

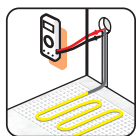
Fig. 4 Conductance

| Covering | Thickness | λ -Value |
|----------|------------|------------------|
| Tiles | max. 30 mm | 1,00 |
| PVC | max. 10 mm | 0,23 |
| Cork | max. 8 mm | 0,08 |
| Carpet | max. 8 mm | 0,09 |



Please attention to the thermostat manual!

TECHNICAL DATA



| | W | Ω |
|----------------------|------|-----------------|
| PHM / PHMS_-160-1,00 | 160 | 313,95 - 363,52 |
| PHM / PHMS_-160-1,50 | 240 | 208,34 - 241,23 |
| PHM / PHMS_-160-2,00 | 340 | 136,45 - 158,00 |
| PHM / PHMS_-160-2,50 | 400 | 116,25 - 134,60 |
| PHM / PHMS_-160-3,00 | 480 | 96,66 - 111,92 |
| PHM / PHMS_-160-4,00 | 640 | 74,45 - 86,20 |
| PHM / PHMS_-160-5,00 | 800 | 58,01 - 67,17 |
| PHM / PHMS_-160-6,00 | 960 | 50,00 - 57,89 |
| PHM -160-7,00 | 1120 | 38,92 - 45,07 |
| PHM -160-8,00 | 1280 | 33,98 - 39,34 |
| PHM -160-9,00 | 1440 | 30,10 - 34,85 |
| PHM -160-10,00 | 1600 | 27,18 - 31,47 |
| PHM -160-12,00 | 1920 | 22,56 - 26,12 |
| PHM -160-15,00 | 2400 | 17,52 - 20,29 |

Resistance readings record

Address : _____

Date of the mat installation: _____ Name, signature : _____

Date of the screed/ tile adhesive laying: _____ Name, signature : _____

Date of the initial start-up: _____ Name, signature : _____

The filled out resistance readings record is the base of any warranty claim.

| Type | Overall resistance in Ω | | Insulation resistance in Ω | |
|------|--------------------------------|------------------------|-----------------------------------|------------------------|
| | before the installation | after the installation | before the installation | after the installation |
| | | | | |
| | | | | |
| | | | | |

All information, including illustrations, is believed to be reliable. Users, however, should independently evaluate the suitability of each product for their particular application. The supplier makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use. Modifications, mistakes and printing errors do not justify claims for compensation. I-warm GmbH's only obligations for this product are those in the general terms of delivery. Specifications are subject to change without prior notice.



Follow the installation manual



Protect against damage

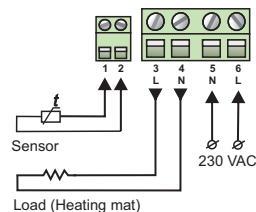


Minimum installation temperature



Voltage supply

Fig. 5 Thermostat connection

Electrical underfloor heating mat
Cosy warmth for your home.INSTALLATION MANUAL
for heating mats PHM &
heating mat sets PHMSM and PHMSPGeneral details for the electrical underfloor
heating mat installation.

- NEVER turn the electrical underfloor heating mat on while it is coiled.
- NEVER cut the heating wire. The cold leads may be shortened or lengthened.
- NEVER connect the heating conductors directly to the power supply, and NEVER shorten the heating conductors.
- ALWAYS install the electrical underfloor heating mat strictly with an all pole disconnection (e.g. relay, power contactor) with a contact opening of minimum 3mm.
- NEVER splice one mat heating wire to another one to extend the mat. Multiple mats must be connected parallel in a junction box or in a control unit.
- ALWAYS connect the braided shield to the PE ground conductor.
- ALWAYS install the wall box for bathrooms or damp locations outside the protected zone 2 according to VDE 0100.
- ALWAYS connect the electrical underfloor heating mat, by means of a wall box, firmly to the power supply 230 V AC (3x1,5mm²).
- The over-all current for parallel connected heating mats should not exceed over the current for the thermostat. (see the type plate of the thermostat).
- NEVER cross or fold the heating conductors.
- NEVER bend the heating cables to a radius less than 30mm at the turnings.
- ALWAYS operate the electrical underfloor heating mat with a ground-fault-circuit-breaker (30mA).
- NEVER let the impact on the junction joints exceed a tensile load of 120N. NEVER fold the joints and they have to be completely covered by screed or tile adhesive.
- NEVER install the heating cable over an expansion joint. This is not permissible.
- The minimum installation temperature is +5°C.
- NEVER install the mats through or behind insulation material wise, not under cabinets or other built-ins or in small closets.
- ALWAYS embed the heating wire and joints completely with mortar.
- The minimum distance to partitions shall be 60cm.
- ALWAYS record the mat resistance readings before, and after the installation.
- ALWAYS make sure all electrical work is executed by qualified persons in accordance with the local building, electrical codes and the latest VDE regulations. e.g. VDE 0700 Part 753 and VDE 0700 Part 701.
- ALWAYS verify if the existing thermal insulation of the floor complies with the current technical standard. Therefore a high energy consumption is excluded.
- NEVER use the same mat for the heating of premises with different floor constructions. Only installations on screed are permitted.
- NEVER install the electrical underfloor heating mat in walls or ceilings.
- We guarantee our products are free from defects in materials and workmanship. Products that have been damaged due to mechanical breakdown, due to incorrect connection or due to disregard of the terms of operating rules and servicing are not subject to warranty repairs, replacement or return.
- NEVER put the underfloor heating system in operation before the tile adhesive or screed is fully dry.
- ALWAYS use materials for the handling, which are convenient for underfloor heating systems, or respectively are certified by the manufacturers.
- ALWAYS install the complete power lead (cold lead) inside a corrugated tube DIN EN 61386-1.
- ALWAYS install the floor temperature sensor cable inside a separate corrugated tube DIN EN 61386-1.
- The maximum nominal category temperature of the electrical underfloor heating mat is 80°C.
- This device is not designed to be used by persons (including children) with physical, sensory or mental disabilities or in the absence of handling experience and/or knowledge, unless these persons are supervised or instructed at using the device by a person that is responsible for their security.
- To guarantee that children don't play with the device, they have to be supervised.

Heating mat placement

Draw the layout of the electrical underfloor heating mat and write down zones free of the heating at the surrounding walls. The distance of the electrical underfloor heating mat and any conductive parts of the building have to be at a minimum of 30 mm e.g. water pipe.



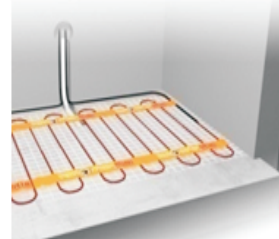
1. Subfloor preparation

The floor should be even, secure, flexfree and with an appropriate bearing capacity. The surface has to be dry, clean, free of grease, dust and sharp pieces. The floor must be completely swept and damp-mopped to remove all nails, wood fragments, dirt, and other construction debris. If the subfloor is uneven, it is necessary to level it before the placement of the heating mat by laying of leveling

material. Therefore cavities below the heating conductor can be avoided. Never install the heating cable over an expansion joint.

2. Thermostat installation preparation

Chisel out channels for the power supply wires, mat cold leads and temperature sensor in the wall and floor. (Attention! cold leads and sensor cables have to be installed in two different tubes).

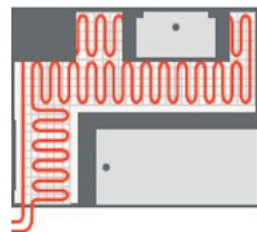


For the thermostat a standard wall box in the chosen location and a power supply with 230 V AC should be available.

A ground-fault-circuit-breaker (30 mA) has to be provided.

3. Mat adjustment

Fix the electrical underfloor heating mat, according to your layout, to the subfloor by means of the adhesive side of the mat.



Adjust the mat to the heating area layout by cutting and turning the fibre mesh (Attention: Do not cut or damage the heating cable!).

After achieving the intended form, press the electrical underfloor heating mat firmly to the subfloor.

The fibre mesh has to be layed without any crinckles.

4. Keeping the safety distance

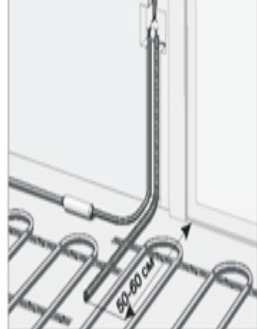
Between the turnings a safety distance of 10 cm has to be maintained. To avoid mechanical damage of the heating mat during the installation, wear soft elastic sole shoes or cover the mat surface with plywood boards or other material. Be careful not to drop sharp objects on the heating cable.

5. Floor temperatur sensor installation

The tube containing the temperature sensor must be located at the same level as the heating cable between two neighboring passes. Cold leads and sensor cable have to be installed in two different tubes!

Route the cold lead to the wall box. Be careful not to cross or touch one of the heating conductors.

Be sure to maintain the minimum distance of about 2 cm to the heating conductor.



After the mat placement is completed, measure and record the mat and insulation resistance. Therefore it is ensured to identify damages in time and to repair or exchange the mat if necessary.

Enter the measured values in the enclosed Protocol (please retain!) under "Before installing" After laying the mat, the instruction plate (located at the cold lead) has to

be placed at the sub distribution, after the room identification, the article number and output was entered. Update the circuit diagram with the heating mat product name, power requirement, and room description.

6. Tile adhesive or screed laying

Be careful not to damage the heating conductor insulation with the trowel during the laying of the tile adhesive or screed. The heating conductor has to be completely covered over the full extend of the layout.

After the laying of the tile adhesive or screed, if necessary the heating mat has to be slightly lifted and then firmly pressed into the laying material again.

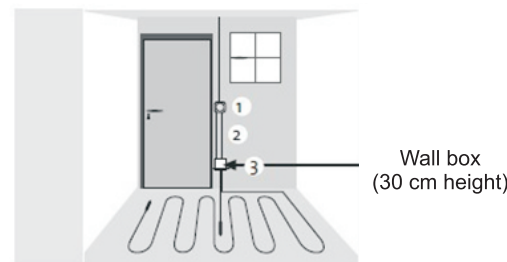
After the laying of the covering, measure and record the mat and insulation resistance into the protocoll under „after installation“. Please retain the resistance readings record.

After the tile adhesive is cured, grout the tiles with appropriate grout material.

Expansion joints shall be provided at all adjoining building units and built-ins. These expansion joints are to be grouted by means of silicone.

For different coverings, e.g. PVC or carpet, the electrical underfloor heating mat has to completely covered with special leveling material about 5-10 mm. The heat transition coefficient of the leveling material is not permitted to exceed $R=0,15(\text{mK})/\text{W}$ and the temperature resistance has to be minimum 50°C . You have to consider the appropriate conductance of the covering. The additional coverage of the heated surface with a carpet or other similar insulating material is permitted. Attention is to be paid to the suitability and corresponding thermal conductivity of the floor covering needs (see Figure 3).

Fig. 1 Installations drawing

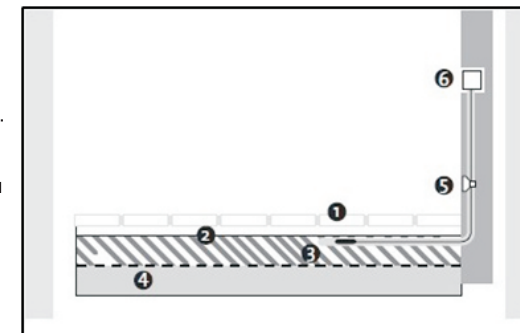


1 = Electrical Thermostat, supply NYM 3 x 1,5 mm² for distribution

2 = Corrugated tube for the temperature sensor or the cold lead. (Both are not to be installed inside the same tube)

3 = Wall box (only necessary for more than one heating mat)

Fig. 2 Construction structure



1 = Decorative Covering

2 = Electrical underfloor heating mat embedded in tile adhesive

3 = Temperature sensor, centred between two heating conductors

4 = Subfloor with thermal insulation

5 = Wall box (only necessary for more than one heating mat)

6 = Electrical thermostat

Fig. 3 Application examples

