



# radiant floor heating



Floor Heating Mats



Floor Heating Cables



Thermostats

**S**OLUTIONS  
FOR EVERYONE

# Radiant floor heating: A modern comfort solution

Floor heating's vertical temperature distribution is the closest form of heating to physiological body temperature distribution.

Floor heating is a low temperature heating solution (floors will reach temperature levels of approx. 79°F (26°C)) and the entire floor constitutes the heating element.

The advantages of these characteristics are as follows:

- no combustion and dust convection which causes allergies
- no draughts
- no drastic temperature differences in rooms
- no dry air



Due to their advantages, floor heating systems are especially recommended for allergy sufferers

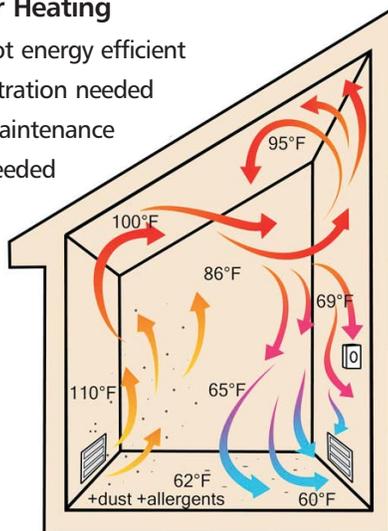


## Floor heating means:

- indoor climate comfort for users
- interior designs are not compromised by bulky heaters, boilers, chimneys, and water or gas pipes
- low capital costs
- decentralized heating – regulation and control of individual rooms possible.

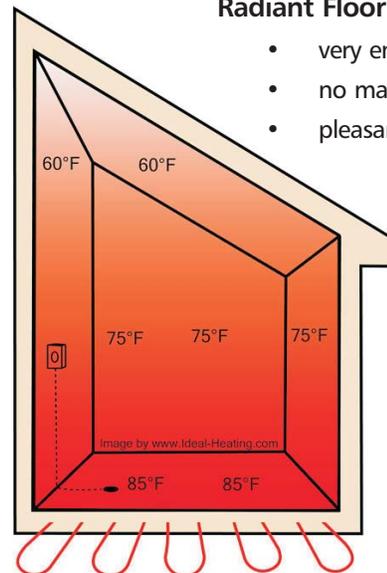
## Forced Air Heating

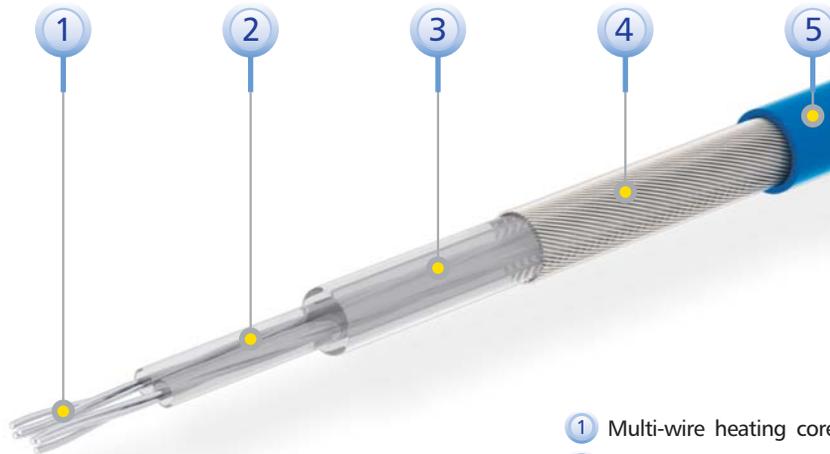
- not energy efficient
- filtration needed
- maintenance needed



## Radiant Floor Heat

- very energy efficient
- no maintenance
- pleasant





**ELEKTRA MD heating mat's heating cable structure**

- ① Multi-wire heating core
- ② PVDF first insulation layer
- ③ XLPE second insulation layer
- ④ Tinned copper braiding for safety grounding
- ⑤ XLPE outer sheath

The efficiency of radiant floor heating will depend upon the floor thermal insulation's thickness. This variable is especially significant for ground floors or floors positioned above unheated rooms.

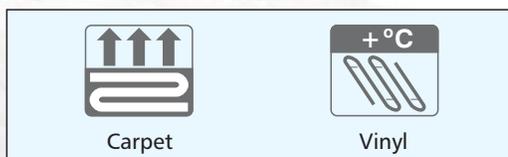
Approved finishing materials for heated floors are as follows:

- floor tiles such as marble, ceramic, porcelain or terracotta
- fitted carpet (of max. thickness 0.6" (15 mm) including underlay)
- PVC / Vinyl flooring
- thin floor-glued wood parquet
- laminate / engineered wood

Each of the above materials (with the exception of floor tiles) must be approved by their producers for applications with floor heating and must be installed according to the producers' instructions.

 **Floor heating system can be developed on the basis of:**

1. **ELEKTRA MD heating mats**
  2. **ELEKTRA DM heating cables**
- Both solutions can be placed in the layer of flexible adhesive or self-levelling compound laid directly under the finished floor on the floor base (concrete or timber).



Markings on approved floorings



ELEKTRA MD heating mats and ELEKTRA DM heating cables are normally used as supplementary heating systems, in order to achieve the warm floor. They can, however, constitute as a primary heating system.



ELEKTRA heating mat in a layer of flexible adhesive or self-levelling compound, directly under the floor

## Warm Floor

### A heating system placed in a layer of flexible adhesive or self-levelling compound, directly under the floor

To achieve the warm floor, the following heat output options are recommended:

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

For a shorter warm-up time, it is recommended to install approx. 50% higher heat output per 1 ft<sup>2</sup> of the floor (only for tiles or stone floorings),

when the heating system is not intended for permanent operation (e.g. in hotel rooms or offices) and in situations when thermostats with temperatures set-back option will be used for heating regulation purposes.

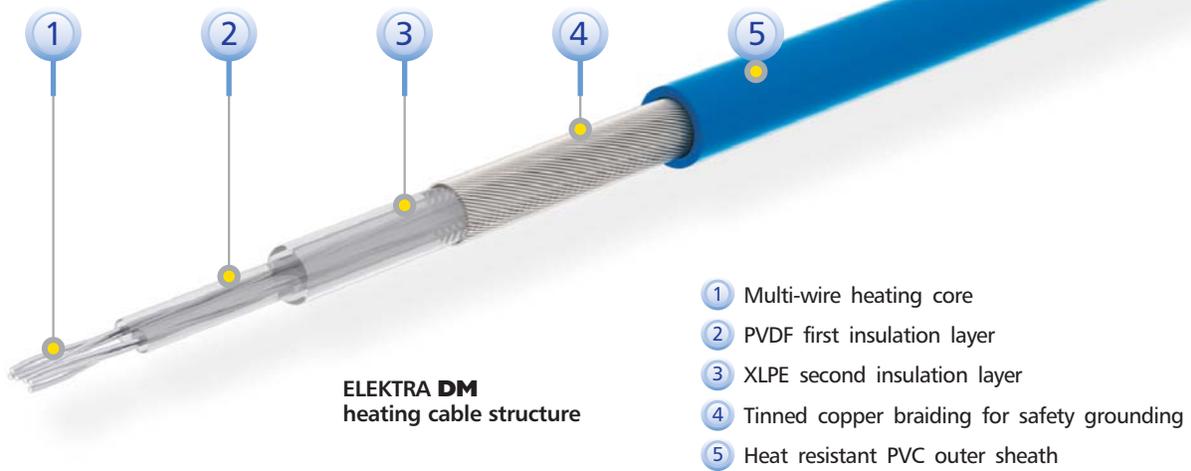
For the cases above, the following can be used:

- ELEKTRA MD heating mats
- ELEKTRA DM heating cables

The heating mats' structure is a thin heating cable fastened to a 19.7 " (50 cm)-wide fiberglass mesh. The mats are easier to install than cables: the self-adhesive properties facilitate floor fastening of the mats, while the DM cable must be attached to the floor.

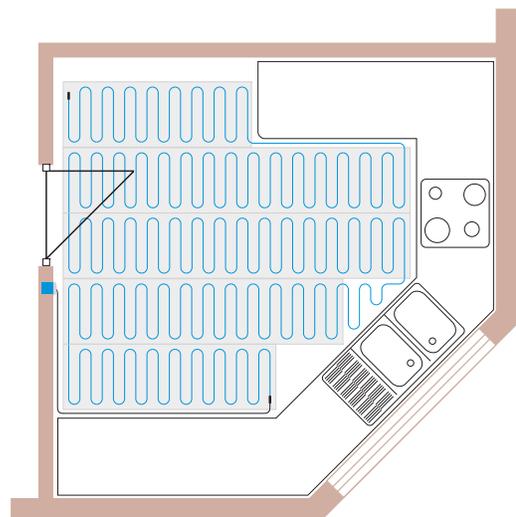
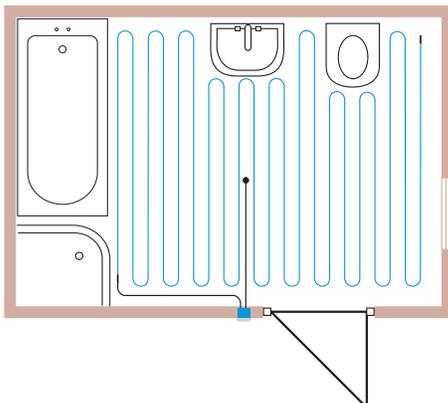
# Reliable, high-tech energy efficient product in safe, inconspicuous compact form

Because heating cables cannot be cut or spliced see here how they are constructed.



## Heating cables are easier to fit onto irregularly shaped areas

The entire mat or cable has to be used up in the available flooring with minimum separation. It must be installed under 'walking' / 'open' area (not covered by vanities, showers, toilets).



# Primary Heating

Primary heating (only heat source) requires having your heating system and its controls planned by a qualified designer, dealer, or installer.



## ELEKTRA MD heating mats

Single side supplied **ELEKTRA MD** mats, approx. 0.15" (3.9 mm) thick, terminated at one side with a power supply conductor and a connecting joint at the other.

**ELEKTRA MD** mats are simple to install, featuring only one power supply conductor. Due to insignificant thickness, the mats are best suited for areas where floor levels should not become excessively elevated.

Heating mat's heat outputs:

- 9 W/ft<sup>2</sup> (100 W/m<sup>2</sup>)
- 14 W/ft<sup>2</sup> (160 W/m<sup>2</sup>)

14 W/ft<sup>2</sup> (160 W/m<sup>2</sup>) heat output heating mats are especially suited for installation under ceramic and stone floorings.

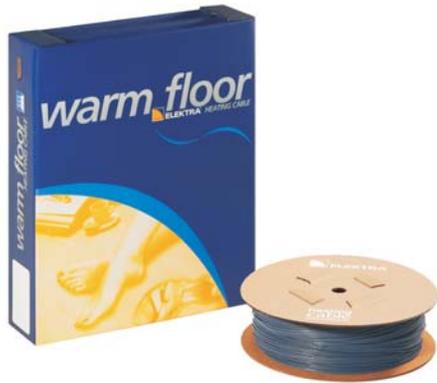
9 W/ft<sup>2</sup> (100 W/m<sup>2</sup>) heat output heating mats can be installed under any flooring type.

Product type	Place of installation	Stage on which the heating system will be constructed	Mat or cable's thickness in. [mm]
<b>MD heating mats</b>	directly under the floor, in the layer of flexible adhesive or self-levelling compound	new construction or remodeling	~ 0.15 [3.9]
<b>DM heating cables</b>			~ 0.17 [4.3]



### ELEKTRA DM heating cables

Heat output 3 W/ft (10 W/m). Terminated at one side with 8.2 ft (2.5 m). Thickness approx. 0.17" (4.3 mm).



### ELEKTRA MD heating mats

Heat output 9 W/ft<sup>2</sup> (100 W/m<sup>2</sup>) (can be installed under any type of floor) or 14 W/ft<sup>2</sup> (160 W/m<sup>2</sup>) (only under stone or ceramic floor tiles).

ELEKTRA MD heating mats are provided at one side with a 13 ft (4.0 m) long power supply conductor and a joint at the other.



ELEKTRA DM heating cables and ELEKTRA MD heating mats are used both as a supplementary floor heating system (with a warm floor) and as a primary heating system.

## Heating Mat and Cable Selection

### ELEKTRA MD heating mats

When selecting the proper dimensions of one or several (if room size requires it) heating mats (the 19.7" (50 cm) -wide width is always constant), it is necessary to adequately plan the layout; on the entire floor or its fragments only.

Mats **cannot** be placed where fixed furnishings are planned (floor-based cupboards, bathtubs, toilets etc.). Mats will be properly shaped by trimming the mesh and turning in the required direction.

Use the tables below to select the product of the length corresponding to the layout requirements.

**Note: Heating mats cannot be shortened.**

### ELEKTRA DM heating cables

For the correct selection of the heating cable, calculate its heat output as follows:

$$\text{Cable's Heating Output} = P \times S,$$

where:

- P: assumed heat output per 1 m<sup>2</sup> of the floor,
- S: floor area to be heated, free of fixed furnishings.

Then, use the product table to select the cable which features the heat output closest to the calculated one.

# Choosing Your Product

## ELEKTRA MD Heating Mats

### 120V 9 W/sq.ft (100 W/m<sup>2</sup>)

Model	Dimensions		Coverage		Amps	Power*
	ft. x ft.	m x m	sq. ft	m <sup>2</sup>	Amps	Watts
MD 100/1.0 120V	1.6 x 6.5	0.5 x 2.0	11.0	1.0	0.8	100
MD 100/1.5 120V	1.6 x 10	0.5 x 3.0	16.0	1.5	1.2	150
MD 100/2.0 120V	1.6 x 13	0.5 x 4.0	21.5	2.0	1.7	200
MD 100/2.5 120V	1.6 x 16.5	0.5 x 5.0	27.0	2.5	2.1	250
MD 100/3.0 120V	1.6 x 20	0.5 x 6.0	32.0	3.0	2.5	300
MD 100/3.5 120V	1.6 x 23	0.5 x 7.0	37.5	3.5	2.9	350
MD 100/4.0 120V	1.6 x 26	0.5 x 8.0	43.0	4.0	3.3	400
MD 100/4.5 120V	1.6 x 29.5	0.5 x 9.0	48.5	4.5	3.7	450
MD 100/5.0 120V	1.6 x 33	0.5 x 10.0	54.0	5.0	4.2	500
MD 100/6.0 120V	1.6 x 39.5	0.5 x 12.0	64.5	6.0	5.0	600
MD 100/8.0 120V	1.6 x 52.5	0.5 x 16.0	86.0	8.0	6.7	800
MD 100/9.0 120V	1.6 x 59	0.5 x 18.0	97.0	9.0	7.5	900
MD 100/10.0 120V	1.6 x 65.5	0.5 x 20.0	107.5	10.0	8.3	1000

### 240V 9 W/sq.ft (100 W/m<sup>2</sup>)

Model	Dimensions		Coverage		Amps	Power*
	ft. x ft.	m x m	sq. ft	m <sup>2</sup>	Amps	Watts
MD 100/1.5 240V	1.6 x 10	0.5 x 3.0	16.0	1.5	0.6	150
MD 100/2.0 240V	1.6 x 13	0.5 x 4.0	21.5	2.0	0.8	200
MD 100/2.5 240V	1.6 x 16.5	0.5 x 5.0	27.0	2.5	1.0	250
MD 100/3.0 240V	1.6 x 20	0.5 x 6.0	32.0	3.0	1.2	300
MD 100/3.5 240V	1.6 x 23	0.5 x 7.0	37.5	3.5	1.5	350
MD 100/4.0 240V	1.6 x 26	0.5 x 8.0	43.0	4.0	1.7	400
MD 100/5.0 240V	1.6 x 33	0.5 x 10.0	54.0	5.0	2.1	500
MD 100/6.0 240V	1.6 x 40	0.5 x 12.0	64.5	6.0	2.5	600
MD 100/8.0 240V	1.6 x 52	0.5 x 16.0	86.0	8.0	3.3	800
MD 100/10.0 240V	1.6 x 66	0.5 x 20.0	107.5	10.0	4.2	1000
MD 100/12.0 240V	1.6 x 80	0.5 x 24.0	129.0	12.0	5.0	1200

### 120V 14 W/sq.ft (160W/m<sup>2</sup>)

Model	Dimensions		Coverage		Amps	Power*
	ft. x ft.	m x m	sq. ft	m <sup>2</sup>	Amps	Watts
MD 160/1.0 120V	1.6 x 6.5	0.5 x 2.0	11.0	1.0	1.3	160
MD 160/1.5 120V	1.6 x 10	0.5 x 3.0	16.0	1.5	2.0	240
MD 160/2.0 120V	1.6 x 13	0.5 x 4.0	21.5	2.0	2.7	320
MD 160/2.5 120V	1.6 x 16.5	0.5 x 5.0	27.0	2.5	3.3	400
MD 160/3.0 120V	1.6 x 20	0.5 x 6.0	32.5	3.0	4.0	480
MD 160/3.5 120V	1.6 x 23	0.5 x 7.0	37.5	3.5	4.7	560
MD 160/4.0 120V	1.6 x 26	0.5 x 8.0	43.0	4.0	5.3	640
MD 160/4.5 120V	1.6 x 29.5	0.5 x 9.0	48.5	4.5	6.0	720
MD 160/5.0 120V	1.6 x 33	0.5 x 10.0	54.0	5.0	6.7	800
MD 160/6.0 120V	1.6 x 40	0.5 x 12.0	64.5	6.0	8.0	960
MD 160/7.0 120V	1.6 x 46	0.5 x 14.0	75.5	7.0	9.3	1120
MD 160/8.0 120V	1.6 x 52.5	0.5 x 16.0	86.0	8.0	10.7	1280

### 240V 14 W/sq.ft (160 W/m<sup>2</sup>)

Model	Dimensions		Coverage		Amps	Power*
	ft. x ft.	m x m	sq. ft	m <sup>2</sup>	Amps	Watts
MD 160/1.0 240V	1.6 x 6.5	0.5 x 2.0	11.0	1.0	0.7	160
MD 160/1.5 240V	1.6 x 10	0.5 x 3.0	16.0	1.5	1.0	240
MD 160/2.0 240V	1.6 x 13	0.5 x 4.0	21.5	2.0	1.3	320
MD 160/2.5 240V	1.6 x 16.5	0.5 x 5.0	27.0	2.5	1.7	400
MD 160/3.0 240V	1.6 x 20	0.5 x 6.0	32.0	3.0	2.0	480
MD 160/3.5 240V	1.6 x 23	0.5 x 7.0	37.5	3.5	2.3	560
MD 160/4.0 240V	1.6 x 26	0.5 x 8.0	43.0	4.0	2.7	640
MD 160/4.5 240V	1.6 x 29.5	0.5 x 9.0	48.5	4.5	3.0	720
MD 160/5.0 240V	1.6 x 33	0.5 x 10.0	54.0	5.0	3.3	800
MD 160/6.0 240V	1.6 x 39.5	0.5 x 12.0	65.0	6.0	4.0	960
MD 160/7.0 240V	1.6 x 46	0.5 x 14.0	75.0	7.0	4.7	1120
MD 160/8.0 240V	1.6 x 52	0.5 x 16.0	86.0	8.0	5.3	1280
MD 160/10.0 240V	1.6 x 66	0.5 x 20.0	107.5	10.0	6.7	1600

## ELEKTRA DM Heating Cables

### 120V 3 W/ft (10 W/m)

Model	Length		Coverage	Amps	Power
	m	ft	sq. ft	Amps	Watts
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 3 W/ft (10 W/m)

Model	Length		Coverage	Amps	Power
	m	ft	sq. ft	Amps	Watts
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

All ELEKTRA MD mats and DM cables are rated ZERO EMF.

# ELEKTRA Heating Cables vs. Heating Mats: Which One is Better?

Problem to solve	DM heating cables	MD heating mats	Notes
Not very square floor plan with many angles and corners	Likely easier to install	Maybe harder to install (more cutting)	Experienced installer can use either product
Simple floor plan	Slower to install for the sole installer	Quicker to install	MD mats are self-adhering and stay really flat
Cost of material	Inexpensive	More expensive	Cables are cheaper to buy and usually take more time to install. Mats are more expensive to buy and often twice as fast or better to install
Part of the floor is over unheated garage and often colder and part over heated living quarters and usually warmer	Can easily vary heating output Watts/sq.ft. by using somewhat different spacing	Mats have fixed output 9 W/sq.ft (100 W/m <sup>2</sup> ) or 14 W/sq.ft. (160 W/m <sup>2</sup> )	Properly insulating the subfloor is the key to energy efficiency. Subfloor can be insulated from underneath or on top
First time installer	Cable spacing need to be calculated and maintained during installation	Mats are generally easier and quicker to install	Both products require planning, floor preparation, electrical preparation and installer's training as well as identical testing of proper spacing and resistance and insulation resistance
Approx. 210-220 sq.ft. (19.5-20.4 m <sup>2</sup> ) of open floor plan to cover for floor warming	Can use just one large DM cable like DM10/2140/240V	Need two MD mats to make up 210-220 sq.ft. (19.5-20.4 m <sup>2</sup> ) as the largest single mat like MD100/12/240V covers less than 130 sq.ft. (12 m <sup>2</sup> )	More than one product can be connected to and controlled by one thermostat as long as the Voltage of both is the same and Amps load less than 15A. Furthermore mats and cables can be combined in the same room
Not sure about the exact size of the bathroom floor to be heated at the distant job location and no easy way to find out without in person visit prior to actual installation	Every heating cable can be used for the range of floor sizes. Installer can have several different cables and able to do almost any average size bathroom without the need to come back with different model (size) of the cable	Mats are size specific so several or more different models (sizes) need to be taken to the job site of not precisely known size	E.g. DM10/570/120V cable can be used on any floor plan from approx.. 41-63 sq.ft. (3.8-5.8 m <sup>2</sup> ) but MD100/5.0/120V 54 sq.ft. (5 m <sup>2</sup> ) mat will not fit into a 43 sq.ft. (4 m <sup>2</sup> ) floorplan. An MD100/4.0/120V is needed instead

Above are sample installation issues used to illustrate the differences between heating cables and mats. There could be many more differences and issues depending on the skill level of the installer and product salesman.

# Floor Heating System's Control

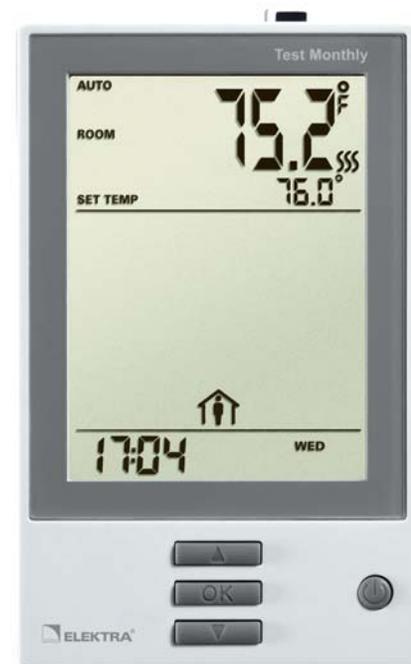
**Each heated room should be controlled with a separate thermostat for regulation of the heating circuit.**

Heating mats or cables will be connected to domestic electric circuit through a thermostat which will ensure maintaining the required floor or air temperature.

In case the warm floor is required, thermostats will be recommended equipped with floor temperature sensors which enable maintaining the desired floor temperature.

For floor heating systems intended as primary heating, the most important issue for the users will be achieving the optimal room temperature. For these applications, temperature thermostats with built-in air sensors and limiting floor sensors will be recommended.

**Properly selected thermostats will save as much as 30% of energy consumption.**



**ELEKTRA UDG  
programmable thermostat**

## Types of thermostats:

- manual thermostats for maintaining steady temperature levels
- programmable thermostats featuring options for programming temperature levels in daily and weekly cycles

Thermostats can control heating circuits consisting of one or more heating mats (or cables), of total heat output of 1800 W (120 V) or 3600 W (240 V).

For outputs exceeding max. permissible thermostat's terminal loads ((1800 W (120 V) or 3600 W (240 V)), heating circuits should be equipped with a contactor.






### ELEKTRA UTN Manual Thermostat

**ELEKTRA UTN thermostat** is equipped with a floor temperature sensor with 10 ft (3 m) cable. The heat output is switched on and off with an accuracy of only 0.7°F (0.4°C).

The thermostat can be configured for control of floor temperature and regulator without sensor. It is compatible with existing floor sensors by means of a temperature setting, making it appropriate thermostat for renovation purposes. The thermostats set-point can be adjusted, matching the actual floor temperature. This ensures a 100% actual measurement and control of radiant floor heating systems.

The thermostat controls floor temperature from +41°F to +104°F (from +5°C to +40°C). The scale can be adjusted if required within this temperature range. Built-in GFCI.




### ELEKTRA UDG Programmable Thermostat

**ELEKTRA UDG is an “all-in-one” thermostat:** a single thermostat for all applications (room, floor, room with floor limitation and regulator). It can be configured for control of floor temperature, room temperature, or room temperature with limit switch, and regulator without sensor. It is compatible with existing floor sensors by means of a temperature setting, making it appropriate thermostat for renovation purposes.

It is pre-programmed for quick set-up and there is no need for a manual. The heat output is switched on and off with a difference of only 0.7°F (0.4°C). The thermostat is equipped with factory-set 4-event program for automatic comfort and set-back temperatures. The factory-set periods or/and temperatures can be changed. The room temperature can be changed for a single event. Built-in GFCI.




### ELEKTRA USG Relay Contactor

**ELEKTRA USG** is a power module with built-in Class A GFCI. It is used in large application: the UTN and UDG thermostats can be extended with additional USG power modules. Output can thus be increased by 15 A per module.

# During and After Installation



Installation  
video

Made in EU



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