as well as the conduit's location during installation. This step will make it easier to repair the cables or lodge a claim.

Support the cables before casting the concrete.

Hold the cold link cable and the two sensors' wires, and tie them together with rope or a clip to be fastened to a ceiling joist or any other suitable support.

Make sure the cold link cable and the two sensors' wires are long enough to reach the thermostat.

Connect the failure warning light to the cold link, and switch it on if you proceed to immediately install the heating cable.



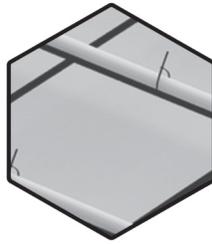
1

Thermostat



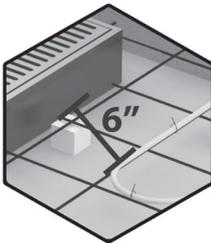
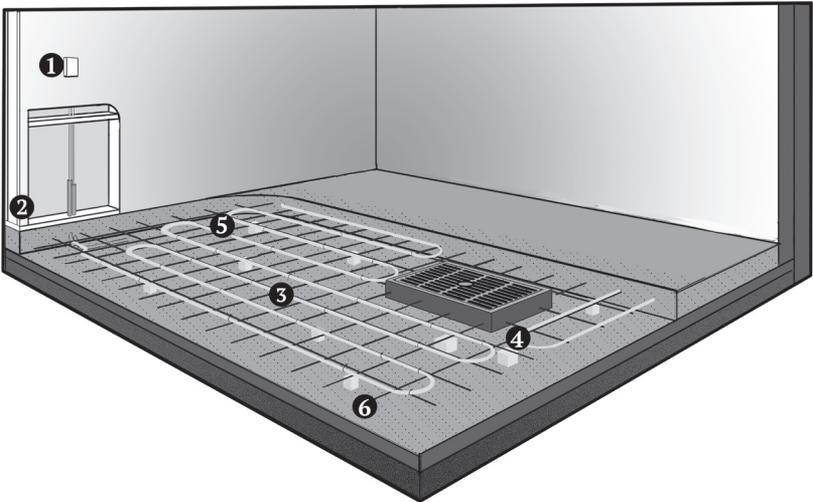
2

Cable ducts  
for cold lead



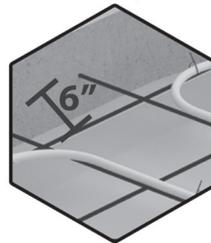
3

Fixe with  
cable ties



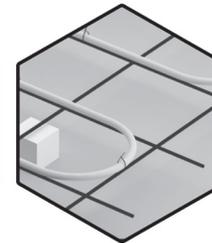
4

Floor fasteners



5

Clearance from drain  
and fixed obstacle



6

Clearance from  
exterior walls

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## 8.5 Casting the Concrete Slab

Cast the concrete slab. Make sure the concrete personnel exercise caution in their work and avoid damaging the cables with their tools, heavy machinery, etc. Once the slab has been cast and the concrete is still wet, measure resistance as outlined in step 3 and take note of the information on the warranty card. Wait about 30 days for the concrete to completely dry before energizing the cables. Check with the concrete manufacturer for exact drying time. In taking these precautions, you will ensure the slab's quality as well as the ThermalStorage cables' and rollers' appropriate operation.

## 8.6 Connecting the Power Supply and Thermostat

Only a certified electrician used to handling heating cables must connect the thermostat in accordance with Canadian Electrical Code (CEC) and National Electrical Code (NEC) requirements.

Exercise caution in appropriately grounding the braided cable surrounding the heating cable.

Now, you have to make sure that the sensor is suitably installed in the conduit. The sensor must reach the conduit's sealed end. Connect the thermostat and sensor based on the thermostat installation manual's diagram.

Lastly, perform a final measure of resistance as outlined in step 3 and take note of the information on the warranty card.

## 9. Recording the Information and Applying the Labels

Make sure that all resistance measurements taken at steps 3 to 6 have been recorded onto the warranty card.

The product number printed on the ThermalStorage cable's label also has to be recorded onto the warranty card.

Install the electrical panel label onto the electrical panel to point out the cable's location.

Install the Warning label onto a visible area of the floor for the duration of construction.

We recommend keeping the cable's identification label in a suitable location for the duration of the warranty.

## 10. Adjusting Thermal Storage Comfort

The ThermalStorage heating system is now ready for use. Gradually increase the temperature at the thermostat and adjust it to the desired level.

Please note that there could be a delay of a few hours before the thermal mass warms up the floor upon first-time use or after a long inactivity period.

The majority of laminate or hardwood flooring manufacturers recommend that the heating system not be used at any temperature higher than 27 °C to 28 °C (82 °F to 84 °F). Please check this information with your flooring manufacturer.

**Cable tests must be conducted by a qualified electrician.**

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## 11. Cable Verification Tests

The cable must be verified at every one of the five steps below in order for the customer to obtain the full warranty:

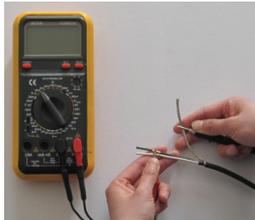
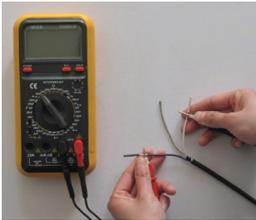
1. upon receiving the cable and before breaking its protective plastic packaging;
2. after installing the cable;
3. after having covered the cable with concrete;
4. after having installed the flooring;
5. before connecting the cable to the electrical network.

- Record the five tests' results onto the test log sheet.
- The five cable testing steps must be recorded onto the test log sheet in order for the customer to obtain the full warranty.

The cable verification device below continually measures the heating cable's resistance throughout the installation process. If the cable gets cut or damaged during installation, the device will generate an audible signal. You must make sure that the device is operational before initiating the installation process; carry out a test with the cable by disconnecting one of the three wires connected to the device. The audible signal should sound. If the device generates the audible signal during installation, stop all work and contact WarmAll.



### 11.1 Measuring Resistance



Each cable undergoes a 1,500-V dielectric insulation test in the factory as well as a conductor resistance test.

Resistance must be measured between the white and black conductors using an ohmmeter or multimeter. Compare the resistance measurement with the one printed on the product's label. If the multimeter is manual, adjust it to the 200-Ohm setting.

It is also compulsory to conduct the cable insulation test using a Meggermetre with its voltage setting adjusted to 1,000 V. Measure between the black and ground cables as well as between the white and ground cables to verify the cable's insulation. Both readings should show an infinite resistance. If there is a current leak between element and insulation, the device should display a value between zero and about 500 Ohms.

Record the resistance onto the test log sheet. You must record the resistance at each of the five cable verification steps in order for the warranty to remain valid. If the amount of resistance does not match expected values (+/- 10%), the cable could be damaged and has to

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be repaired; in this case, please contact WarmAll to find out the procedures to follow.

You must also measure the floor sensors' resistance. They should be 10 k $\Omega$  at room temperature (25 °C/77 °F).

## **12. Electrical Connection**

### **12.1 Circuit**

Floor heating systems must be connected to a dedicated circuit. To determine the power of the circuit that will drive the system, see the power used up by the cable on its label.

The thermostat can take on a maximum current load of 15 A. If your system requires over 15 A, it will need more than one dedicated electrical circuit. Such a load necessitates an expansion unit. Refer to the thermostat's instructions manual for further information on expansion unit connection and operation.

Determine the location where the thermostat's junction box will be installed. It should be accessible, in the room where the system is to be installed, and at an appropriate height.

Use a *Iberville #3004LH-RT* or bigger (or equivalent product) type box for connecting the system. Provide one box per circuit with a 15-A current load. A 3-m (10-ft) length of non-heating cable is available at the end for connecting to the box.

## **13. Non-Heating Cable**

The non-heating cable is connected to the heating cable by a mechanical joint, which must also be buried in the concrete slab.

Locate the spot where the mechanical joint will be secured. It is recommended to insert the non-heating cable portion into an approved conduit installed in conformity with your region's electrical code. Insert the non-heating cable into the approved conduit. Afterwards, pull the cable until the mechanical joint gets to about 30.48 cm (12 in) from the lower end of the conduit (see figure 3)



LIMITED WARRANTY

SEE THE WARRANTY CARD IN THE PRODUCT'S BOX.

THANK YOU.



TM/MD