

*ELEKTRA SnowTec<sup>®</sup>*  
***Heating  
Mats***



- SnowTec<sup>®</sup>
- SnowTec<sup>®</sup> 400 V
- SnowTec<sup>®</sup><sub>Tuff</sub>
- SnowTec<sup>®</sup><sub>Tuff</sub> 400V



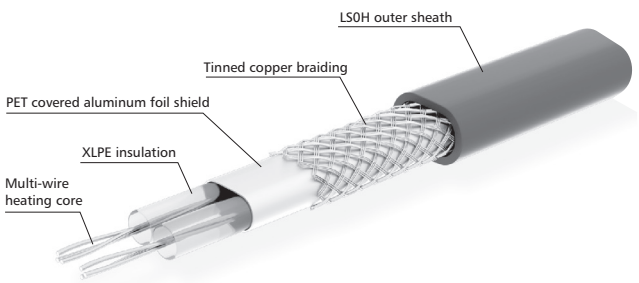
## Applications

ELEKTRA SnowTec® heating mats are intended for prevention of snow and ice deposition on:

- driveways, roads, parking spaces and terraces,
- viaducts, bridges, loading ramps.

The installation of the heating mats depends on the type of surface:

- in a layer of sand or dry concrete – for the flagstones, paving cobbles or asphalt surfaces,
- directly in concrete – for the concrete slabs or reinforced concrete surfaces.



ELEKTRA SnowTec® heating mat's cable structure

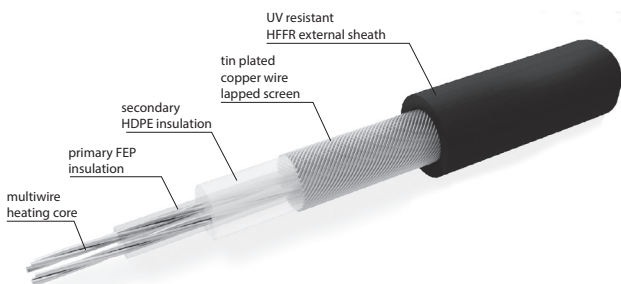
# Heating Mats

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ELEKTRA SnowTec<sup>®</sup><sub>Tuff</sub> heating mats can be installed:

- directly in asphalt – the mat's cable is characterized by high thermal properties, as well as resistance against bituminous substances,
- directly in concrete – in concrete surfaces characterized by the increased risk of mechanical damage (e.g. in case when concrete consolidation machinery is utilized), as the mat's cable is characterized by high mechanical strength.



ELEKTRA SnowTec<sup>®</sup><sub>Tuff</sub> heating mat's cable structure

## Characteristics

Heating mats are manufactured as ready-made units, suitable for direct installation. Composed of single-side supplied heating cables.

Technical parameters:

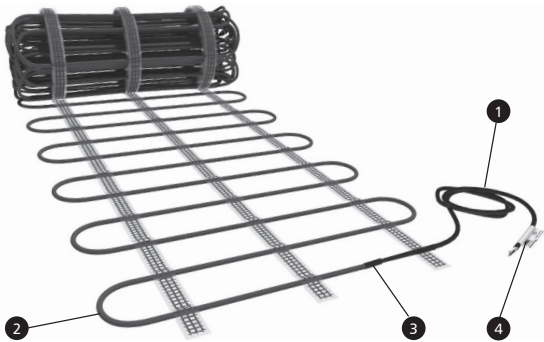
- Dimensions:  
Width 40 and 60 cm - ELEKTRA SnowTec<sup>®</sup> heating mats, 60 cm - ELEKTRA SnowTec<sup>®</sup><sub>Tuff</sub> heating mats

Length from 2 to 25 m for the ELEKTRA SnowTec® heating mats, from 1.5 – 27 m for the ELEKTRA SnowTec®<sub>Tuff</sub> heating mats

Thickness approx. 7.5 mm

Length of the power supply conductor (“cold tail”) 4 m

- Surface heat output
  - 300 W/m<sup>2</sup> for the ELEKTRA SnowTec® heating mats,
  - 400 W/m<sup>2</sup> for the ELEKTRA SnowTec®<sub>Tuff</sub> heating mats
- Power supply:
  - 230 V for the ELEKTRA SnowTec® and SnowTec®<sub>Tuff</sub> heating mats,
  - 400 V for the ELEKTRA SnowTec® 400V and SnowTec®<sub>Tuff</sub> 400V heating mats
- Min. installation temperature:
  - 5°C SnowTec®, -25°C SnowTec®<sub>Tuff</sub>
- Heating cables are screened, and their mains connection via a residual current device constitutes effective anti-shock protection.



- 1 “cold” power supply conductor
- 2 ELEKTRA VCD heating cable (SnowTec®) or ELEKTRA TuffTec™ heating cable (SnowTec®<sub>Tuff</sub>)
- 3 connecting joint between the power supply conductor and the heating cable
- 4 rating label

# Heating Mats

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## Note:



ELEKTRA SnowTec<sup>®</sup> and SnowTec<sup>®</sup><sub>Tuff</sub> heating mats are designed for the rated voltage 230 V, 50 Hz, and ELEKTRA SnowTec<sup>®</sup> 400V and SnowTec<sup>®</sup><sub>Tuff</sub> 400V heating mats – for the rated voltage 400 V, 50 Hz.

Heating mats' power output may vary with +5% and -10% from the label values.



Self-adhesive label

The label features the following pictograph:



Single-side powered heating mat

## Note:



Never cut the heating cable. Only the cable connecting tape can be cut, in order to shape the heating mat as desired.

Never trim the heating cable, only the power supply conductor may be trimmed if required.

Never squash the “cold tail”.

Do **not** ever undertake on your own any attempts to repair the heating cables, and in case any damage is detected, report the damage to an ELEKTRA authorized installer.

Never stretch or strain the mat excessively, nor hit it with sharp tools.

Do **not** install the heating mats when ambient temperature drops below -5°C (SnowTec<sup>®</sup>), -25°C (SnowTec<sup>®</sup><sub>Tuff</sub>).

The heating mat should **not** cross the expansion joints.

## Note:



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 - depending on the type of surface - within the layer of sand, dry concrete or directly in concrete.

Never bend the joint and end seal.

Heating mats **must** be installed in accordance with the instructions.

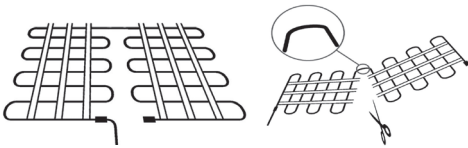
Mains connection of the heating mats **should** be performed by an authorized electrician.

Power supply conductors ("cold tails") in asphalt **should** be positioned in the protective metal installation conduit. Alternatively, power supply conductors can be led out of the area where asphalt will be poured out.

## General information

The length of the heating mat should match the dimensions of the surface to be heated.

The heating mat can be shaped as desired by cutting the fixing tape (do not cut the heating cable itself) and turning the mat in the required direction.



Applying insulation layer to the surfaces exposed to wind from below can improve the effectiveness of the heating.

To protect large areas against snow and ice deposition, one option is application of 400 V voltage heating mats, which would evenly load the electric supply. Application of such mats could also simplify installation works, limiting the required number of heating mats.

After the heating mats has been laid, secure the mat's cables to the surface to prevent from displacement and maintain steady cable spacing.

# Heating Mats

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## Controls

A properly selected control system will ensure adequate operation of the system only during snow and freezing rainfall. A temperature controller with a temperature and moisture sensor will automatically recognize the weather conditions. The heating system will be then kept on standby and only switched on when actually necessary. For this purpose, DIN-bus installed controllers ELEKTRA ETR2 and ETO2 can be utilised.

### Snow & ice protection controls



ELEKTRA ETR2G controller – max. load up to 16 A, total output of installed heating cables must not exceed 3600 W. As standard, equipped with one temperature and moisture sensor with installation tube.



ELEKTRA ETOG2 controller – max. load up to 3x16 A. For applications in extended heating systems. As standard, equipped with one temperature and moisture sensor and an installation tube. Additional temperature and moisture sensor can be connected to this controller, which will enable protection of two outdoor areas.





ELEKTRA SMCG controller – max. load up to 2x16 A.

For applications in extended heating systems.

Enables remote operation via a web browser and signaling of operating status or errors.

As standard, equipped with one temperature and moisture sensor and an installation tube. Additional temperature and moisture sensor can be connected to this controller, which will enable protection of two outdoor areas.

## Installation

### Stage 1: Heating mat's installation

The heating mat layout should be commenced from the side of the power supply, in such a way to enable easy reach to the electricity supply. If the cold tail needs to be extended, a heat shrink joint should be used, ensuring that the connection is safely sealed.

The heating mat can be laid:

- in the layer of sand constituting the base for the asphalt, flagstones or paving cobbles surfaces,
- directly in concrete,
- directly in asphalt (exclusively SnowTec®<sub>Tuff</sub>).

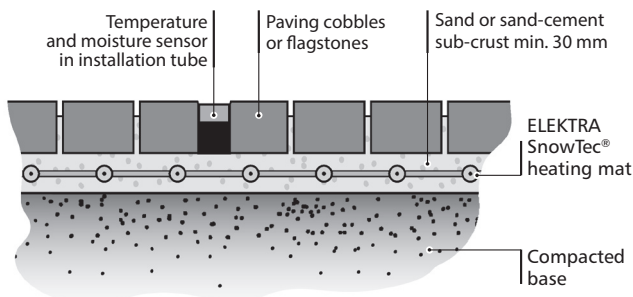
# Heating Mats

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## Flagstones, paving cobbles and asphalt surfaces

Stages of works:

- the hard concrete core base that is covered with a layer of sand or dry concrete of the min. 30 mm thickness (min. 50 mm for the asphalt surfaces), and then compacted,
- ELEKTRA SnowTec® heating mats are laid on the layer of the compacted sand or dry concrete,
- securing the heating mat's cables to the surface,
- the mats are completely covered with a layer of sand or dry concrete,

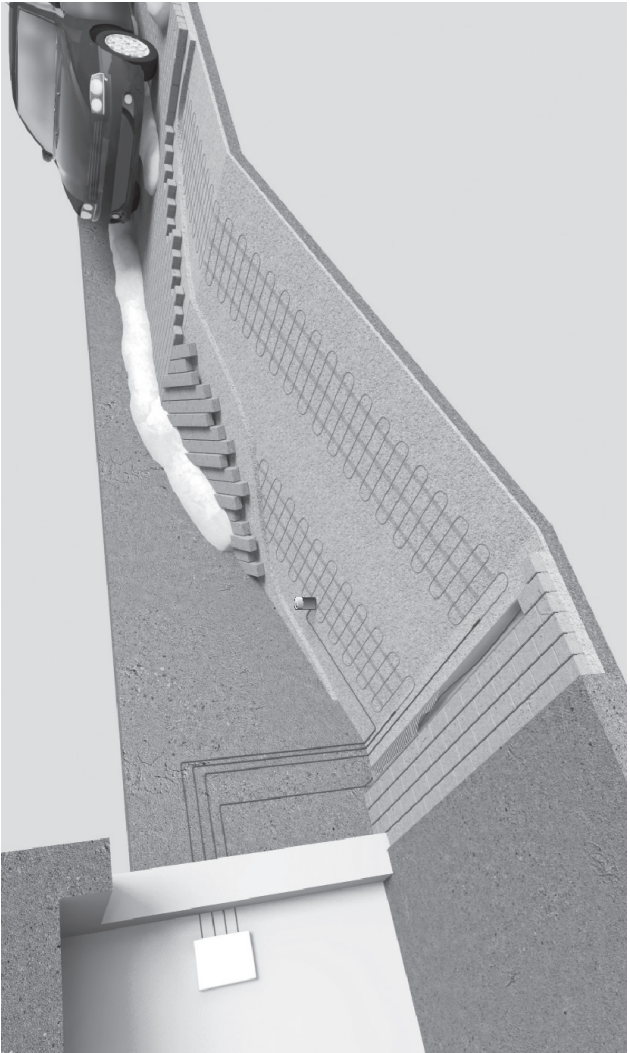


Cross section of pavement or driveway made from flagstones or paving cobbles

## Flagstones, paving cobbles and asphalt surfaces

Stages of works:

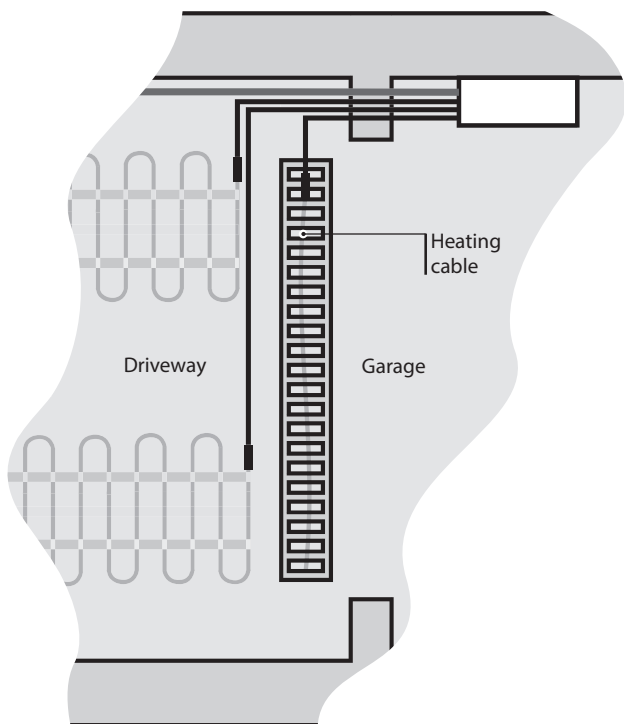
- the hard concrete core base that is covered with a layer of sand or dry concrete of the min. 30 mm thickness (min. 50 mm for the asphalt surfaces), and then compacted,



**Example of ELEKTRA SnowTec® heating mats as laid in the garage driveway made from paving cobbles**

# Heating Mats

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Linear drainage heating

It is also necessary to heat the floor drain (drainage) in order to ensure the outflow of water originating from snow melting. For this, use ELEKTRA SelfTec®PRO 33 self-regulating cable. Place the cable at the through bottom, enter the cable's end into the drainage down to 0.5 m – 1.0 m deep.

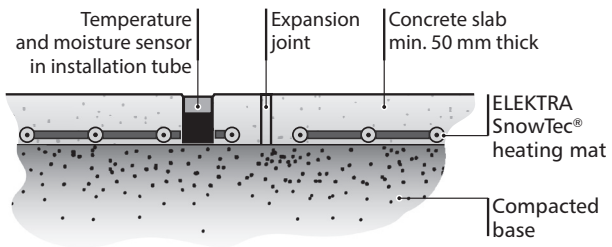
The heating circuit should be connected to the power source in the electric board of the driveway, so that it is switched on simultaneously with the remaining heating circuits.

- ELEKTRA SnowTec® heating mats are laid on the layer of the compacted sand or dry concrete,
- securing the heating mat's cables to the surface,
- the mats are completely covered with a layer of sand or dry concrete,
- the finishing surface works follow – stage 4.

When protecting garage driveways against snow and ice, it is not necessary to heat the entire surface, but only the tyre tracks. The temperature and moisture sensor should be placed within the heated area, but not directly in the tyre tracks under the car tyres' path – in order to avoid snow accumulation and unnecessary operation of the heating system.

## Concrete surfaces

Concrete surfaces require expansion joints. Unreinforced concrete slabs should be divided



**Cross section of pavement or driveway made of concrete slab**

# Heating Mats

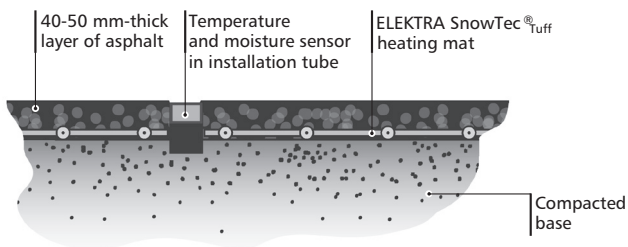
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## Asphalt surfaces

Stages of works:

- levelling the hardcore base,
- positioning the ELEKTRA SnowTec<sup>®</sup><sub>Tuff</sub> heating mat,
- power supply conductors (“cold tails”) in asphalt should be positioned in the protective metal installation conduit. Alternatively, power supply conductors can be led out of the area where asphalt will be poured out,
- securing the heating mat’s cables to the surface,
- manual laying out of the 40-50 mm thick asphalt layer – Stage 4,
- rolling the asphalt surface – Stage 4.



Cross section of a driveway or road with asphalt surface

## Stage 2: After the heating mat has been laid

At this stage, it is necessary to undertake the following steps:

- stick into the Warranty Card the self-adhesive label, positioned on the power supply conductor of the heating mat,
- in the Warranty Card, prepare a sketch of the heating mat's layout positioning,
- feed the power supply conductor of the heating mat into the switchboard,
- in case of planned delay in connection of the heating cable to the electrical installation, seal the power supply cable of the heating cable against the possibility of internal moisture penetration, using a protective cap placed on the conduit or a heat shrinkable end cap.
- perform the measurements of:
  - heating wire resistance,
  - insulation resistance.

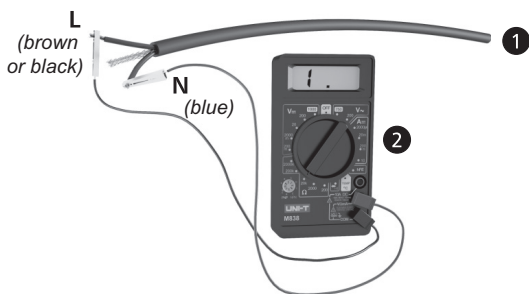
The measurement results of the heating core's resistance should not vary from the one given on the label with more than -5% and +10%.

The insulation's resistance for the mat's heating cable, as measured with a tool of the rated voltage 1000 V (e.g. megaohmmeter) for at least 30 seconds, should not be below 50 MΩ. Enter the results into the Warranty Card.

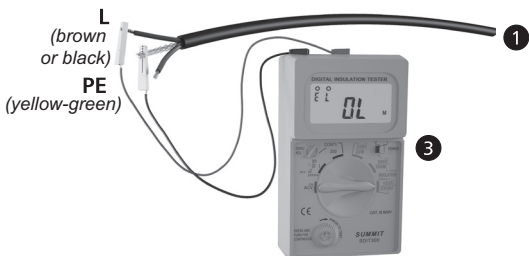
When the surface has been finished, repeat the measurements and compare the results to ensure that the mat has not been damaged while surface installation works.

# Heating Mats

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Heating wire's resistance measurement



Insulation resistance measurement

- 1 Power supply conductors
- 2 Ohmmeter
- 3 Megaohmmeter



## Stage 3: Temperature and moisture sensor's installation preparation

- Establish the optimal positioning for the temperature and moisture sensor – a place which would be especially vulnerable to prolonged low temperatures and increased moisture deposition (e.g. in a shade or exposed to wind).

### Note:



Fill the spot selected for the sensor's installation with material to be removed after concrete or asphalt has been cured (e.g. a wooden block of 100 x 100 mm and the height equal to the planned thickness of the finished surface).

- Feed the protective conduit with the so called "draw wire" from the planned sensor's positioning to the switchboard (after the surface has been completed, the protective conduit will enable feeding the temperature and moisture sensor's wire).

### Note:



The protective conduit should be run in such a way to enable the future exchange of the temperature and moisture sensor, if required.

In case of a significant sensor's distance from the switchboard, or bending of the protective conduit, it is necessary to:

- install an additional sealed electric box "on the way" to the board, or
- install the protective conduit with a twisted pair screened control cable, min. 3-pair (e.g. LIYCY-P 3x2x1.5)
  - the sensor's wire with the control cable is to be connected with a heat shrink connecting joint.

## Note:



The section of the protective conduit to be laid in asphalt should be made of a metal pipe, due to high temperatures present while asphaltting.

## Stage 4: Finishing surface works

### Concrete and paving cobbles

During surface works, level the installation tube, so that it is located 5 mm below the surface level. Due to this, water will be able to accumulate on the temperature and moisture sensor installed in the tube.

### Asphalt

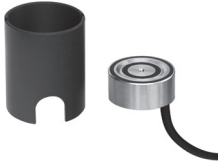
At the time of pouring and rolling the asphalt, the place selected for the positioning of the sensor should be filled with material which – after the asphalt has cooled down – will be removed (e.g. a wooden block 10x10x10 cm in size).

Then, after rolling and cooling down of asphalt have been completed, mount the installation tube. The space between the tube and asphalt should be filled with either concrete or asphalt poured cold, and the tube should be levelled so that it will be positioned 5 mm below the level of the surface.

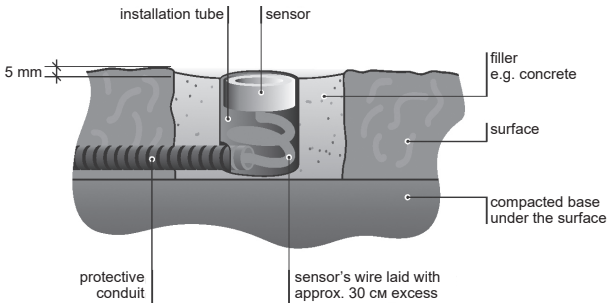
## Stage 5: Temperature and moisture sensor's installation

The temperature and moisture sensor should be mounted in an installation tube after the surface works have been completed.

Then feed the sensor's wire with the so called "draw wire" into the protective conduit installed before finishing works on the surface. Under the sensor, excess wire should be allowed (min. 300 mm) for the future sensor replacement, if required.



Ground temperature and moisture sensor ETOG-56T with installation tube (for soil, concrete flagstones, paving cobbles etc.) can be used for heating control of driveways, traffic routes, etc.



Example of temperature and moisture sensor's installation in the surface

## Stage 6: Temperature controller's installation

The heating mat connection to the domestic electric circuit should be performed by an authorised electrician.

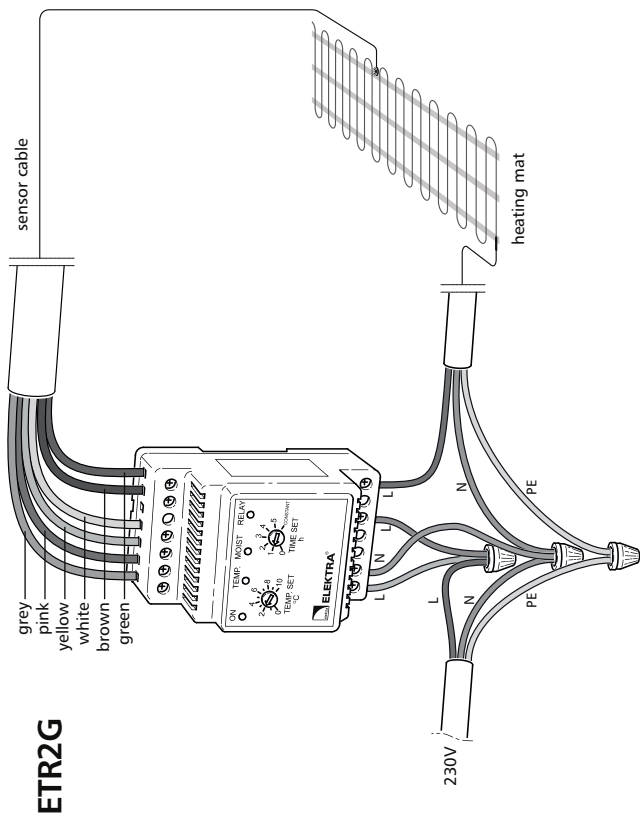
The connection of the:

1. mains,
2. power supply conductors of the heating mat,
3. temperature sensor,

should be executed according to the diagram included in the temperature controller's Instructions.

# Heating Mats

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**ETR2G**

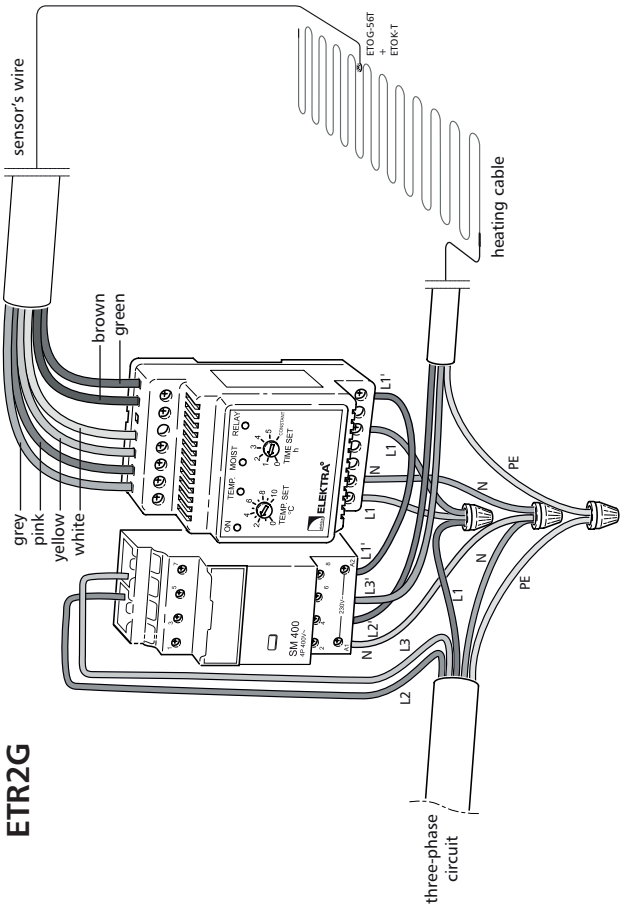
## Single-phase electric circuit

Connection diagram of

ELEKTRA SnowTec® and SnowTec®<sub>Tuff</sub> heating mats

with temperature and moisture sensor

and ELEKTRA ETR2G controller



## ETR2G

### Three-phase electric circuit

Connection diagram of

ELEKTRA SnowTec<sup>®</sup> 400V and SnowTec<sup>®</sup> Tuff 400V

heating mat with temperature

and moisture sensor and ELEKTRA ETR2G controller

# **Heating Mats**

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## **Anti-shock protection**

The electric circuit of the heating mat should be equipped with a residual current device of the sensitivity level  $\Delta \leq 30\text{mA}$ .

## **Warranty**

**ELEKTRA** company grants a 10 year-long warranty (from the date of purchase) for the **ELEKTRA SnowTec®** heating mats.

## Warranty Conditions

1. Warranty claims requires:
  - a. that the heating system has been executed in full accordance with the Installation Instructions herein, by a certified electrician,
  - b. presentation of the properly completed Warranty Card,
  - c. presentation of the proof of purchase of the heating mat under complaint.
2. The Warranty loses validity if any attempt at repair has been undertaken by an unauthorised installer.
3. The Warranty does not cover the damages inflicted as a result of:
  - a. mechanical fault,
  - b. incompatible power supply,
  - c. lack of adequate overload and differential protection measures,
  - d. discord of the domestic heating circuit with the current regulations in force.
4. Within the Warranty herein, ELEKTRA company undertakes to bear exclusively the costs required to cover the necessary repairs to the heating mat itself, or to exchange the mat.
5. The Warranty covering the purchased commercial goods does not exclude, limit or suspend other Buyer's rights resulting from the incompatibility of the goods purchased with the agreement of purchase.

### Note:



The Warranty claims must be registered with the Warranty Card and proof of purchase, in the place of purchase or the offices of ELEKTRA company.

The Warranty Card must be retained by the Client for the entire warranty period of 10 years. The Warranty period starts on the date of purchase.

# Heating Mats

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<b>PLACE OF INSTALLATION</b>	
Address	
Zip code	City / town

The Warranty claims must be registered with the Warranty Card and proof of purchase, in the place of purchase or the offices of ELEKTRA company.

<b>TO BE COMPLETED BY AN INSTALLER</b>	
Name and surname	Electrical authorisation certificate n°
Address	E-mail
Zip code	Phone n°:
	Fax



Heating wire and insulation's resistance	
after laying the heating mat, before the surface works commence	$\Omega$
	$M\Omega$
after the surface has been completed	$\Omega$
	$M\Omega$

Date	
Installer's signature	
Company's stamp	

**Note:** Heating core's resistance measurement result should not vary from the label with more than -5%, +10%.  
The heating wire insulation resistance, as measured with a megohmmeter of the rated voltage 1000 V for at least 30 seconds, should not drop below 50M $\Omega$ .



Heating mat's layout and power supply conduit connection to the switchboard – sketch

**Note:** The installer is obliged to provide the user with the post-realisation documentation.



## **NOTE!**

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