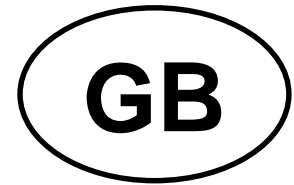


Installation Instructions



The surface-heating elements have been tested to VDE Standards in accordance with DIN EN60335-1 and DIN EN60335-2-96.

These instructions must be read carefully before commencing the installation procedure. Whenever work is being undertaken on this heating equipment the relevant VDE-Regulations must be readily available and handed directly to the installer. These instructions relate to the Surface-heating Elements 1 square metre to 10 square meters. The manufacturer guarantees the product for a period of 10 years. This guarantee does not include any preparatory work or replacement of surface covering material. Installation must be carried out by a qualified person and be made strictly in accordance with the appropriate Standards and Regulations, such as, for example, VDE 0700 - Teil(Part) 753 and VDE 0100 - Teil(Part) 701. Please pay careful attention to the information given on the Guarantee Card. The specified entries (measured values made on the completed installation) must be recorded on that Guarantee Card. The manufacturer will not accept responsibility for any faults which can be attributed to measurements which either have not been made and recorded at all or which have been made incorrectly.

Precautionary Measures

Care must be taken to ensure that during the course of the installation procedure no damage is caused by, for example, falling objects, sharp objects, walking on the heating element or the like. The heating elements are to be powered by a circuit with a fault current breaker (F-1 Protection Switch) with a release current of 30 mA. It is necessary to mount a warning notice in the close proximity of the distribution system which fully describes the lay-out of the heating unit. One of these plaques (about 105 x 148 mm) is required for each heating element and the installer must enter the lay-out details of each element on the relevant plaque (a sketch will suffice). The heating cable must not be shortened or crossed over itself. The flooring material covering the heating element should have the least possible resistance to the conduction of heat. Care must be taken to ensure that the heating element is not trodden upon while the floor material is being laid. It is also necessary to avoid laying the material over screed expansion joints. Normal practice involves using a control thermostat with a floor-sensor, with the sensor inserted in an empty pipe. Please note that a defective sensor will not be replaced unless it was protected in this way. The sensor should be located close to the floor surface and between two lengths of heating cable. In the same way, the cold conductor (connecting cable) is also to be laid inside a separate empty pipe. For safety reasons a switching device should be used which ensures an all-pole disconnection of this permanently fixed equipment. This can be, for example, a 2-pole F1-Protective Switch (with a 3 mm gap).

Laying Procedure

The purpose of the heating elements is to provide direct heating and to achieve control of floor surface temperatures. They must not be used for insertion in walls or ceilings. The individual loops of heating cable should run parallel to one another over the floor area and they should be separated by a minimum distance of 5 cm. The cold conductors (connection cables) must not cross over themselves. They are to run alongside and parallel to the heating elements from the connection socket or directly to the thermostat. Several different heating elements can be connected in parallel to one thermostat (in a similar manner to the connection of several light bulbs in a lighting fixture). In this situation we recommend the use of a connection socket.

The heating elements are to be embedded in a flat, single plane within the adhesive- or filling mass. Ensure that no air bubbles are trapped and that the glass-fibre gauze fabric lays completely flat on the floor surface with no folds. In order to avoid heat or energy losses into the sub-floor and thereby to ensure optimum heating of the upper floor surface the existing insulating material between the sub-floor surface and the heating element must correspond to the latest state of the technology. Finally there must be a minimum distance of 30 mm between the electrical elements and any conductive system, e.g. water-pipes.

Recommended build-up of floor surface components:

It is always essential to follow the Instructions for Use provided by the manufacturer of the building materials used (adhesive, levelling compound, insulating material). Do not lay any heating elements underneath baths or shower bases - or in areas which will be directly covered by furniture or built-in units.

Base surface:

The base surface must be solid, undeformable, clean, free from cracks and any materials which impede adhesion. It must also be able to carry superimposed loads. If a new screed is to be applied (cement or anhydrite) the nature of its surface must be examined. If in poor condition the surface must be ground down, vacuum cleaned and then primed. In this event pay careful attention to the recommendations of the suppliers of the materials used.

Recommended products:

By way of providing typical examples, we offer below suggestions for the use of products supplied by the manufacturers PCI Augsburg GmbH, Piccardstraße 11, 86159 Augsburg. Naturally, similar products supplied by other manufacturers (e.g. Ardex, Knauf, etc) are equally suitable. However, please follow the instructions provided by the individual suppliers..

✓ **Laying tiles and other ceramic floor products on a screed**

Apply the adhesive (e.g. "PCI-FlexMortel") onto the screed using a 6-mm-toothed spatula. Embed the heating element into the mortar with the heating cable underneath.. Apply more adhesive using a 10-mm-toothed spatula. Place the tiles or other ceramic floor material in position.

✓ **Laying natural stone products on the screed:**

Proceed as described above but use, e.g. "PCI-Carraflex" as the adhesive.

✓ **Laying soft materials such as carpets, PVC, parquet blocks, etc. on the screed:**

Apply the adhesive (e.g. "PCI-FlexMortel") onto the screed using a 6-mm-toothed spatula. Embed the heating element into the mortar with the heating cable underneath. When this has hardened, apply a universal filler mass such as PCI-USP32 in a layer which is at least 5 mm thick. When this has hardened, the particular soft floor covering can be put in place using an adhesive (typically Textil-Belagskleber(Textile-covering material adhesive) PCI-TKL315, PVC-Belagskleber (Covering material adhesive) PCI-PKL324, Linoliumkleber (Linolium adhesive) PCI-LKL334, Korkkontakkleber (Cork contact adhesive) PCI-KKL347, Parkettkleber (Parquet Block adhesive) PCI-PAR354, etc.) - i.e. adhesives specially prepared for the floor covering being used.

✓ **If it is necessary to level the floor because of surface irregularities:**

we recommend the readily-flowing screed levelling material "PCI-Periplan" applied as a layer 4 - 5 mm thick. This can be followed by the laying activity using PCI-Flexmortel as described above.

✓ **For filling joints between tiles or other ceramic floor materials we recommend:**

"PCI-Flexfuge". Finally, wall gaps and expansion joints can be filled with the elastic material "PCI-Silcoferm-S"

✓ **For filling joints between natural stones we recommend:**

"PCI-Carrafug" or "PCI-Carrafern"

✓ **Preliminary treatment required when laying upon a solid wooden floor base:**

Remove all dust and other forms of soiling, close the cracks in the floor with "PCI-Adapto!" and apply an adhesive primer such as "PCI-Flächengrund-404". When this has dried out apply a levelling compound such as "PCI-Periplan". After this, too, has dried out the covering material may be applied as described above. Under no circumstances may the heating elements be laid over movement joints.

✓ **Preliminary treatment required when laying upon a chipboard base:**

Remove all dust and other contamination, prime with "PCI-Wadian" and allow to dry. Then proceed to lay the selected floor covering as described above. The chipboard slabs must be at least 25 mm thick and must be secured to the sub-floor by screws spaced no more than 40 cm apart.

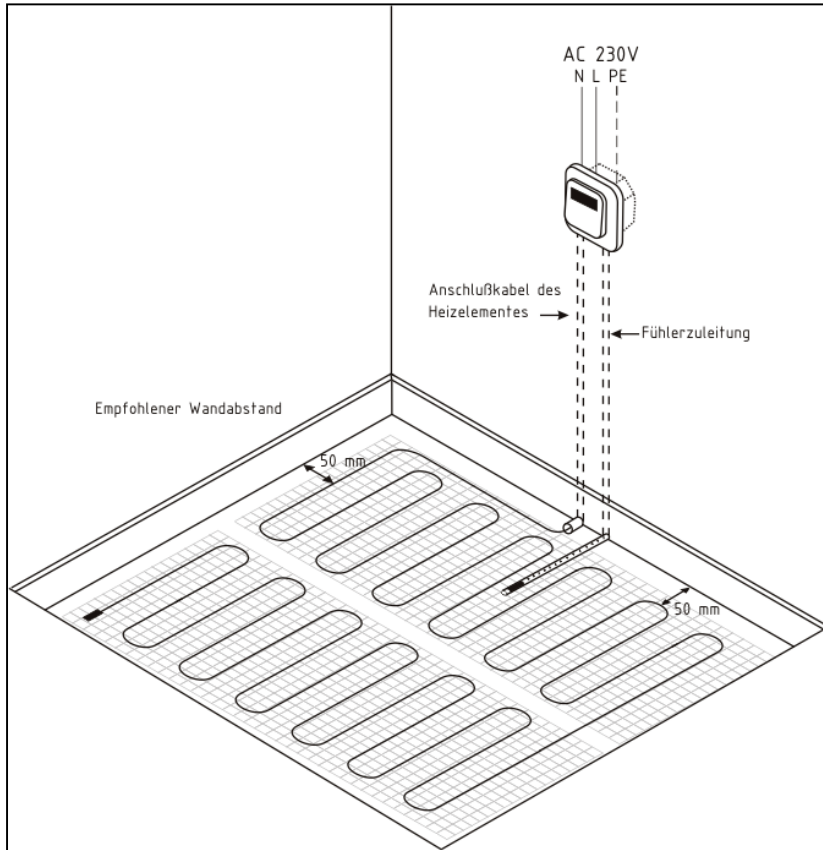
Under no circumstances may the heating elements be laid over movement joints.

Control Units

Our surface-heating elements are certified for use with the following control units
Standard (Thermostat, lower layer of filler) or. Digital (4-Event Clock-Thermostat, lower layer of filler).

Diagrammatic Information

Thermostat-Controller and Floor Temperature Sensor

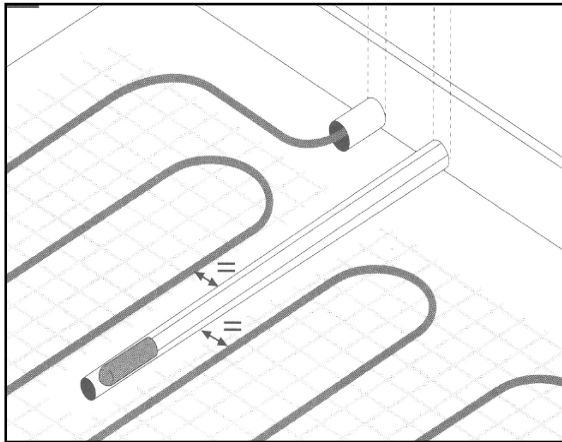


Anschlusskabel des Heizelementes=
Connecting cable for heating element

Empfohlener Wandabstand=
Recommended minimum distance to the
Wall

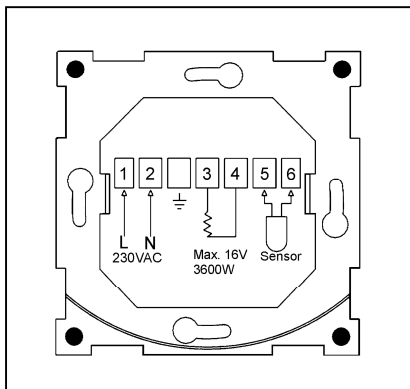
Fühlerzuleitung = Sensor cable

Location of the floor sensor between the meanders of the heating element. The two empty pipes for the connection to the heating element and the floor sensor can also be seen.

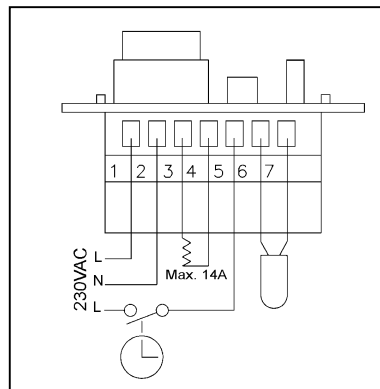


Attention must be given to the relevant Controller Connection Diagram

Digital



Standard



Technical Data

Rated Voltage	AC 230 Volt
Rated Heating Capacity	160 W / m ²
Bending radius	min. 30 mm
Distance between meanders	min. 70 mm
Surface temperature	+90 Degrees Celsius
Installation temperature	min. +5 Degrees Celsius
Cross-section of connection cable	1.0 mm ²
Cross-section of protective braiding	0.985 mm ² (16x4x0,14 mm)
Approved against	VDE DIN EN 60335-1, VDE DIN EN 60335-2-96, CE

Maximal permitted levels of thermal resistance

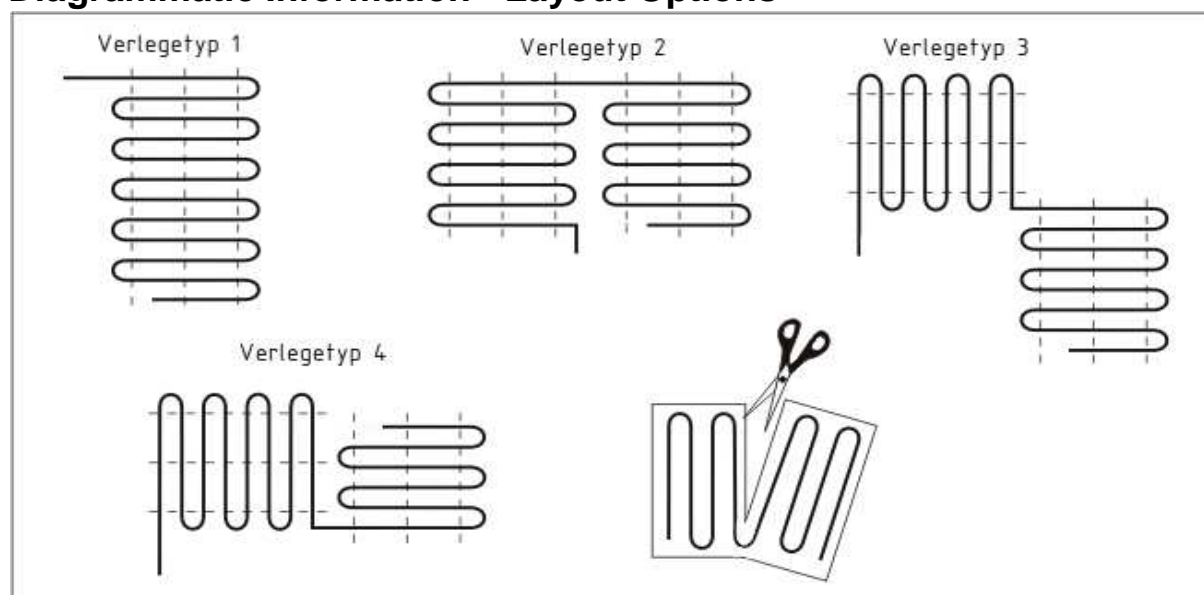
The thermal resistance values between the heating element and the room space together with the relevant maximal thickness of the material in question are as follows:

Tiles / Stoneware	max. 30 mm thick	$\lambda = 1,00$ W/mK
Carpet	max. 20 mm thick	$\lambda = 0,09$ W/mK
Parquet blocks	max. 16 mm thick	$\lambda = 0,14$ W/mK
PVC	max. 10 mm thick	$\lambda = 0,23$ W/mK
Cork	max. 10 mm thick	$\lambda = 0,08$ W/mK

Dimensions- and Heating Value Table

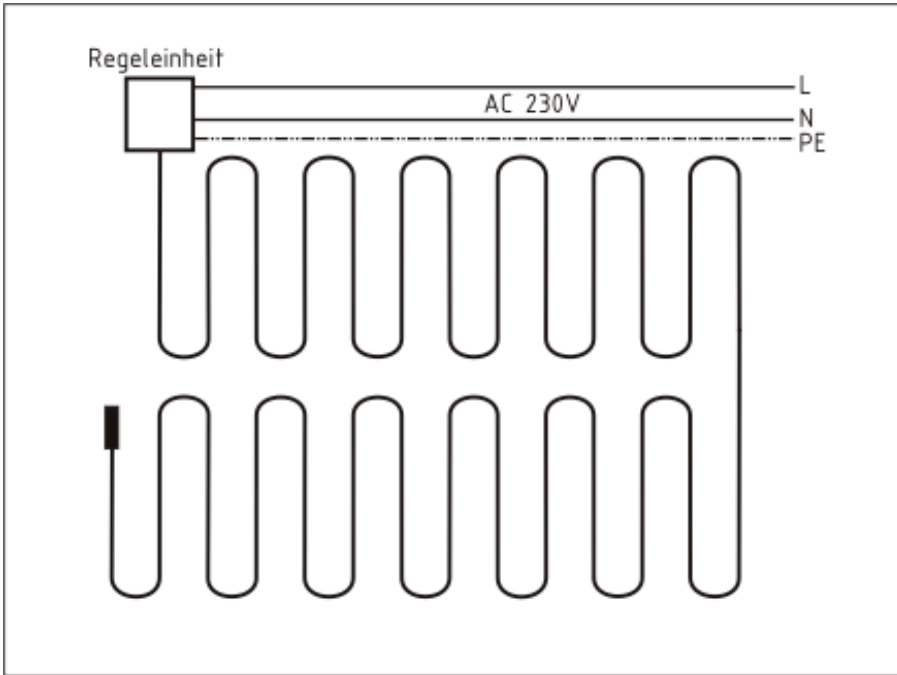
Surface area in m ²	Dimensions in cm	Specific capacity in Watts / m ²	Capacity in Watts	Resistance in Ohms
1,00	50 x 200	160	160	330
1,50	50 x 300	160	240	220
2,00	50 x 400	160	320	165
2,50	50 x 500	160	400	132
3,00	50 x 600	160	480	110
3,50	50 x 700	160	560	95
4,00	50 x 800	160	640	83
4,50	50 x 900	160	720	73
5,00	50 x 1000	160	800	66
6,00	50 x 1200	160	960	55
7,00	50 x 1400	160	1120	47
8,00	50 x 1600	160	1280	41
9,00	50 x 1800	160	1440	37
10,00	50 x 2000	160	1600	33

Diagrammatic Information - Layout Options



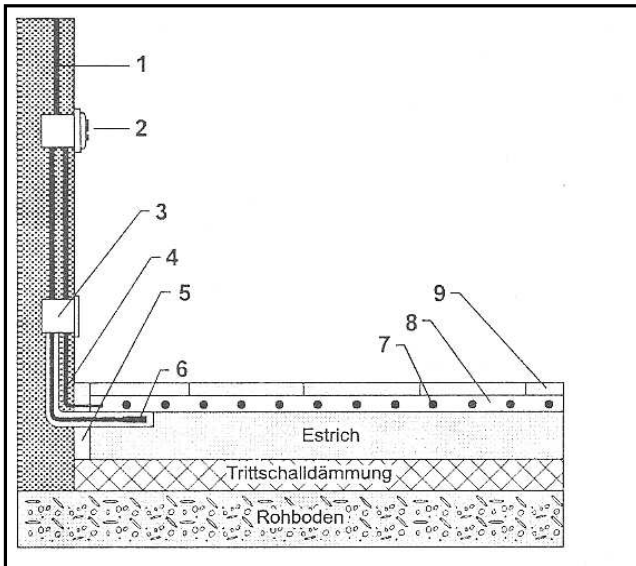
Verlegetyp = Layout pattern

Diagrammatic Information - Connection to the mains



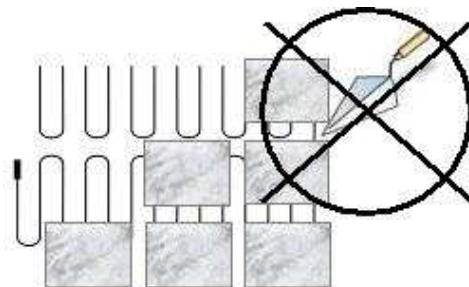
Regeleinheit = Control Unit

Diagrammatic Information - Installation example



Estrich
Trittschalldämmung
Rohboden

Screed
Footfall noise insulation
Rough floor surface



- 1: Mains connection AC 230 Volt
- 2: Thermostat-Controller
- 3: In-Wall-Distributor Socket
- 4: Connection cable to the heating element
- 5: Edge insulation strip
- 6: Floor-temperature sensor for the thermostat control unit
- 7: Heating element
- 8: Adhesive
- 9: Floor covering material (e.g. tiles)

Between 8 and 9 a barrier layer (e.g. insulating mass) can be provided. (This is optional for damp areas)