SunStone
Affordable Underfloor Heating

Underfloor Heating Mat Installation Manual

Technical Helpline
0345 034 8272
www.sunstone.co.uk

CE UKCA

DO'S & DON'TS

Ensure correct measurements

Cut mats cannot be returned, so check that you have the correct room dimensions and heater size and quantities before starting on the installation.

IMPORTANT NOTES

(To avoid damaging your new heating system)

DO NOT CUT THE HEATING WIRE

DO NOT shorten the heating wire.

DO NOT overlap the heater with another heater or wire in case of overheating.

DO NOT run the sensor wire or power lead over or under the heating wire.

DO NOT connect mats in series, only in parallel.

DO NOT put built-in units or solid-based furniture on the heated floor areas.

ALWAYS test the system before, during and after installation.

ALWAYS ensure everyone involved in the installation or construction knows how to keep the system safe from damage.

ALWAYS keep an even spacing between heating elements.

DO

- ensure that during the course of the installation no damage is caused to the heater by falling or sharp objects.
- plan the heater layout and installation so that any drilling after tiling (e.g. for fixing sanitary ware) will not damage the wiring.
- use ceramic tile adhesives and grouts suitable for use with underfloor heating (they must contain a flexible additive).
- wait at least 10 days before switching the system on for the first time in order for the tile adhesive to dry.
- ensure that the heating element including joints are completely embedded within adhesive.
- ensure the subfloor is fully cured and stable before commencing installation of the heater.
- ensure that the control card at the back of the manual is completed and fixed at the consumer unit along with any plans and electrical test records as per the current edition of BS7671.
- prepare timber subfloors for tiling in accordance with BS 5358-3.
- install floors coverings which are at least 5 mm thick. For floor coverings other than tile, lay a minimum of 10 mm levelling compound over the heater first. Always check with the manufacturer of the floor covering for its suitability for use with underfloor heating.

DON'T

- bend the cable less than 25 mm radius.
- allow traffic over an installed mat. This is when damage is most likely to occur.
- store tiles or other sharp or heavy objects on the mats while tiling.
- attempt to install the heating up walls or up a set of stairs.
- install heating mats under permanent fixtures.
- attempt a DIY repair if you damage the heater, please call our helpline.
- tape over manufactured joints or the floor sensor tip.
- install items above the heating system which has a resistance of more than 1.5 tog, as this may cause overheating.
- install the heating cable in temperatures less than -10 °C.
- leave surplus heating mat rolled up under units or fixtures, use the correct size mat.

BEFORE INSTALLATION

Ensure you have the necessary tools

- Thermostat with floor sensor
- RCD: required as part of all installations
- Multi-meter: for testing the resistance of mats
- Electrical trunking/conduit for housing the unheated power leads
- Electrical housing, back boxes & junction boxes; back box for the thermostat must be at least 35 mm deep
- Permanent marker & measuring tape
- Pair of small utility scissors for cutting the fibreglass mesh
- Tape (to secure floor sensor and loose wire)

Choice of floor covering

Underfloor heating performs the most efficiently with conductive, low resistance floor finishes such as stone and tiles. The maximum thermal resistance of the floor should not exceed 0.15 [m²K/W]. The SunStone system has been designed primarily for use with stone or tile floors. If you are considering using any other type of floor covering, such as carpet or wood laminate or vinyl or vinyl lay a minimum 10 mm levelling compound over the heater. You must ensure that all heating cables are completely covered. It is important that the levelling compound is suitable for use with underfloor heating.

NOTE: Before installing the floor finish its suitability for use with underfloor heating and its maximum operating temperature should be checked against required operating conditions.

Electrical installation

As with all electrical projects governed by Part P regulations, all mains electrical connections must be undertaken by a certified electrician. All work must conform to the latest edition of IEE Wiring Regulations.

Installing an RCD

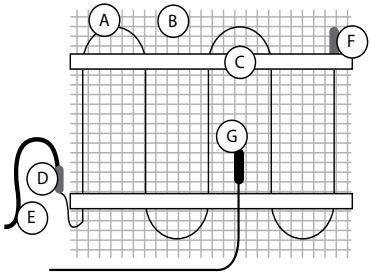
The SunStone underfloor heating system must be wired via an RCD. You must install a dedicated RCD if one is not already present. You may wish to use a fused spur/RCD. No more than 7.5 kW of heating may be connected to a single 30 milliamp RCD.

NOTE: It is possible to run the heater(s) from an existing circuit. Consult with an electrician to determine whether or not the circuit can handle the load and if it is RCD protected.

TECHNICAL INFORMATION

The SunStone Heating Mat

A - Heating Element
B - Fibreglass mesh
C - Tape (Fixes cable position)
D - Factory-made joint
E - Power lead (2-core)
F - Termination joint
G - Floor sensor (included with thermostat)



System components

The Heating Element

The heating element is constructed of PVC insulation and a metallic earth sheath surrounding two heating cores and a copper drain wire providing a ground path. The heating element is fixed to the fibreglass mesh (B) using an adhesive tape (C) and is spaced so as to give an even heat throughout the covered area. The fibreglass mesh (B) has a pressure sensitive adhesive which allows for quick and secure installation. The heating element is terminated at one end with a 3 m power lead (E) which supplies power to the element via the thermostat. The factory made joint (D) which connects the two must be installed under the tiles. It may be necessary to cut a small groove in the subfloor to allow for the extra thickness of the power lead. The factory made joints (D & F) must be cut into the subfloor so that it sits at the same height as the heater. DO NOT tape over these joints, they must be in direct contact and fully embedded within the tile adhesive or levelling compound being laid over.

Floor sensor

Proper installation of the floor sensor (G) is critical if the thermostat and floor warming system is to work properly.

The sensor, which is embedded in the adhesive, should be installed centrally between two runs of heating element and should extend a minimum of 150 mm into the heated area. It is best to avoid placing the tip of the sensor in areas prone to heat fluctuations due to drafts, sunlight, radiators or hot water pipes. You may wish to cut a groove in the floor to accept the sensor cable and tip in order to keep them at the same height as the heating element.

Technical Specifications - Sunstone Mat	
Operating Voltage	230 V AC : 50 Hz
IP Rating	IPX7
Mat Width	500 mm (0.5 m)
Mat Thickness	3 mm
Output Rating	150 & 200 W/m²
Colour	Blue (150 W/m²), Red (200 W/m²)
Inner Insulation	ETFE
Outer Insulation	PVC
Minimum Installation Temperature	-10 °C
Connection	3 m Coldtail Connection

Mat size guide

SSMAT - 150 W/m² Mat Heater						
Model	**Dimensions**	**Heated area (m^2)**	**Power (W)**	**Amperage (A)**	**Resistance (Ω)**	**Resistance Band (-5% Ω +5%)**
SSMat 1.0	0.5 x 2.0m	1.0	150	0.65	**352.7**	**335.1 - 370.3**
SSMat 1.5	0.5 x 3.0m	1.5	225	0.98	**235.1**	**223.3 - 246.9**
SSMat 2.0	0.5 x 4.0m	2.0	300	1.30	**176.3**	**167.5 - 185.1**
SSMat 2.5	0.5 x 5.0m	2.5	375	1.63	**141.1**	**134.0 - 148.2**
SSMat 3.0	0.5 x 6.0m	3.0	450	1.96	**117.6**	**111.7 - 123.5**
SSMat 3.5	0.5 x 7.0m	3.5	525	2.28	**100.8**	**95.8 - 105.8**
SSMat 4.0	0.5 x 8.0m	4.0	600	2.61	**88.2**	**83.8 - 92.6**
SSMat 4.5	0.5 x 9.0m	4.5	675	2.93	**78.4**	**74.5 - 82.3**
SSMat 5.0	0.5 x 10.0m	5.0	750	3.26	**70.5**	**67.0 - 74**
SSMat 6.0	0.5 x 12.0m	6.0	900	3.91	**58.8**	**55.9 - 61.7**
SSMat 7.0	0.5 x 14.0m	7.0	1050	4.57	**50.4**	**47.9 - 52.9**
SSMat 8.0	0.5 x 16.0m	8.0	1200	5.22	**44.1**	**41.9 - 46.3**
SSMat 9.0	0.5 x 18.0m	9.0	1350	5.87	**39.2**	**37.2 - 41.2**
SSMat 10.0	0.5 x 20.0m	10.0	1500	6.52	**35.3**	**33.5 - 37.1**
SSMat 12.0	0.5 x 24.0m	12.0	1800	7.83	**29.4**	**27.9 - 30.9**
SSMat 15.0	0.5 x 30.0m	15.0	2250	9.78	**23.5**	**22.3 - 24.7**

2-SSMAT - 200 W/m² Mat Heater						
Model	**Dimensions**	**Heated area (m^2)**	**Power (W)**	**Amperage (A)**	**Resistance (Ω)**	**Resistance Band (-5% Ω +5%)**
2-SSMat 1.0	0.5 x 2.0m	1.0	200	0.87	**264.5**	**251.3 - 277.7**
2-SSMat 1.5	0.5 x 3.0m	1.5	300	1.30	**176.3**	**167.5 - 185.1**
2-SSMat 2.0	0.5 x 4.0m	2.0	400	1.74	**132.3**	**125.7 - 138.9**
2-SSMat 2.5	0.5 x 5.0m	2.5	500	2.17	**105.8**	**100.5 - 111.1**
2-SSMat 3.0	0.5 x 6.0m	3.0	600	2.61	**88.2**	**83.8 - 92.6**
2-SSMat 3.5	0.5 x 7.0m	3.5	700	3.04	**75.6**	**71.8 - 79.4**
2-SSMat 4.0	0.5 x 8.0m	4.0	800	3.48	**66.1**	**62.8 - 69.4**
2-SSMat 4.5	0.5 x 9.0m	4.5	900	3.91	**58.8**	**55.9 - 61.7**
2-SSMat 5.0	0.5 x 10.0m	5.0	1000	4.35	**52.9**	**50.3 - 55.5**
2-SSMat 6.0	0.5 x 12.0m	6.0	1200	5.22	**44.1**	**41.9 - 46.3**
2-SSMat 7.0	0.5 x 14.0m	7.0	1400	6.09	**37.8**	**35.9 - 39.7**
2-SSMat 8.0	0.5 x 16.0m	8.0	1600	6.96	**33.1**	**31.4 - 34.8**
2-SSMat 9.0	0.5 x 18.0m	9.0	1800	7.83	**29.4**	**27.9 - 30.9**
2-SSMat 10.0	0.5 x 20.0m	10.0	2000	8.70	**26.5**	**25.2 - 27.8**
2-SSMat 15.0	0.5 x 30.0m	15.0	3000	13.04	**17.6**	**16.7 - 18.5**

TESTING YOUR HEATING SYSTEM

We recommend that you test your heating system at least three times during the installation process to ensure that you do not install a damaged heating mat:
- before installation
- during the mat fixing process, immediately prior to tiling
- after tiling

Testing with a multi-meter:

The resistance (ohms) of each mat should be measured from the live (brown) wire to the neutral (blue) wire. We recommend the use of a digital multi-meter set to a range of 0-20k ohms for testing.

The readings should be +/- 5 % of these measurements and should be recorded in the control card at the end of this manual.

Earth Fault Check

Also test for resistance between the Earth Braid and Live/Neutral. The result of this test should be negative. If you get a reading, then the heater is damaged and must be replaced. Call the technical helpline.

NOTE: Due to the high resistance of the wire, it may not be possible to get a continuity reading from a mat and as such, continuity testers are not recommended.

Insulation resistance test

Set an insulation resistance tester to 500VDC. Measure the resistance across the live (brown) and neutral (blue) wires to the earth braid wire. Ensure the measured resistance is showing greater than 500MΩ to indicate a pass.

If at any time you do not get the proper readings or suspect that there is a problem, call the helpline immediately.

ELECTRICAL SUPPLY

Install the RCD

You must install a dedicated RCD if one is not already present. You may wish to use a fused spur/RCD. No more than 7.5 kW of heating may be connected to a single 30 milliamp RCD.

NOTE: It is possible to run the heater(s) from an existing circuit. Consult with an electrician to determine whether or not the circuit can handle the load and if it is RCD protected.

NOTE: When conducting an insulation resistance test on the supply to the thermostat the thermostat and heaters must be isolated or disconnected.

Install electrical boxes and trunking

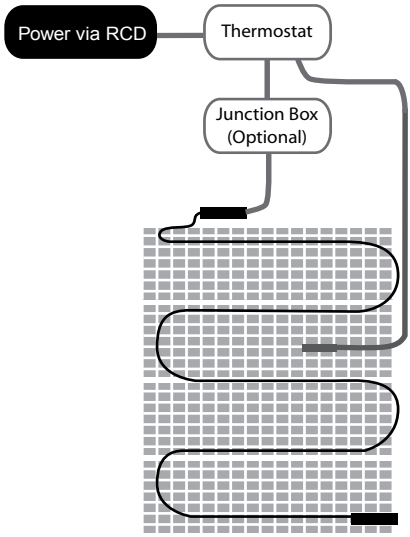
You will require a deep (35-40mm) back box for the thermostat. If you are installing more than two heaters, a junction box will also be required. The wiring from the heater to the thermostat should be chased into the wall and protected by conduit or plastic trunking.

NOTE: In the case of bathroom installations, electrical regulations prohibit the installation of Mains Voltage products such as thermostats, contactors, fused spurs, isolators or junction boxes, within Zones 0 or 1.

Any mains voltage product fitted within Zone 2 must have a degree of protection at least of IPX4 or IPX5 if water jets are present. It is common to install the thermostat outside of wet rooms in the adjacent connected room in circumstances where it is not practicable to install the thermostat within the wet room. When installed in this way, using only the floor probe to control the heating, it is not possible to directly control the air temperature, only the floor surface temperature.

All electrical connections must conform to the current BS 7671 Wiring Regulations. Final connections to the main electricity supply MUST be completed by a Part P qualified electrician.

Wiring Overview



GETTING THE SUBFLOOR READY

Subfloors previously covered in vinyl, cork or carpeting: all old flooring and glues must be removed.
Any materials on or within the subfloor must be suitable for supporting electric underfloor heating systems. If using temperature sensitive materials beneath the electric underfloor heating system, such as damp proofing or tanking systems, contact the manufacturer for advice.

Wooden Subfloors

Make sure that there is enough underfloor ventilation. Secure existing floorboards and if need be, level with a latex/cement self-levelling compound to give a flush fit for the subsequently applied WBP plywood or tile backer board. Fixing ply directly to joists will not always provide a sufficiently stable floor finish for accepting tiles, a rigid base is essential. Always refer to BS 5385: Part 3 for timber floor perparation for accepting tiles.

Concrete Subfloors

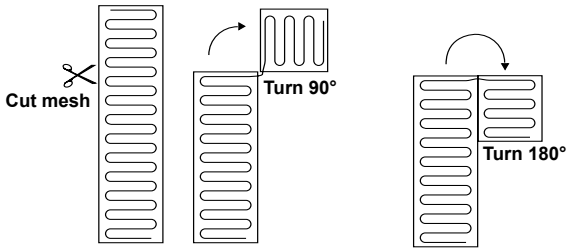
For best results and ease of installation, the use of a “tile backer board” with cement-based facing, such as the Sunstone Insulation Board, is recommended. Fixing of the board should be as per the manufacturer’s instructions. For optimum performance it is recommended that you use Sunstone Insulation Boards beneath the mat. The insulation will improve the systems response to heating demand, saving energy and reducing running costs. Where expansion joints are present in the subfloor, these must be preserved up through all covering layers, including insulation where installed.

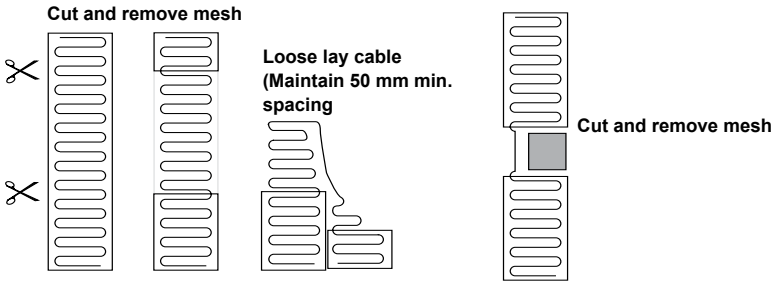
HOW TO CUT & TURN YOUR MAT SYSTEM

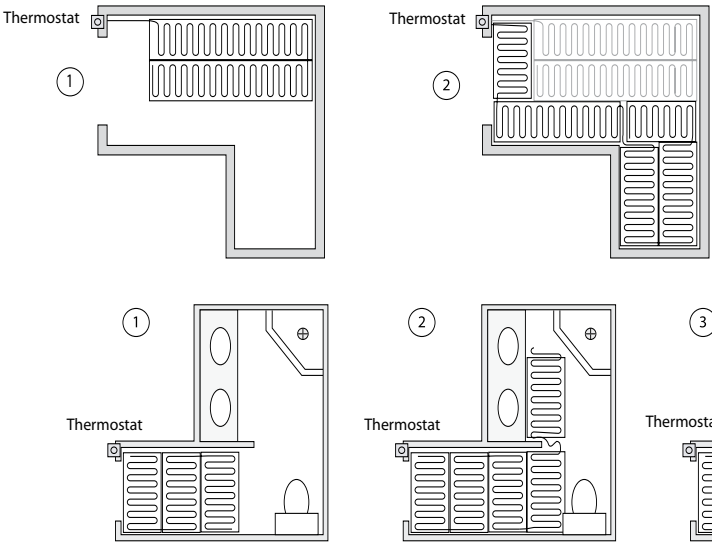
The heating mats can be modified by cutting the fibreglass mesh (NOT THE WIRE) and turning the mat as needed. Examples of turns and flips can be found below. It may not be necessary to completely remove the heating wire from the mesh in order to fit the system into small or odd-shaped areas. It is essential that care is taken during this process not to nick the wires with your scissors.

Please take a moment to double-check that your plan has the proper room dimensions and that you have the correct size and proper number of mats. Mats should run backwards and forwards between walls and obstructions as shown in the examples.

Examples of mat modification and room layout







INSTALLING THE MAT

Resistance Test

Perform a resistance test as shown on page 6 for each mat(s). Record the results in the control card.

Make Indications on the Subfloor

Ensure the subfloor is dry and smooth. If necessary an appropriate smoothing or levelling compound should be applied. Use a permanent marker to mark out the areas on the subfloor where fixtures and other unheated areas are going to be. Do not install the heating mat in any of these areas.
Next, mark the positions and planned route of the power lead cables as well as the position of the floor sensor. Indicate on the subfloor the locations where the mats will need to be turned or where loose wire (detached from mesh) will need to be laid.

Trial Fit the Mat(s)

Laying the mats out according to your plan. At this stage, it is still possible to make any last minute adjustments in the mat layout before securing them. Take care not to step on or kink the mat as this could fracture the wire and damage it.

Fit the Mats

Beginning with the mat furthest from the thermostat location, secure the mats to the substrate using the pressure sensitive adhesive mesh, pressing the mesh into the substrate ensuring a secure bond.
Any loose wires (wire cut away from mesh) should be no closer than 50 mm from each other or from any other wires still attached to the mesh and fixed in place with tabs of tape, taking care to remove air cavities. Once the mats are in place, check that there are no loose sections, paying close attention to the ends of the mats and any section which has been modified by turning.

NOTE: Ensure that the cable is away from the influence of other heat sources, such as heating and hot water pipes, lighting fixtures or chimneys at all times.

At the end of the heating cable, you will find a termination joint. This joint will have to be cut into the subfloor so that it sits at the same height as the heater. DO NOT tape over the termination joint, it must be in direct contact and fully embedded within the tile adhesive or levelling compound being laid over.

Install Floor Sensor

The floor sensor that comes with the thermostat should now be placed below the fibreglass mesh, centred between two parrallel heating elements. It should be secured in place using the double-sided tape, but DO NOT tape over the sensor tip. Air pockets may result in incorrect temperature reading.

It is also wise at this point to check the resistance of the floor sensor using your multi-meter. Refer to thermostat manual for correct floor sensor resistance reading. You may need to change the setting on your meter in order to accommodate the higher readings. If you do not get a reading, your sensor may be damaged.

Fit the Power Leads

Each mat is fitted with a single power lead for connecting the heating mat to the thermostat. In order to keep the power leads at the same height as the heating element, you may wish to cut or chisel a channel in the subfloor. Take care not to damage the heating element. Secure the leads in place using tape however DO NOT tape over the manufactured joint. It must be fully embedded within the tile adhesive or levelling compound being laid over. The power leads will go into the conduit or trunking that leads from the floor to the thermostat. The power leads may be shortened or extended as needed. You must not cut the factory made joint and you must make certain that the joint will be covered with both adhesive and tiles.

Resistance Test

Perform a resistance test as shown on page 6 for each mat(s). Record the results in the control card.

NOTE: Ensure that all of the heating element including the joints are fully embedded within the tile adhesive or levelling compound being laid over. Do not tape over the joints as this will create air pockets that can cause the heater to fail.

LAYING TILES OVER THE HEATING MAT

Cover the installation with a full bed of flexible tile adhesive using a notched trowel. Take care not to damage or dislodge the heating cable. If using tiles smaller than 90 mm cover the installation with levelling compound first.

Carefully lay the tiles and press into the adhesive bed. After laying the first tile, remove and ensure the tile is getting a full coverage of adhesive from your application. Ensure the width of the grout line is in line with the manufacturers instructions for the size and type of tile being used. Tiles must not be removed once the adhesive has set, doing so will damage the heater.

Grout the floor as soon as possible as per the adhesive manufacturer's instructions. DO NOT switch on the heater until the tile adhesive and grout has fully cured. DO NOT use the heater to accelerate the drying process of the adhesive or levelling compound.

NOTE: Please ensure that the tile adhesive used is compatible with underfloor heating.

Other Floor Coverings

If you are planning to install wood, carpet or vinyl over the heater you MUST lay a minimum 10mm levelling compound over the heater. You must ensure that all heating cables are completely covered. It is important that the levelling compound is suitable for use with underfloor heating.

NOTE: Before installing the floor finish its suitability for use with underfloor heating and its maximum operating temperature should be checked against required operating conditions.

Resistance Test

Perform a final resistance test on the mat(s) as shown on page 6. Record the results in the control card.

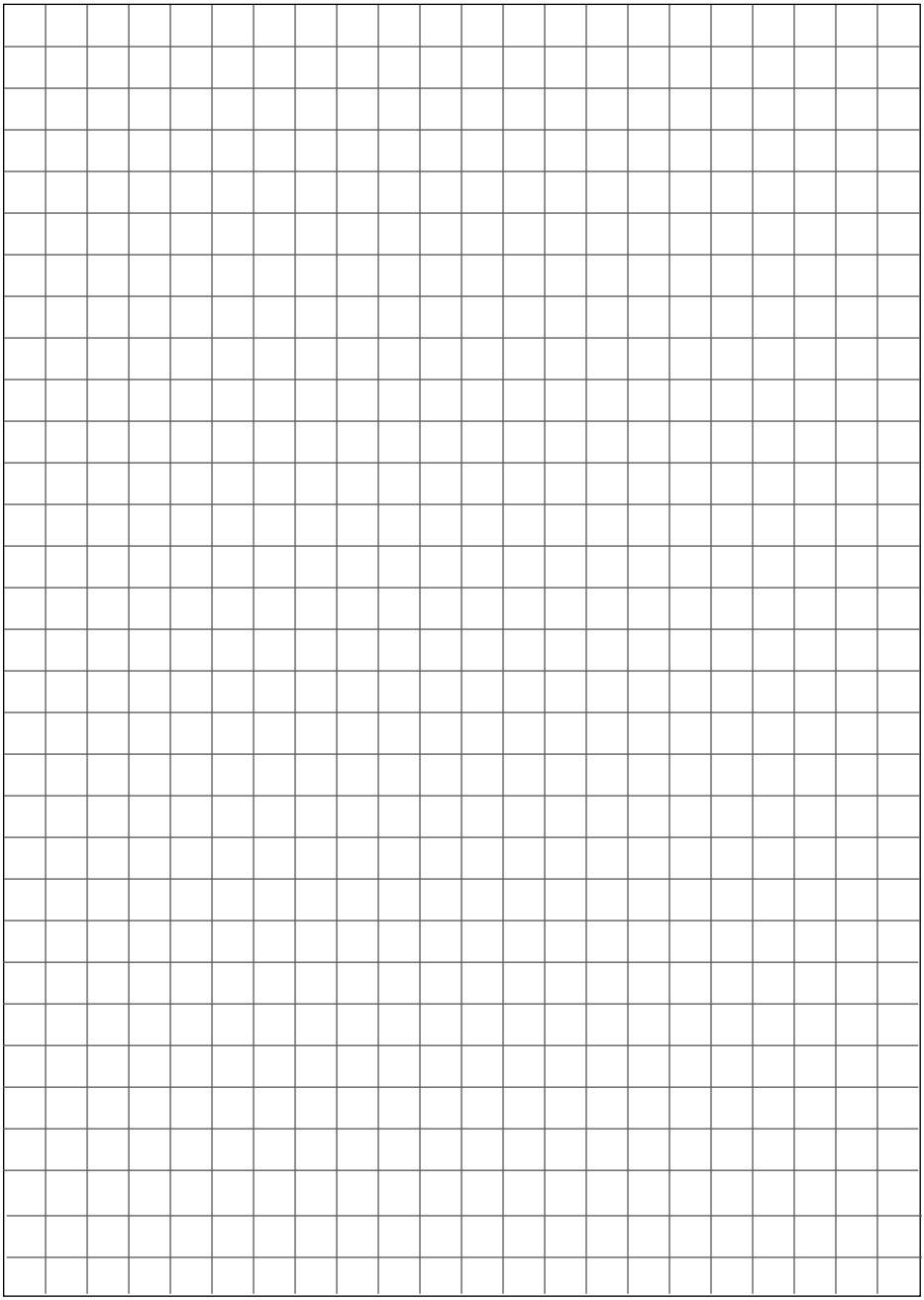
CONNECT THE THERMOSTAT

Install the thermostat in accordance with its installation instructions

Instructions for how to install the thermostat can be found inside the thermostat box. The thermostat must be connected to the main electrical supply via a fuse, circuit breaker or ‘double pole isolator in accordance with National Wiring Regulations.

The heater power cable consists of conductors coloured brown (live), blue (neutral) and earth braid. If you are installing more than two heaters on a single thermostat a junction box will be required. These should be connected in accordance with current wiring regulations by a qualified electrician.

MAT LAYOUT GRID



CONTROL CARD

Place this card in a visible spot close to the consumer unit.

Please Note:

1. A 30mA RCD must be used in conjunction with the heating system.
2. Never cut or shorten the heating element.
3. Ensure all parts of the heating element. (including joints) are installed beneath the tiles.
4. For the guarantee to be valid, this form must be completed.
5. Check that the values match the ones in the instruction manual.
6. Draw a plan showing the layout of the heater.
7. This card must be completed as part of the Warrnaty. Ensure that the values are as per the instruction manual.

WARNING

Radiant Floor Heating Systems - Risk of electric shock

Electric-wiring and heating panels contained within the floor.

DO NOT penetrate with nails, screws, or similar devices.

DO NOT restrict the thermal emission of the heated floor.

Heater Location	Total Wattage

Heater Model	Resistance Before	Resistance During	Resistance After	Insulation Resistance (Pass)	Sensor probe resistance

Signature

Date

Electrician's Part P registration no.

Company stamp/name

WARRANTY

This SunStone underfloor heating mat is backed up by Warmup's team of engineers and is guaranteed against any fault caused by manufacturing defect for a period of 10 years from date of purchase. There is no other warranty, express or implied. No claim can be brought against the manufacturer or its agents for any consequential damages whatsoever. This warranty covers the cost of replacement or repair of the SunStone mat only, subject to the discretion of the manufacturer.

This is the sole warranty, express or implied. The manufacturer or its agents cannot be held liable for any resultant damages. Send the completed form back to: SunStone Warranty, BCR House, 3 Bredbury Business Park, Stockport, SK62SN

Proof of purchase is needed in the event of a claim, so keep your invoice with this warranty

This warranty is subject to the following conditions:

1. To qualify for your 10-year warranty, please register your product by completing and returning the attached "Warranty Registration" form.
2. In the event of a claim, proof of purchase will be required, so keep your warranty with the installation manual.
3. The heater has been installed and used in full compliance with the installation manual.
4. The heater has been earthed and protected by the RCD at all times.
5. The heater is used in conjunction with a thermostat or control system approved by SunStone.
6. The warranty is returned to SunStone within 1 month of purchase of the heater(s).
7. If SunStone or its agents carry out diagnostic or remedial work as a result of a claim being made, and evidence of incorrect installation or usage of the heater becomes apparent, SunStone or its agents shall have the right to levy reasonable charges for the work undertaken by them.

This warranty does not cover heater failure due to incorrect installation or tiling. Please check that the heater is working (as laid out in the installation manual) prior to tiling.

Name	
Address	
Postcode	**Telephone**
Email	
Installer	**Electrician**
Date of purchase	
Room the heating system is installed:	
Subfloor type (Concrete/Wood/Tile Backer Boards etc)**:**	

I hereby confirm that I have read and understand the contents of the Installation Manual and that the heater has been installed as specified therein.
I acknowledge that no claim can be brought against the manufacturer or its agents for any consequential loss or damage whatsoever.
I confirm that the heater was working prior to the commencement of tiling.

Signed: **Date:**

NOTES

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