

*Thin Heating Cables*  
**ELEKTRA DM**



- single-side powered

# *Heating Cables*

*ELEKTRA*

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For the proper installation and operation of the ELEKTRA radiant floor heating system, it is recommended to first read this Installation Manual.

The heating cables should be installed in accordance with NFPA 70, National Electrical Code (NEC), Article 424 and Canadian Electrical Code, Part I (CEC), C22.2-09, Section 62.

## Application

The thin ELEKTRA DM heating cables are primarily intended for use in rooms with a tile or natural stone floor covering.

Additionally, they can be used with floor covering materials as:

- carpet (no more than an 1/2" thick, incl. padding),
- vinyl flooring (no more than an 1/4" thick),
- thin, glued down parquet, engineered wood or wood flooring (no more than an 1/3" thick),
- thin laminate flooring.

Each of the above applications need to be approved to work with underfloor heating by particular the floor covering manufacturer and installed according to directions.

Maximum thermal resistance value (R-Value) rating of floor covering that can be placed on top of heating cables can't be larger than 0.15m<sup>2</sup>K/W (0.852ft<sup>2</sup>F/Btu).

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The thin heating cables can be laid directly on concrete floors, self-leveling concrete slab, as well as existing ceramic tiles, terrazzo or water resistant wooden floors.

If heating cables are to be laid on a wooden subfloor, or on existing ceramic tiles, it is necessary to first apply the additional layer of thinset mortar, or use the approved concrete backer boards.

## Caution



The heating cables can not contact combustible surfaces.

Heating cables can be laid in the thin layer of thinset mortar, flooring adhesive or self-leveling compound.

Heating cables are typically used as a supplementary floor heating system, in order to provide the user with a warm floor. However, they can be used as a primary heating system.

## Product Features

- Available as ready-to-install units, with the lengths from 29.5 to 672 ft (9 – 205 m).
- Ended at one end with a shielded 8.2 ft (2.5 m) long power supply cable, and with a joint at the other end.
- Power output: 3W/ft (10W/m).
- Cable voltage:

Two options for heating cables are available:

- 120VAC 50/60Hz-rated, supplied from an electrical panel with 120VAC electrical circuit;
- 240VAC 50/60Hz-rated, supplied from an electrical panel with 240VAC electrical circuit.

The cable nameplates sticker always show the rated voltage for each heating cable.



- Min. cable bending radius 1" (25 mm).
- The minimum installation temperature of the heating cable is 41°F (5°C).
- The heating cables are shielded and power supply connection requires GFCI protection so full anti-shock protection will be provided.

# Heating Cables

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ELEKTRA DM heating cables:  
cable external diameter – 1/6" (4.3 mm).



- 1 "Cold tail" power supply cable
- 2 Heating cable
- 3 Joint connecting the heating cable with the power supply cable
- 4 Cable nameplates sticker

## Note



The power output of the heating cables can vary +5%, -10% from the provided rated specifications.

### Cold tail marking

120V – yellow outer jacket or yellow label  
with 120V printing

240V – red outer jacket or red label  
with 240V printing

The following symbols are placed on the rating  
labels of the ELEKTRA heating cables:



single-side powered  
heating cable,



direct in-floor heating,



to be embedded in thinset  
(mortar), thickset (mudjob),  
or self leveler underlayment.

## Materials and Tools

### Required for the heating cables installation

- Properly chosen (based on size and power vs. floor coverage calculation) approved heating cable.
- Approved line voltage thermostat with floor temperature sensors.
- Approved, single gang, deep, electrical installation box, (or a double gang box with a single gang cover adaptor). One box per thermostat or relay module as per installation directions of the particular device.
- Approved electrical conduits as per local code requirements.
- Approved aluminum self stick tape.
- Approved wire nuts, grounding tails, under baseboard protective finish metal plates etc.
- Approved fast-drying primer for concrete subfloors.
- Thinset mortar or self-leveler.

### Typical tools needed:

- multimeter (resistance tester),
- mega ohms meter (insulation resistance tester) with min. 1000V testing voltage,
- cable installation monitor,
- installation tape,



- measuring tape, calculator, shop vacuum cleaner, wire snake, electrical tape, scissors, wire cutter, markers, drill, chisel, camera to document the layout, etc.

## Caution



**Never** cut the heating cables.

**Never** shorten the heating cables. Only cold tails can be made shorter, if necessary.

**Never** attempt to crumple the “cold tail”.

The heating cable **shall not** extend beyond the room or area in which it originates.

**Never** attempt self-repairs of the heating cables. If the heating cables are damaged, please contact an ELEKTRA authorized installer.

**Never** expose the heating cables to excessive stretching, stressing or any impact with sharp tools.

**Never** attempt to lay the ELEKTRA DM heating cable if the ambient temperature drops below 41°F (5°C).

**Never** install the heating cables in places where fixed furniture is planned (e.g. floor-level wardrobes, kitchen units, baths).

## Caution



**Never** lead the end joint and the connecting joint between the heating cable and the power supply conductor out of the surface. Both joints must be placed within the layer of the concrete or self-leveling slab.

**Never** install the heating cables in closets.

**Never** install the heating cables in walls.

**Never** use installation materials other than those specified in the installation manual.

**Never** use nails or screws of any kind for installation of the heating cables.

**Always** install the heating cables according to the installation manual.

The heating cables **must not** cross or touch with each other.

Electrical connection of the heating cables must be **always** performed by a qualified licensed electrician.

The minimum distance between the heating cables and other heat sources (e.g. hot water pipes) should **always** exceed 2" (51 mm).

## Choosing the right Heating Cable

When selecting your heating cable, follow the instructions below.

1. Choose the cable's proper rated voltage – 120 or 240VAC.
2. Decide on the main purpose of your heating system – is it the warm floor you would like to achieve, or rather is your system going to be the primary heating source.
3. Decide on the floor finishing details.

### How to do it?

re 1. When selecting the cable of the proper voltage rating – 120 or 240VAC – it is necessary to remember that the cable (or cables, if the room size requires it) in the heated room will be connected to a thermostat. The max. thermostat's load is 15A. The thermostat is voltage flexible (it is rated for both 120 and 240VAC). This means that the following heating cables can be connected to one thermostat (without a relay contactor):

- of overall wattage 1800W – for the 120VAC-rated cables;
- of overall wattage 3600W – for the 240VAC-rated cables.

120VAC-rated heating cables are optimal for smaller systems, up to 1500W. For larger systems, 240VAC-rated cables are recommended.

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re 2. To achieve the warm floor, it is normally sufficient to install the heating cables of the following heat output:

- 9-11W/ft<sup>2</sup> (100-120W/m<sup>2</sup>) – for the stone or ceramic floor finishing;
- 12-14W/ft<sup>2</sup> (130-160W/m<sup>2</sup>) – for the ceramic floor finishing laid on the concrete slab subfloor with no heat insulation;
- 9W/ft<sup>2</sup> (100W/m<sup>2</sup>) – for the thin wood parquet floor finishing, laminates, carpets or vinyl flooring.

re 3. If your heating system is to be the primary heat source in the room, the necessary heat output will depend on:

- the climate zone of your location;
- building's insulation;
- windows' heat tightness;
- the floor surface available for the heating cables (free from fixtures).

## Stone and ceramic floors

If no heat loss calculation has been performed, the heating cables can be selected, which would allow to achieve the heat output of 12-14W/ft<sup>2</sup> (130-160W/m<sup>2</sup>) of the floor.

## Thin parquet, laminate, carpet and PVC floors

With such floors, the min. spacing of the heating cables must not drop below 4" (10 cm) – this will ensure the heat output of 9W/ft<sup>2</sup> (100W/m<sup>2</sup>) of the floor.

In this case, the heating cables can constitute the primary heating system, but only for buildings equipped with highly efficient thermal insulation and located in mild climate zones.

re 4. The heating cable spacing should not drop below:

- 2.5" (6.25 cm) – for the stone or ceramic floor finishing;
- 4" (10 cm) – for the thin wood parquet floor finishing, laminates, carpets or vinyl flooring.

For the proper selection of the heating cable, first calculate its required heat output:

$$\text{Heating cable output} = P \times S$$

where:

P – assumed wattage per 1 ft<sup>2</sup> (1m<sup>2</sup>) of the floor;

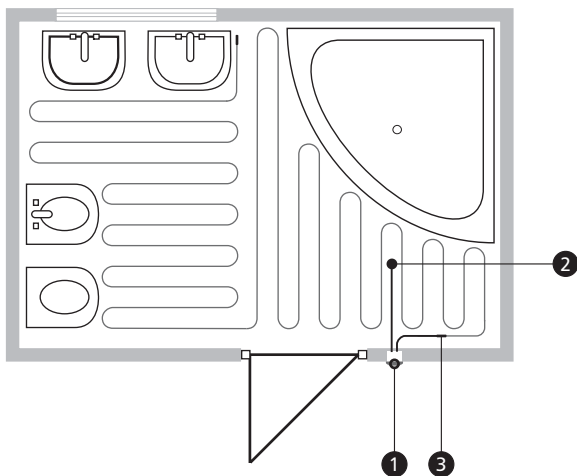
S – free floor surface available for heating.

Then, select the cable of the wattage closest to the just calculated.

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- ❶ Electric box
- ❷ Temperature sensor
- ❸ Joint connecting the heating cable with the power supply cable

## Choosing the Thermostat for ELEKTRA Heating Cables

An approved line voltage thermostat is a core component of any radiant floor heating.

The thermostat connects the heating cable with the electrical system and ensures that the required temperature of the floor or ambient air in the room is maintained.

- If the heating cables serve as a supplementary heating source in the room and the user wishes merely to enjoy a warm floor feeling, then a thermostat equipped with a floor temperature sensor is sufficient to keep the required temperature of the floor.
- If the heating cables are the primary heating source in the room, then what the user usually wants is the optimum ambient temperature. In such a case, a thermostat that can measure air temperature should be installed. Such a thermostat should be equipped with both an air temperature sensor and an additional floor temperature sensor (while measuring the ambient temperature, the floor temperature sensor protects the floor and the heating cable from overheating).

For temperature control, either a manual thermostat may be used which keeps constant temperature or a programmable thermostat which can be programmed in a daily and/or a weekly cycle.

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Thermostats are flexibly voltage-rated, both for 120VAC as well as 240VAC, and their max. load is 15A. Therefore, they can operate with the 120VAC or 240VAC-rated heating cables.

For the thermostats with the 120VAC-rated heating cable, max. cable's heat output will be 1800W. For higher outputs, it is possible to connect a relay contactor which will increase the thermostat's capacity with the additional 1800W.

For the thermostats with the 240VAC-rated heating cable, max. cable heat output will be 3600W. For higher outputs, it is possible to connect a relay contactor which will increase the thermostat's capacity with the additional 3600W.

Heating type	Thermostat type	
	Manual	Programmable
Primary	—	UDG
Supplementary for the warm floor	UTN	UDG

UDG, UTN thermostats and USG relay module are UL/cUL listed.



### UDG: programmable 4-event thermostat.



Consists of the control unit with an built-in air temperature sensor, and the floor temperature sensor.

The possibility of the setup in 3 variants of the temperature measurement, via:

the air, floor and both air and floor (limit) sensor.

Load max. 15A  
- 1800W @ 120V or  
3600W @ 240V.

Built-in GFCI.

### UTN: manual thermostat.

Consists of the control unit, and the floor temperature sensor.

Load max. 15A  
- 1800W @ 120V or  
3600W @ 240V.

Built-in GFCI.





**USG: relay contactor for large applications.**

When the maximum thermostat load has been exceeded, the device enables the connection of the subsequent heating cables in the same room.

Load max. 15A  
- 1800W @ 120V or  
3600W @ 240V.

Built-in GFCI

## Heating Cable Installation

ELEKTRA heating cable can be installed in the floor by a tile setter, a flooring contractor or a suitably qualified person, on condition that they have read and understood the Installation Manual.

Only a qualified licensed electrician should connect the floor heating cable to the control device and to the electrical circuit, in accordance with the National Electrical Regulations. The electrical connection presents risks of fire and electrical shock, which can result in personal injury. Caution should be taken to guard against each risk.

## Step 1 – Preparation of Electric Works

As preparation for the installation take the following steps:

1. select the location of your thermostat, preferably in the same room where the heating cables will be assembled, at the height of approx. 4 – 5 ft (1.2 – 1.5 m), in a easily accessible place. Thermostats should be located in a current standard-approved distance from wet zone,
2. install an approved deep single-gang electrical box for the thermostat. In case more than two cold tails of the heating cable will be connected, use a respectively larger box with a masking ring. For the installation of relay contactor, use an approved deep double-gang electrical box,
3. from the electrical panel to the electrical box, lead min. 14 AWG supply conductor placed inside a protective conduit, suitable for the amperage of 15A. In case the planned wattage of your floor heating system will be exceeding 1800W (at the voltage of 120 VAC) or, respectively, 3600W (at the voltage of 240 VAC), an additional 14 AWG supply conductor should be applied, leading to the additional electrical box, where the power module will be installed.

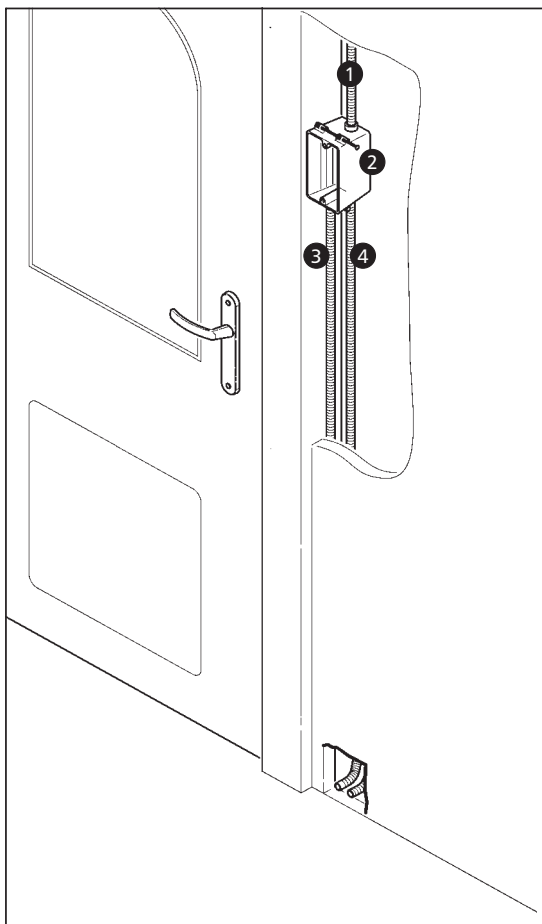
The conductor should supply from the electrical panel the voltage suitable for the cable rating. 120VAC-rated heating cables require 120VAC electrical panel voltage supply, and respectively

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- 240VAC-rated heating cables require supply with the conductor leading from the electrical panel to the 240VAC 2-pole interrupter,
- 4. two protective conduits should be run from the electrical box down to the floor. One will contain the cold tails of the heating cables the other one will be used for the floor temperature sensor,
- 5. using appropriate tools, make a wall cavity of 2 x 2" (51 x 51 mm) at the floor level, below the controller box, as well as the groove in the wall sill plate, which will facilitate running the heating cable's cold leads inside the wall,
- 6. in case any other controlling device with the built-in GFCI is planned to be used rather than the one recommended by ELEKTRA, it must be mounted in the terminal junction box.



- ① Power supply cable
- ② Deep installation box for the thermostat
- ③ Flexible conduit for the floor temperature sensor
- ④ Flexible conduit for the cable's cold tails

## Step 2 – Subfloor Preparation

### Wood subfloors

Installation of heating cables directly on plywood or wood subfloors is not recommended.

First, min. 1/2" thick approved backer boards must be laid, in accordance with manufacturers' instructions.

Building regulations require that the subfloor's overall thickness amounted to min. 3/4", depending on the target application.

Ground-based concrete slab subfloors must be insulated before any floor heating system is laid.

In case the subfloor's finish is existing ceramic tiles, they should be removed or covered with thinset mortar (if floor level rise is acceptable).

Remove all debris, staples and nails. Sand the edges of any boards to eliminate potential differences in elevations. Clean the floor first, then apply the primer for concrete subfloors. The primer will bind dust on the subfloor surface and consequently:

- increase the adhesiveness of thinset or self-leveling compound;
- increase the adhesiveness of self-adhesive aluminum tape used to preliminarily fix heating cables to the subfloor;
- increase the adhesiveness of hot glue used to fix heating cables to the subfloor permanently.

After priming, it is recommended to indicate on the subfloor the areas of the predicted location of fixtures (closets, cupboards, baths, shower

## Step 3 – Testing the Heating Cables

Before installing the heating cable, it is necessary to take the following resistance measurements:

- the resistance measurement of the heating wire,
- the resistance measurement of the insulation of the heating core.

The resistance value taken for the heating wire should not vary with more than  $-5\%$ ,  $+10\%$  from the one listed on the product label.

The insulation's resistance for the heating cable, as measured with a tool of the rated voltage 1000 V (e.g. megaohmmeter), should not be below 50 M $\Omega$ . Enter the results into the Warranty Card.

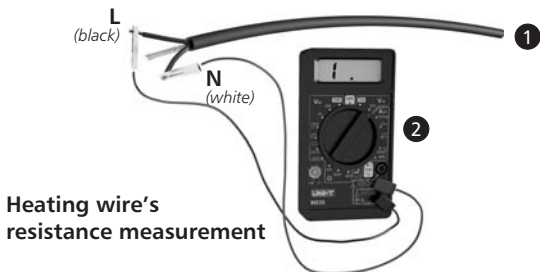
After the heating cable has been attached to the floor, and the slab laid, the measurements should be repeated to certify that at no installation stage the heating cable was damaged.

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## DM heating cable – measurements



- 1 DM heating cable's cold lead
- 2 Ohmmeter
- 3 Megohmmeter (Insulation Tester)



## Cable Installation Monitor

The device enables detection of mechanical damage of heating cables or power supply conductors.

The monitor should be connected to the power supply conductor of the heating set from the time the installation is commenced until the floor finish is ready. The device will signal mechanical damage and will sound an alarm.



### Note



As soon as the device signals the damage, it is necessary to contact the heating system's installer to determine the location of the damage and repair as required.

Application of the monitor does not eliminate the need to perform the resistance measurements of the heating core and insulation.

## Step 4 – Installation of the Heating Cable

Before attempting to install the selected heating cable:

- calculate the required spacing;
- indicate on the subfloor predicted position of the fixtures (closets, cupboards, baths, shower bases or toilets).

Required spacing for heating cables can be assessed by drawing the cable layout, or – alternatively – by applying the following formula:

$$a-a = \frac{S}{L+0.5P}$$

where:

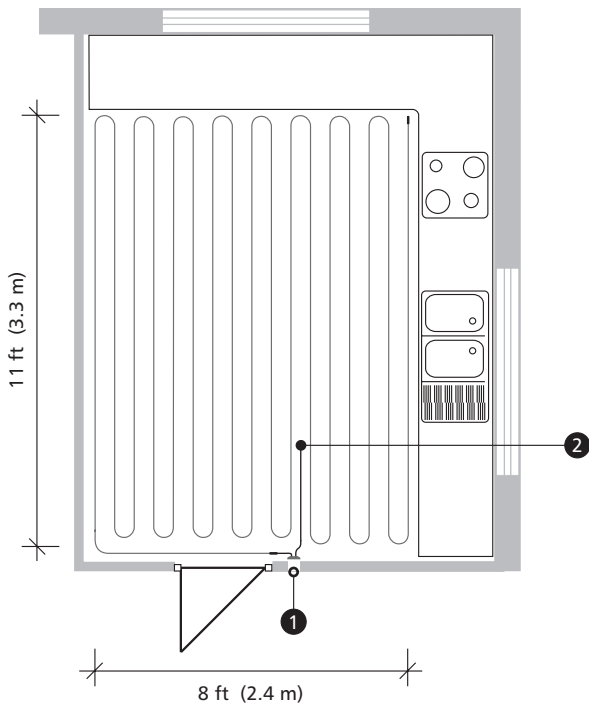
a-a – cable spacing;

S – free floor surface available for cable heating;

L – length of the heating cable;

P – free floor perimeter available for cable heating.

Example:



- 1 installation box
- 2 temperature sensor

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Primary heat source for a kitchen in a newly-constructed well-insulated residential building located in the middle-northern State, climate zone 3.

1. Calculate free floor surface available for cable heating:

$$8 \text{ ft} \times 11 \text{ ft} = 88 \text{ ft}^2$$

2. Assume the wattage per  $\text{ft}^2$  floor surface, as in the part "How to select optimally your heating cable":

$$88 \text{ ft}^2 \times 12\text{W}/\text{ft}^2 = 1056\text{W}$$

3. Select the heating cable of the wattage closest to the just calculated:

$$\begin{aligned} &\text{DM 10/1070/120VAC} \\ &\text{length } L = 4296'' \end{aligned}$$

4. Calculate spacing for the selected heating cable:

- calculate the free floor surface in square inches
- $S = 88 \text{ ft}^2 = 88 \times 12 \times 12 = 12672 \text{ sq. inches}$
- calculate the free floor perimeter available for cable heating, in inches
- $P = 8 \text{ ft} + 8 \text{ ft} + 11 \text{ ft} + 11 \text{ ft} = 38 \text{ ft} = 38 \times 12 = 456''$
- divide floor perimeter (P) by 2
- $456'' \times 0.5 = 228''$
- Add the length of the cable (L) to half of the floor perimeter (P/2)  
 $4296'' + 228'' = 4524''$
- apply the calculated value in the

$$a-a = \frac{S}{L+0.5P} \quad \text{formula}$$

- $a-a = 12672''/4524'' = 2,8'' = \underline{2 \text{ and } 4/5''}$

Start laying the heating cable from the cold tail's end to ensure that it can freely reach the electrical box.

The heating cable should be laid on the subfloor bypassing the predicted location of the room's fixtures, and then preliminarily fixed to the subfloor with self-adhesive installation tape, retaining the previously determined spacing.

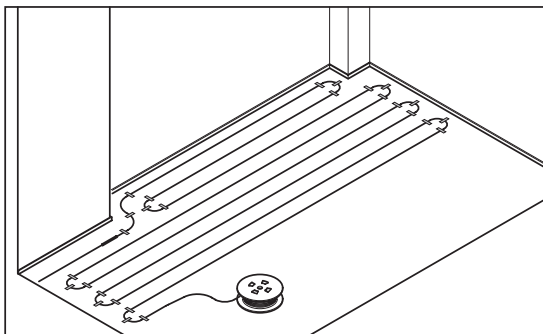
The heating cable should be distanced from the walls and fixtures by the same spacing as retained between the cable runs.

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In case the cable layout has been done incorrectly, the self-adhesive tape can be removed and the cable re-arranged on the subfloor, then re-fixed.



## Caution



While the cable is being installed, ensure an even distance between the cables.

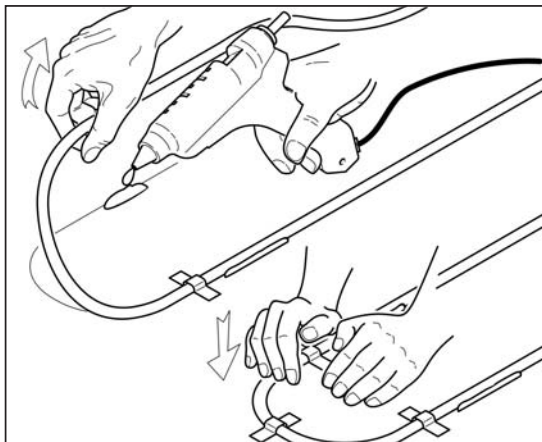
Laying the cable should start from the cold tail side, so that the cold tail could easily reach the installation box.

When the heating cable has been successfully positioned on the subfloor, it should be secured with hot glue.

## Caution



Hot glue fixes fast, so it should be applied onto small subfloor surface fragments at a time.



## Caution



While applying the hot glue, it is necessary to prevent the hot tip of the hot glue gun to come into contact with the heating cable.

## Step 5 – After Fixing the Heating Cable to the Floor

- Make a groove in the subfloor to accommodate the mechanical joint, located at the end of the heating cable, connecting the heating cable with cold tail.

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- Enter the heating cable cold tail into the installation box through the protective conduit mounted at the step 1: Preparation.

## Caution



The cold leads of the heating cable should be run not closer than 2" (51 mm) from the heating cable itself.

- Perform measurements:
  - heating wire resistance,
  - insulation resistance.

Enter the results into the Warranty Card.

## Caution



If the heating system's design requires more than one heating cable to be used in a single room, the cold lead of the cables should be labeled appropriately with numbers.

The electrician should place the heating cables product label in the Warranty Card.



## Step 6 – Installation of the Floor Temperature Sensor

Run the temperature sensor cable inside a protective conduit mounted at the stage of the electric works. The sensor should extend min. 10" (25 cm) into the heated area.

Place centrally the sensor between two heating cables and attach to the subfloor with the installation tape.

The temperature sensor cable must not cross the heating element.

It is possible to install the second (backup) floor temperature sensor.

In case of floating laminate floors, or the engineered wood floors, install the sensor between the underlay and the floor finishing material.

### Caution



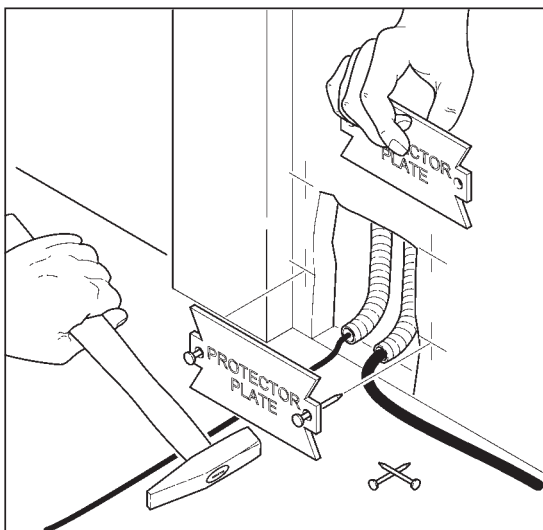
The temperature sensor cable should be positioned just between the heating cables.

Mount the protective plate on the groove previously cut in the sill plate under the thermostat's box.

In the Warranty Card, make the sketch of the heating cable and temperature sensor's layout, as well as take photographs of the layout.

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## Step 7 – Slab

The heating cable should be embedded in:

- “modified” thinset (acrylic, latex or polymer), or tile adhesive;
- self-leveling compound of the minimal thickness of 1/4”. The heating cables and “cold tails” must be completely covered with the slab.
- never lead the end joint and the connecting joint between the heating cable and the power supply conductor out of the surface. Both joints must be placed within the layer of the concrete or self-leveling slab.

If your floor covering will be carpeted or laminated, you will need a two stage slab application to produce the smooth and flat surface, necessary for these types of flooring.

## Caution



**Use** plastic trowel (not metal), to apply thinset mortar or help the flow of self-leveler;

**Never use** ready-mix mastic to cover the wires.

**After** the mortar bed is ready, re-measure:

- the heating core's resistance;
- the insulation's resistance;

and enter the results in the Warranty Card.

## Step 8 – Installing the Thermostat

When connecting the thermostat to the domestic electrical circuit, switch off the main power supply on the electrical panel to prevent the danger of electric shock.

Connection of the heating cable with the household wiring should be made by a qualified licensed electrician.

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Connections of the following cables with the thermostat:

1. power supply cables of the electric system,
2. heating cable's cold tails,
3. temperature sensor in the installation box should be carried out according to the instructions included in the thermostat's installation manual.

## Caution



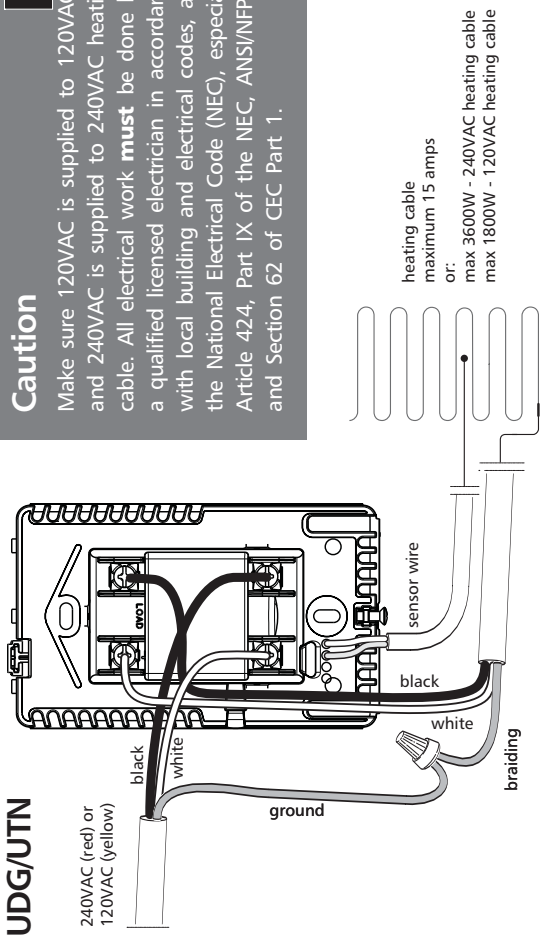
It is not allowed to apply different voltage than indicated on the rated nameplates to the heating cable.

If several heating cables were installed in the room, connect them in parallel, i.e. cables with the same markings should lead to the same terminals on the thermostat.

The electrician should mark the cold leads of each heating circuit and should place a warning label in the panelboard.

The label is included with the heating cable.

**Caution**  
 Make sure 120VAC is supplied to 120VAC and 240VAC is supplied to 240VAC heating cable. All electrical work **must** be done by a qualified licensed electrician in accordance with local building and electrical codes, and the National Electrical Code (NEC), especially Article 424, Part IX of the NEC, ANSI/NFPA70 and Section 62 of CEC Part 1.



Wiring diagram for the heating cable's connection to the thermostat

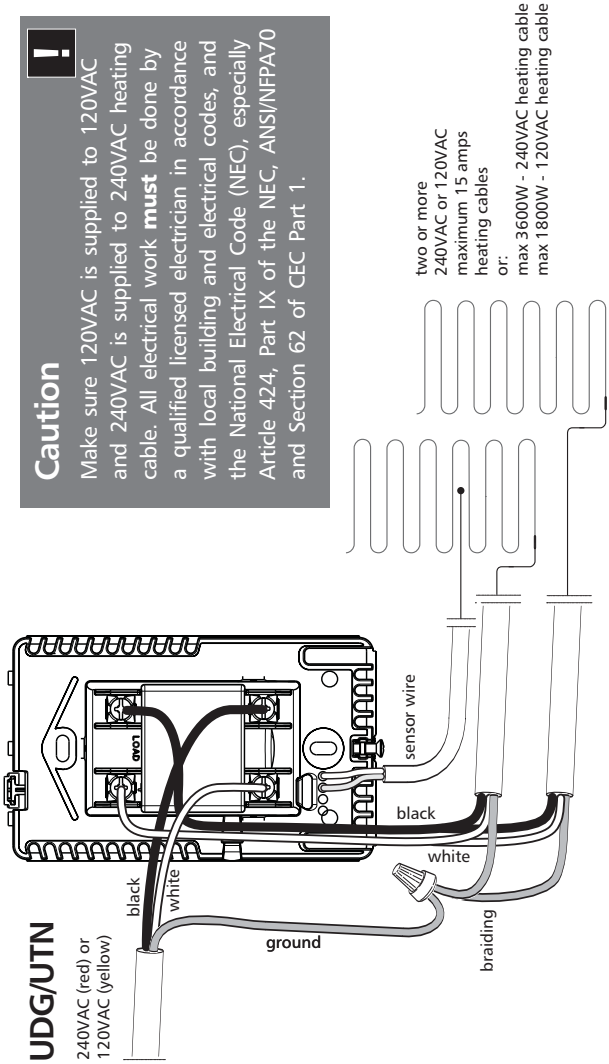
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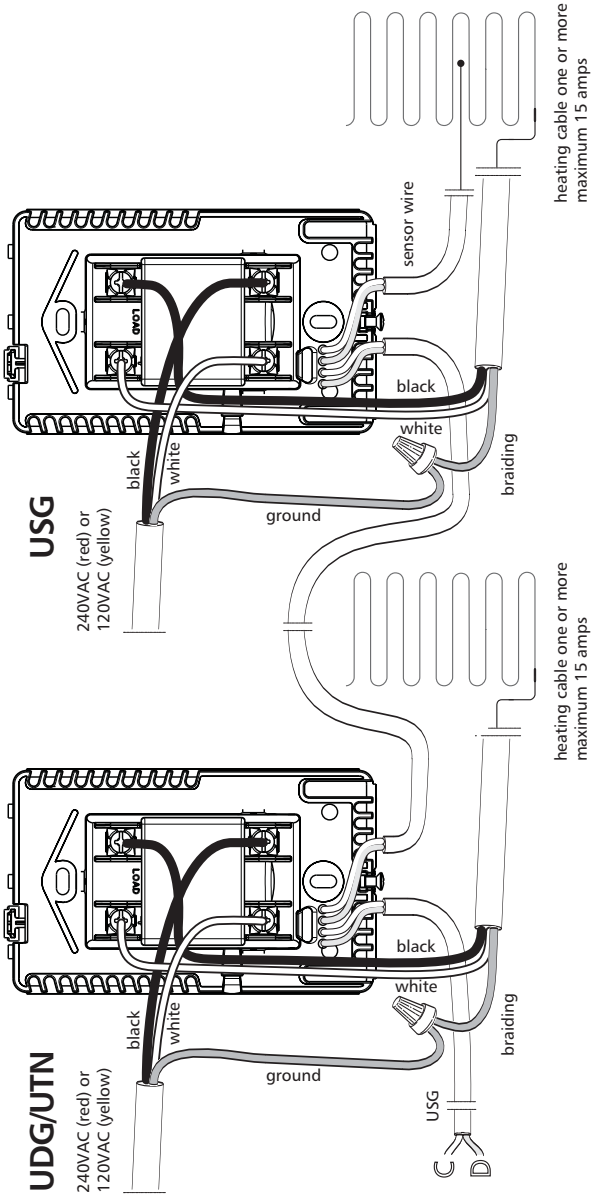


## Caution

Make sure 120VAC is supplied to 120VAC and 240VAC is supplied to 240VAC heating cable. All electrical work **must** be done by a qualified licensed electrician in accordance with local building and electrical codes, and the National Electrical Code (NEC), especially Article 424, Part IX of the NEC, ANSI/NFPA70 and Section 62 of CEC Part 1.



Wiring diagram for the heating cable's connection to the thermostat, for more than one cable



Wiring diagram for the heating cable's connection to the thermostat, with a relay contactor

## Caution



Make sure 120VAC is supplied to 120VAC and 240VAC is supplied to 240VAC heating cable

All electrical work **must** be done by a qualified licensed electrician in accordance with local building and electrical codes, and the National Electrical Code (NEC), especially Article 424, Part IX of the NEC, ANSI/NFPA70 and Section 62 of CEC Part 1.

## Step 9 – Floor finishing

Special care must be taken when using power tools (such as drills or grinders) on the floor surface when installing the floor finish, so as not to damage the heating cable.

Cleaning grout lines with sharp tools or power tools is not allowed as it may permanently damage the heating cable.

## Anti-shock Protection

The heating cable must be connected to the domestic electrical system via a Ground Fault Circuit Interrupter (GFCI). The ELEKTRA thermostats feature an built-in GFCIs.



## Note for the System Owner

Make sure the person doing the electrical work has:

- properly completed the Warranty Card,
- labeled the electrical circuit that supplies the ELEKTRA radiant floor heating system.

## Operation

The floor temperature of the heating system is limited by setting the desired temperature in the thermostat.

Note that the entire floor or a large part of it serves as a heater. Hence, heat dissipation from the floor should always remain unhindered by furniture or by the way the room is used.

For that reason, do not place large footprint objects on the heated sections of the floor, such as mattresses or furniture pieces without feet which have large contact surface with the floor.

Holes can be drilled in the floor only after the exact arrangement of the heating cables has been determined (based on the as-built documentation or measurements taken with a special detector).

# Troubleshooting

Problem	Possible cause	Solution
<p>Cable resistance measurement is different than the nameplate label.</p>	<p>An analog type meter with a needle to indicate reading) was used for measurement.</p>	<p>Re-measure with a digital Ohmmeter.</p>
	<p>If the measurement is significantly different from the value on the nameplate label, this indicates an open or short-circuit, and the cable has been damaged.</p>	<p>Contact the Manufacturer's Representative.</p>
	<p>If the measurement is slightly different from the value on the nameplate label, room temperature might have affected the resistance.</p>	<p>While taking the measurement, ensure that the room temperature stays around 68°F (20°C).</p>

	<p>The cables have been wired in series.</p>	<p>In case more than one heating cable is to be used, the cables must be connected in parallel (i.e. cables of the same color must be connected to the same thermostat's terminal).</p>
<p><b>The thermostat is not working.</b></p>	<p>The thermostat is off.</p>	<p>Check if the thermostat's switch is on.</p>
	<p>No power is supplied.</p>	<p>Measure power supply conductor's voltage at the thermostat.</p>
	<p>The thermostat is defective</p>	<p>Return the thermostat to the local Dealer for replacement.</p>

<p><b>The floor continuously heats.</b></p>	<p>The temperature sensor's wires have become loose at the thermostat's terminals, or have been broken.</p>	<p>In case your heating system is equipped with a thermostat with a floor temperature sensor, re-connect the wires at the thermostat's terminals. If this proves ineffective, measure resistance of the sensor's wire and compare with the reference values given in the Sensor Resistance Table to be found in the thermostat's Manual.</p>
<p><b>The floor is not getting warm.</b></p>	<p>The heating cable has been damaged.</p>	<p>Measure heating cable's resistance (as detailed in this Manual) and compare to the value given on the nameplate label. If the measured values differ significantly, contact the local Representative.</p>

	<p><b>GFCI is tripped.</b></p> <ol style="list-style-type: none"> <li>1. Your heating system is controlled with an ELEKTRA thermostat factory-equipped with a GFCI device.</li> </ol>	<p>The GFCI will restart automatically (the red control will go on), reset the GFCI by pressing the Standby button.</p>
	<ol style="list-style-type: none"> <li>2. Your heating system is controlled with a thermostat with no integrated GFCI device, but protected with a GFCI interrupter positioned on the electrical panel.</li> </ol>	<p>Reset the GFCI. If the GFCI trips again, check if the heating cable has not been damaged (as described above). If not, replace the thermostat or the GFCI.</p>
	<p>Incorrect voltage has been supplied to the heating system.</p>	<p>Measure the voltage. 120V cables have yellow cold tails or yellow labels marked with "120V". 240V cables have red cold tails or red labels marked with "240V".</p>

	<p>Heating system laid on concrete slab floor.</p>	<p>Concrete slab floors take longer to warm up. Only if after 5–8 hours of heating, the change of temperature is not noticeable, check for cable damage (see “The heating cable has been damaged”).</p>
<p><b>The thermostat is not working correctly.</b></p>	<p>Incorrect programming.</p>	<p>Carefully read the thermostat’s Manual.</p>
	<p>Incorrect voltage supplied.</p>	<p>Measure the voltage of the heating system’s power supply conductor at the thermostat and make sure it matches the thermostat’s rating.</p>
	<p>The temperature sensor’s wire has become loose at the thermostat’s terminals, or has broken.</p>	<p>See “The floor continuously heats”.</p>

## Product's Limited Warranty

ELEKTRA DM electric heating cables ("The Product") are warranted to be free from defects in materials and workmanship for twenty years (from the date of purchase).

### Warranty Terms and Conditions

1. The warranty claim will be held valid if:
  - a. the heating system has been installed in accordance with the Installation Guide hereby, the National Electrical Code (NEC) or the Canadian Electrical Code (CEC) for Canadian customers, and all applicable local building and electrical codes;
  - b. the room where the Product has been installed, has been used in accordance with the instructions included in the part "Operation" of the Installation Guide hereby;
  - c. the properly completed Warranty Card will be presented.

# Heating Cables

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2. Within the validity conditions of the Warranty hereby, the Manufacturer will **ONLY** bear the costs of repair of the defective Product returned to the Manufacturer's local Representative, its replacement for the fault-free one, or refund the cost of purchase of the Product which proved to be defective. The Manufacturer will not assume responsibility for the cost of flooring materials, or the cost of their removal and replacement.
3. This Warranty is transferable to subsequent owners.
4. The Manufacturer will not be held responsible for the consequences of the inappropriately selected heating output of the Product per ft<sup>2</sup> (m<sup>2</sup>) of the heated room.
5. Due to differences in building- and flooring insulation, as well as climate conditions, the Manufacturer does not guarantee, that the floor temperature will achieve the level at which users may subjectively be satisfied with.

## Note



The complaint claims **must** be associated with the properly completed Warranty Card and the proof of purchase, and reported at the place where the Product was purchased, or at the Manufacturer's local Representative's office.



Before returning the Product recognized to be defective in materials and workmanship, and not damaged as a result of misuse, misapplication or improper installation, to the Manufacturer's local Representative's office for repairs, you **MUST** contact the Representative in order to obtain the dedicated Returned Authorization number (Returned Authorization RA), otherwise the shipment will not be accepted and subsequently returned to the sender.

# Warranty Card

Customer shall keep this Warranty Card throughout the entire warranty period of 20 years. The warranty period starts from the date of product purchase.

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## INSTALLATION SITE

Address		
Zip Code		City

Warranty claims with included Warranty Card and the retail sale receipt must be filled with the dealer.

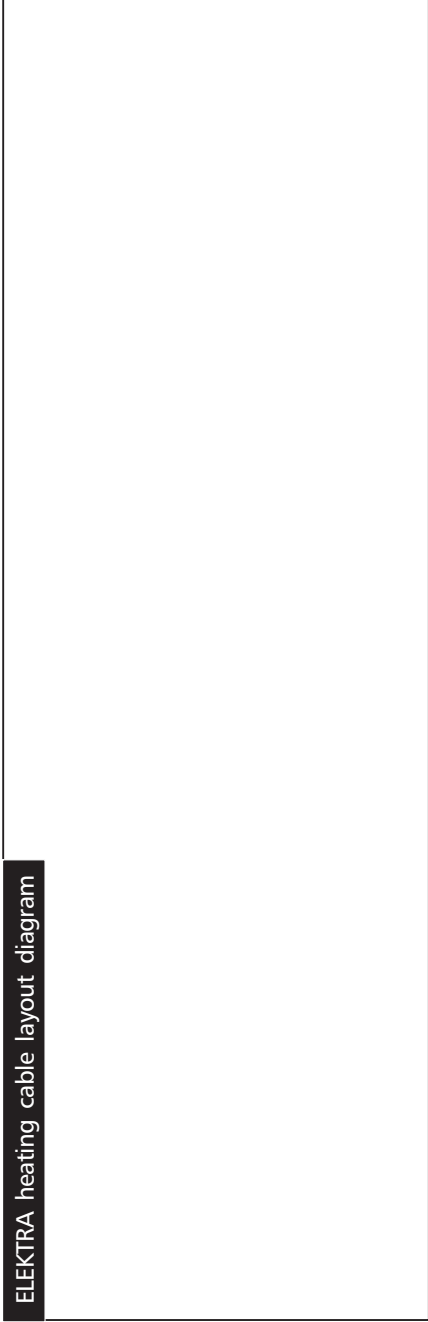
## TO BE FILLED BY INSTALLER

Name			Electrician's Co. name and licence #:	
Address			e-mail	
Zip Code		City	phone #	fax #

**Note** Installer **has to** provide as-built documentation to the user.



**ELEKTRA heating cable layout diagram**



**Note** The layout diagram **must** include distances between the heating cable and walls and fixed furniture with a clearly marked position of the temperature sensor and of heating cables.

**Note** Please keep the photos of the heating cables' layout for future reference.



Square footage of the heated area	
Heating cable model	
<b>Heating wire and insulation's resistance</b>	
Before you start the installation	$\Omega$
	$M\Omega$
After securing the heating cable to the subfloor	$\Omega$
	$M\Omega$
When the floor is completed, before system connected and powered up	$\Omega$
	$M\Omega$

Date	
Installer's legible signature	

## Caution



The measurement results of the heating core's resistance should not vary from the one given on the nameplate with more than -5% and +10%. Resistance of the heating wire insulation **should** be at least 50  $M\Omega$  when measured with a megohmmeter (Insulation Resistance Tester) with a rated voltage of 1000V.

**NOTE!**

Place the self-adhesive product nameplates attached to the product here (must be carried out prior to installing the heating system)

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## The Heating Cables – Complete Product Listing

### 120V

ELEKTRA 110-120V model	Length		Coverage	Amps	Power
	m	ft	ft <sup>2</sup>	A	W
DM 10/70 120V	7.0	23.0	5-8	0.6	70
DM 10/120 120V	12.0	37.5	6-9	1.0	120
DM 10/150 120V	14.5	47.5	8-13	1.3	150
DM 10/210 120V	21.0	69.0	15-23	1.8	210
DM 10/235 120V	23.5	77.0	17-26	2.0	235
DM 10/290 120V	29.0	95.0	21-32	2.4	290
DM 10/360 120V	36.5	120.0	26-40	3.0	360
DM 10/410 120V	40.5	133.0	29-46	3.4	410
DM 10/450 120V	45.5	149.0	32-50	3.8	450
DM 10/510 120V	51.5	169.0	36-57	4.3	510
DM 10/570 120V	57.5	188.5	41-63	4.8	570
DM 10/690 120V	69.0	226.5	49-77	5.8	690
DM 10/860 120V	85.5	280.5	61-96	7.2	860
DM 10/1070 120V	108.0	354.5	76-119	8.9	1070

### 240V

ELEKTRA 208-240V model	Length		Coverage	Amps	Power
	m	ft	ft <sup>2</sup>	A	W
DM 10/150 240V	15.5	51.0	11-17	0.7	150
DM 10/230 240V	23.5	77.0	16-26	1.0	230
DM 10/295 240V	30.0	98.5	21-33	1.2	295
DM 10/330 240V	33.5	110.0	24-37	1.4	330
DM 10/420 240V	41.5	136.0	30-47	1.8	420
DM 10/470 240V	47.0	154.0	34-52	2.0	470
DM 10/575 240V	58.0	190.0	41-64	2.4	575
DM 10/725 240V	72.5	238.0	52-81	3.0	725
DM 10/815 240V	81.5	267.5	58-91	3.4	815
DM 10/910 240V	90.0	295.0	65-101	3.8	910
DM 10/1020 240V	102.5	336.0	73-113	4.3	1020
DM 10/1140 240V	114.5	376.0	81-127	4.8	1140
DM 10/1380 240V	137.5	451.0	99-153	5.8	1380
DM 10/1720 240V	171.0	561.0	123-191	7.2	1720
DM 10/2140 240V	215.0	705.5	153-238	9.0	2140



