The ELEKTRA Heating Mats

- **Single-side power supply**
- **Double-side power supply**

Application

Heating mats may be used as the basic heating system or they may supplement an existing system. Frequently they are used in places where for structural reasons, the installation of "simple" heating cables (which can considerably elevate the floor level) would be inconvenient. In practice they may be installed everywhere as they are only 3mm thick. The effect of a "warm floor" is achieved in a very short time. It is the quickest, simplest and most effective way of heating or re-heating rooms - or just chosen areas - with the minimal amount of labour.

Advantages

Simple installation

- The heating mats are stuck directly to a correctly prepared floor with the use of tile adhesive.
- Assembly of the heating system is exceptionally simple and quick.

Comfort of use

- The temperature of the room is easily regulated by the adjustment of the temperature controller.
- The whole room has an even temperature.
- Low temperature of the heated surface (i.e. the floor).
- Warm dry floor in a short time.
- Absolutely unseen heating system.

Safety

- The entire length of the cable is screened and the screen is earthed.
- Proper connection of the mats through a differential switch eliminates any danger.

Low cost

- Exceptionally low cost of system's installation.
- Low operating costs - due to the precise temperature regulation.
- Selected surfaces are heated only when necessary.

Maintenance

- The problem does not exist

Characteristics

Elektra heating mats are produced in the form of finished sets that are prepared directly for easy installation. There are two types of heating mats, powered either on one or both sides. Single side powered mats, due to their construction, are easier to assemble and install. Double-side powered mats are thinner and during their installation it is important to remember to lead both cold tails into the power supply. The heating cable is attached to plastic netting. The end of the heating cable terminates with a 4 metre factory fitted cold tail (this is the section of the cable which does not heat and is used to connect the mat to the thermostat and then to the main electricity supply).

In large rooms it is possible to install two or more mats as necessary. In such cases it is important that the mats are connected in parallel to each other.

ATTENTION Before executing the parallel connection of two or more mats, all the cold cables must be lead to the installation cable boxes. It is absolutely unacceptable to make such connections and place them below the floor.

Selecting the correct power unit

Depending on the application and the type of a room we recommend the mats with the power unit amounting to 100 W/m^2 or 160 W/m^2.
The correct selection is specified in Table 1.

Table 1.

	KITCHEN / BATHROOM		OTHER ROOMS
	HEATING SURFACE < 3/4 OF THE TOTAL SURFACE	HEATING SURFACE > 3/4 OF THE TOTAL SURFACE	
Heating			
100W/m^2		●	●
160W/m^2	●		
Reheating			
100W/m^2	●	●	●

ATTENTION In case of any doubts please contact the technical department of our Company.

Technical data

DOUBLE-SIDE POWER SUPPLY

Table 2. 100 W/m^2

TYPE	DIMENSIONS	SURFACE	POWER	
-	m x m	m^2	W	
MG100/1,0	0,5 x **2,0**	1,00	100	
MG100/1,5	0,5 x **3,0**	1,50	150	
MG100/2,0	0,5 x **4,0**	2,00	200	
MG100/2,5	0,5 x **5,0**	2,50	250	
MG100/3,0	0,5 x **6,0**	3,00	300	
MG100/3,5	0,5 x **7,0**	3,50	350	
MG100/4,5	0,5 x **9,0**	4,50	450	
MG100/5,0	0,5 x **10,0**	5,00	500	
MG100/6,0	0,5 x **12,0**	6,00	600	
MG100/8,0	0,5 x **16,0**	8,00	800	
MG100/9,0	0,5 x **18,0**	9,00	900	
MG100/10,0	0,5 x **20,0**	10,00	1000	**new!**
MG100/12,0	0,5 x **24,0**	12,00	1200	**new!**

Table 3. 160 W/m^2

TYPE	DIMENSIONS	SURFACE	POWER	
-	m x m	m^2	W	
MG160/1,0	0,5 x **2,0**	1,00	160	
MG160/1,5	0,5 x **3,0**	1,50	240	
MG160/2,0	0,5 x **4,0**	2,00	320	
MG160/2,5	0,5 x **5,0**	2,50	400	
MG160/3,0	0,5 x **6,0**	3,00	480	
MG160/3,5	0,5 x **7,0**	3,50	560	
MG160/4,0	0,5 x **8,0**	4,00	640	
MG160/5,0	0,5 x **10,0**	5,00	800	
MG160/6,0	0,5 x **12,0**	6,00	960	
MG160/7,0	0,5 x **14,0**	7,00	1120	
MG160/8,0	0,5 x **16,0**	8,00	1280	**new!**
MG160/9,0	0,5 x **18,0**	9,00	1440	**new!**
MG160/10	0,5 x **20,0**	10,00	1600	**new!**

SINGLE-SIDE POWER SUPPLY

Table 4. 100 W/m^2

TYPE	DIMENSIONS	SURFACE	POWER	
-	m x m	m^2	W	
MD100/1,0	0,5 x **2,0**	1,00	100	
MD100/1,5	0,5 x **3,0**	1,50	150	
MD100/2,0	0,5 x **4,0**	2,00	200	
MD100/2,5	0,5 x **5,0**	2,50	250	
MD100/3,0	0,5 x **6,0**	3,00	300	
MD100/3,5	0,5 x **7,0**	3,50	350	
MD100/4,0	0,5 x **8,0**	4,00	400	
MD100/4,5	0,5 x **9,0**	4,50	450	
MD100/5,0	0,5 x **10,0**	5,00	500	
MD100/6,0	0,5 x **12,0**	6,00	600	
MD100/8,0	0,5 x **16,0**	8,00	800	**new!**
MD100/10,0	0,5 x **20,0**	10,00	1000	**new!**

Table 5. 160 W/m^2

TYPE	DIMENSIONS	SURFACE	POWER	
-	m x m	m^2	W	
MD160/1,0	0,5 x **2,0**	1,00	160	
MD160/1,5	0,5 x **3,0**	1,50	240	
MD160/2,0	0,5 x **4,0**	2,00	320	
MD160/2,5	0,5 x **5,0**	2,50	400	
MD160/3,0	0,5 x **6,0**	3,00	480	
MD160/3,5	0,5 x **7,0**	3,50	560	
MD160/4,0	0,5 x **8,0**	4,00	640	
MD160/4,5	0,5 x **9,0**	4,50	720	
MD160/5,0	0,5 x **10,0**	5,00	800	**new!**
MD160/6,0	0,5 x **12,0**	6,00	960	**new!**
MD160/7,0	0,5 x **14,0**	7,00	1120	**new!**
MD160/8,0	0,5 x **16,0**	8,00	1280	**new!**

ATTENTION Heating cables for the mats are adapted to the voltage rating amounting 230V/50 Hz.

Temperature control

The temperature controller is the indispensable element of any floor heating system, because it enables the heating cables to operate correctly. The selection of the correct temperature controller will optimise the effectiveness of the heating mats.

- If the heating mats are not the only heating source and are to be used to compliment an already existing heating system, then the temperature controller with the floor sensor would be the best choice. This would have the effect of providing a "warm floor" (for instance in the bathroom) and would keep the floor at a constant temperature.

- If the heating mats are the main heating source one of the temperature controllers which measure the air temperature would be the best selection, in particular:
  a) temperature controller with air temperature sensor
  b) temperature controller with air and floor temperature sensors
     (the unit controls the air temperature whilst the floor sensor protects the heating mats and the floor against overheating).

Elektra offer a range of temperature controllers from basic controllers (e.g. Elektra MICROLINE OTN, Elektra ELR 10) which monitor the constant temperature of the floor and/or air - through to the highly sophisticated electronic programmable controllers (e.g. Elektra MICROLINE OCC2, Elektra DIGI 2, Elektra EUROSTER) which can be programmed in a variety of ways.

Essential requirements for the installation of mats

The heating mats must be assembled according to the following instructions.

- The connection to the mains power supply must be carried out by a qualified electrician.
- The heating mats must not be either over tightened or stretched in any way.
- The heating cable must not be cut under any circumstances. Only the mesh to which the heating cable is fastened may be cut.
- The heating mats should not be installed where permanent furniture or fixtures are planned (e.g. bathtub, cupboards without stems etc).
- The mat should not cross any expansion gaps in the floor.
- A flexible tiling grout should be used to prevent the possibility of cracked tiles.

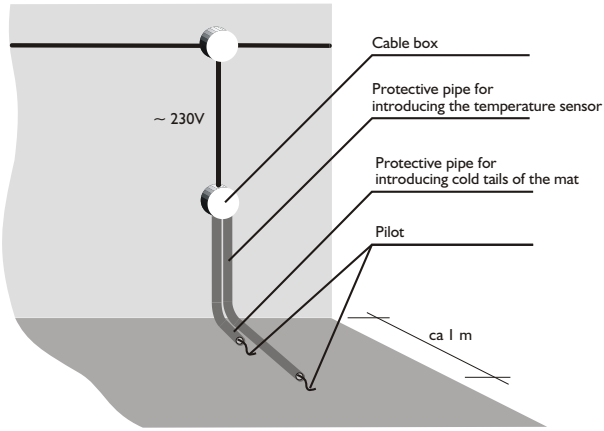
Preparatory work

The following should be completed during the electrical works phase:

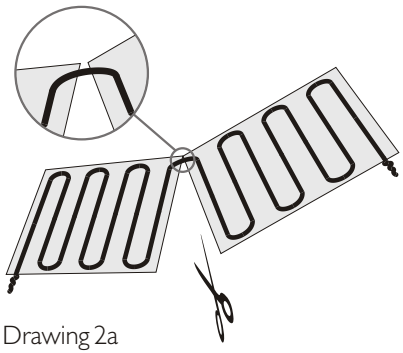
1) choose a location for the temperature controller
2) mount the electric cable box, where the temperature controller will be placed
3) lead the power supply cable into the box
4) lead two protective pipes out of the cable box, in which the following should be placed at the time of the installation of the heating mat:
   - floor sensor (optional)
   - cold tails of the mat (fig. 1)

ATTENTION The protective pipes located at the boundary between the wall and floor may not be bent at a right angle. The pilot (an elastic cable) located inside the pipes will allow for an easy introduction of the floor sensor and the cold tails of the mat (following plastering or the laying of tiles).

ATTENTION The temperature controller must be placed on the outer wall of the bathroom in order to protect it from moisture damage.



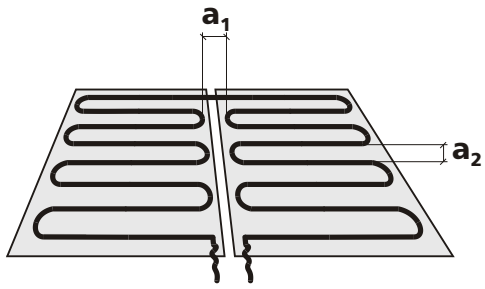
Rys. 1



Drawing 2a

The basis on which the heating mat will be laid down has to be cleaned, levelled and the old concrete surfaces have to be grounded. Before finally sticking the mat to the floor it should be laid out to see if it fits and to check that it works. If everything is alright then the mat can be stuck down. Depending on the planned surface that has to be heated, form the mat by cutting the mesh with scissors (drawing 2a). Do not damage the heating cable!

In the place of the mat's slit the cable has to be carefully straightened and the parts of a mat have to be arranged side by side in such a way so they do not overlap. Distance $a_2 \approx a_1$ (drawing 2b).



Drawing 2b Distance $a_2 \approx a_1$

Before sticking the heating mat to the floor surface, the floor temperature sensor must be installed. The sensor, which can be found at the end of a 4 metre long cable, should be placed inside a protective tube and this in turn should be laid in 10 mm groove which is cut out of the floor surface. (The purpose of the tube is to allow the replacement of the sensor in the unlikely event that it fails at a later date). The sensor cable should be led under the plaster work to the installation cable box where the temperature controller will be installed. The temperature sensor should be placed as close as possible to the centre of the floor.

ATTENTION Under no circumstances should the protective tube be bent at right angles (see drawing 4).

After laying the heating mat, the cold tail from this will also be led into the cable box, along with the sensor tail.

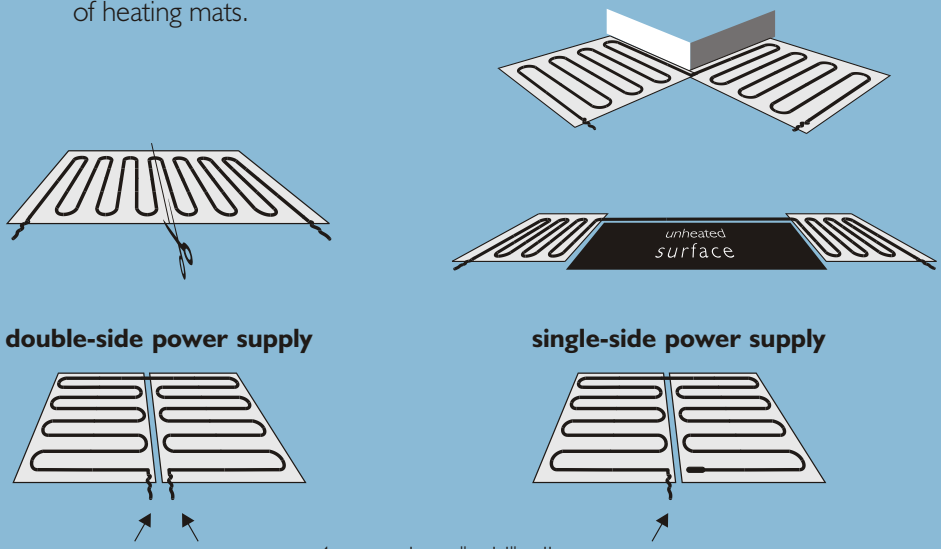
It is important to find the right location for the installation cable box for both aesthetic (the temperature controller is visible on the wall) as well as practical reasons.

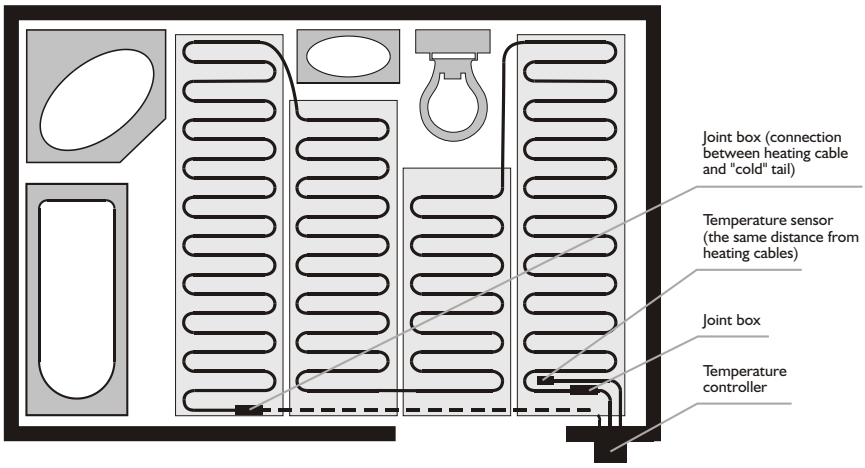
The temperature controller for the bathroom should be place outside of the room (i.e. in a convenient adjacent room). The reason for this is that the increased humidity might affect the proper functioning of the controller.

If the mats have been laid in such a way that any of tails (i.e. the cold power or the sensor tail) cannot reach the temperature controller box, then they may be extended by installing an intermediate cable box.

ATTENTION The temperature sensor has to be placed at the same distance from heating cables.

Drawing 3. An example of the arrangement of heating mats.



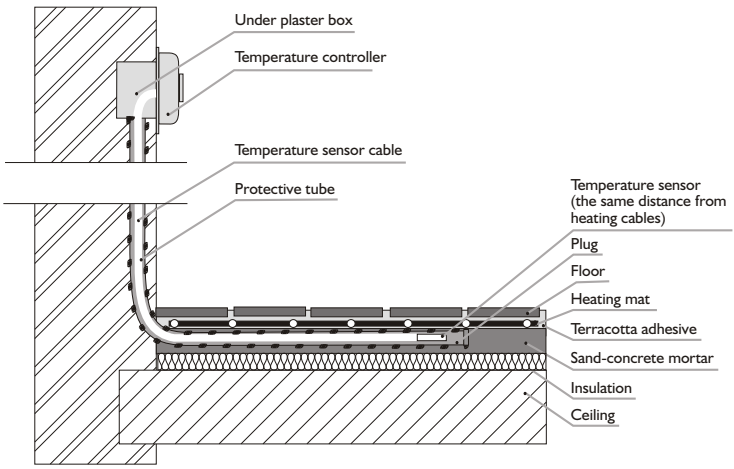


Drawing 4 An example of the heating mats arrangement (single-side and double-side power supply) and the temperature sensor's location (bathroom).
– – – – second "cold" tail of the mat powered on both sides.

Arrangement of the heating mats

ATTENTION Before sticking the heating mat to the floor it is necessary to measure the resistance value of the core and heating cables insulation, install the box, the protective tube for the cables and the temperature sensor.

With the use of a serrated spatula, spread the adhesive mortar on the clean base and then lay the heating mat so that the heating cables are face down. Make sure that the mat is covered completely by the mortar. If necessary, lay a further layer of the adhesive to eliminate air bubbles and any irregularities in the floor. After this has dried, lay the tiles with a further layer of adhesive. If the mats are to be laid under carpeting, PVC or mosaic, it is possible to cover the mats with a self-levelling mix. If this method is used the mat must be firmly taped to the floor to prevent it rising to the surface of the self-levelling mix.



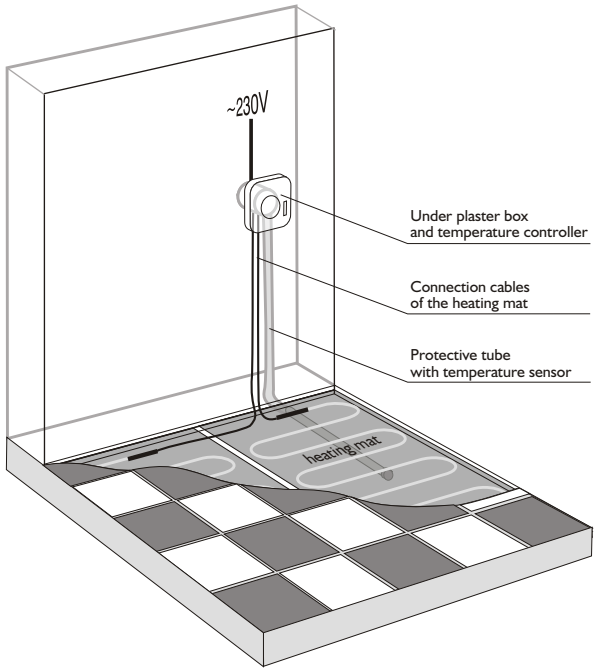
Drawing 5

After laying the heating mats

Once again the resistance value of the core and heating cables insulation must be made to compare it to the original value.

It is recommended that electric terminals are made with the use of a three core conductor 3 x 1,5 mm^2.

The heating system can only be started when the mortar or self-levelling mix is completely dry. The drying times will be specified on the manufacturer's instructions.

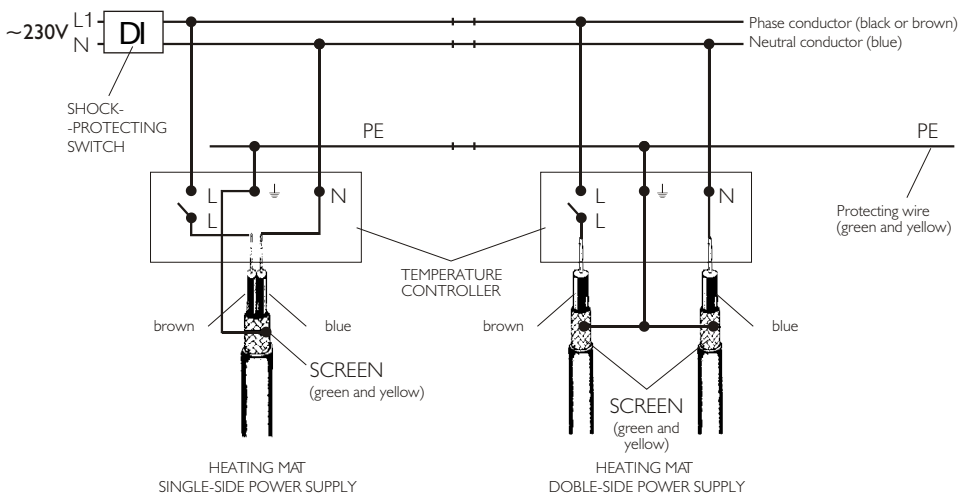


Drawing 6

C Connecting the heating mat

The connection of the heating mat to the mains supply should only be made via the temperature controller (drawing 7). The heating mat cannot be connected to the supply by plug-in sockets.

ATTENTION The protective cables of the mat (green-yellow) have to be linked to a protective cable (green-yellow) of the electrical system with the use of a special clamp in the temperature controller. If such a clamp does not exist, the connection has to be made separately and placed in the installation cable box.



Drawing 7

Shock protection

The copper screen linked to the PE cable (earth) provides complete safety while using the heating cables (drawing 7). A differential shock-protecting switch D ≤ 30 mA. should be used in the installation. The time of the voltage disconnection in this protection system cannot exceed 0.2 seconds. A diverse power switch may be the same for differential switch. The resistance of the heating cable insulation - measured with the use of a device with a voltage rating of 1000V - cannot be lower than 0.5 MW.

Operation

The electric under-floor heating is very easy to operate with the use of the temperature controller. However, it must be remembered that the entire floor surface is the heat source for the room and as such, any furniture without an air flow underneath, or heavy carpets which would prevent the heat from rising, must not be moved once the mats have been laid to accommodate them.

If it is necessary to drill holes in the floor after laying the mats, it must be ensured that the cables are not affected. If necessary an appropriate wire detecting device should be used.

In case of any doubt, please contact the technical department of our company.

Notes

elektra ELEKTRA®


SILVER ACE '93


BRONZE HELMET '97


SILVER HELMET '98


GOLD HELMET '97


GOLD MEDAL
MTP Poznań '2001

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