

INSTALLATION MANUAL

SmartFlex



Intertek



Before you begin installing, read through these instructions carefully and check that you have all the components required.

01473 559077

www.smartmat.co.uk

Introduction

Important notes, please read carefully before proceeding with installation

The SmartMat brand

Congratulations on choosing your SmartMat underfloor heating product from the SmartMat range of underfloor heating solutions.

The SmartMat range has been manufactured to exceed all relevant standards and expectations considering ease of installation and usability through the lifetime of the product.

SmartMat

The SmartMat loose laid cable system provides a flexible and easy under tile heating solution for any floor size or shape. SmartMat is suitable for use beneath most floor types such as ceramic and porcelain tiles, limestone etc. Its thin heating element keeps floor depth to a minimum.

Note: Please seek advice from the manufacturer for floor coverings other than the above regarding suitability with underfloor heating.

Tools needed for installation

The following items are needed to install and test the SmartMat system:

- Tape measure drawing pad and pencil
- Cable strippers and screw driver
- Resistance tester (multimeter)

Contents of SmartMat system

- | | |
|-----------------------------|--------------------------|
| • Heating cable | • eGauge measuring tape |
| • Sensor tube | • eFix double-sided tape |
| • Installation instructions | • eMesh |
| • Warranty | |

Examples of wattage requirements

Wattage requirements will depend on the application. The following can be used as a general guide:

- a) New concrete floors of new well-insulated buildings..... 100W per m²
- b) Wooden floors..... 100W per m²
- c) Wet areas, bathrooms etc..... 150W per m²

Please note the wattage values shown above are meant as a general guide only. Actual requirements will depend on insulation levels, floor construction, type of floor coverings, ambient temperature, movement of people, etc.

Do's & Don'ts

Do

Carefully read this instruction manual before starting your installation and **follow the testing procedure on page 9**.

- Plan your cable layout considering all obstacles, e.g. drain covers, kitchen units bathroom sinks etc, using the grid on pages 10–11.
- Ensure the floor sensor thermostat is inserted within the flexible tube provided, with the floor end of the flexible tube properly sealed (to ensure easy removal of the floor sensor after installation if required).
- Maintain a minimum of 50mm spacing between the heating element runs at all times.
- Take care not to damage the heating cable and cold tail (power cable) whilst screeding the floor area.
- Ensure all the orange heating element is covered with the tile adhesive or flexible self-levelling compound.
- Ensure the floor surface is correctly prepared before installation (*see page 4*).
- Ensure the entire orange heating element is installed within the floor.
- When using more than one SmartFlex from a single supply, cold tails must be connected in parallel.
- When using foil faced insulation ensure all insulation joints are properly taped to prevent the SmartFlex from slipping in-between insulation panels.
- Ensure the SmartFlex is evenly spaced across the complete free floor area.

Don't

- Don't cut or shorten the orange heating cable.
- Don't cross or touch the orange heating cables together.
- Don't connect the heating element to the power supply whilst still rolled up.
- Don't leave rolled up surplus cable under kitchen units or bath spaces.
- Don't commence installation of your floor surface before testing your SmartFlex (*see page 9*).
- Don't tile over damaged or twisted cables.
- Don't install heating cables closer than 50mm.
- Don't install near other heat sources such as luminaries & chimneys.
- Don't place flush fitting furniture, including bean bags, rugs or mats on the floor where heating cables are situated.
- Don't install on stairs or irregular surfaces.
- Don't install SmartFlex when the ambient temperature is below –10°C.
- Don't switch on your under floor heating system for a minimum of 7 days after tiling to allow curing of tile adhesive and grout.

Construction of the SmartMat

Intertek Semko certified as per -----

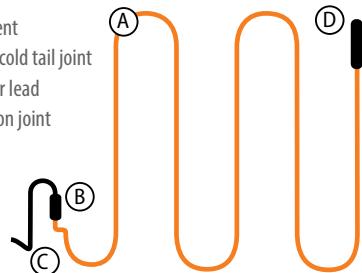


The heating cable consists of a resistance-heating element insulated with Fluoropolymer (FP), possessing high dielectric strength and able to withstand high temperatures, which makes the cable totally safe. A metallic sheath gives additional mechanical strength and provides ground path.

A tough outer PVC jacket protects it from corrosion.



- A Heating element
- B Factory made cold tail joint
- C Cold tail power lead
- D End termination joint



Electrical Requirements

Always consult a qualified electrician regarding your requirements

Please follow these instructions carefully.

If you require assistance prior to or during your installation, please call our helpline on 01473 559077

Important Notes

The heating system installation wiring must be in accordance with the national wiring rules.

The maximum thermal resistance recommended between the heater and the room is 0.15 m²K/W (1.5 TOG)

For safety reasons you must use a fused spur that has a contact separation in all poles that will provide full disconnection under overvoltage category III conditions.

The thermostat/connection box should be positioned flush to the wall surface, about 1.2m (4ft) up from the floor for easy access and setting. Route the floor sensor cable and the heating cable cold leads to the thermostat/power connection box in separate conduits.

In case the heating system load is below 3.2KW, based on thermostat power rating, it can be connected directly to a control electronic thermostat, as per the diagram on the right, which shows a typical scheme of an electrical system. If the heating system load is more than the thermostat power rating, you must consult a qualified electrician for the scheme.

GFCI (Ground Fault Circuit Interrupter)/Residual Current Device (RCD) or equivalent having a rated residual operating current not exceeding 30mA is recommended for protection against earth leakage currents.

List of accessories required in addition to the heating cables:

- Floor sensing programmable thermostat (*see below*)
- Main switch
- Residual current device (RCD)

Note:

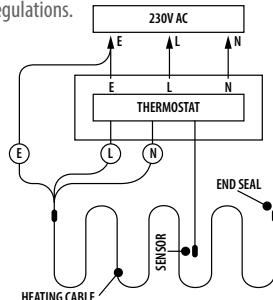
Details of the thermostat installation will be available in the installation manual provided with the thermostat.

Controls

- Thermostat-OJ Electronics OCC4 with sensor

For a 3.2KW load a 16A GFCI/RCD is required. Please consult a qualified electrician for selecting a GFCI of suitable rating based on the floor heating system or any other protection equipment as per the applicable local rules and regulations.

Caution: Radiant floor heating systems, warning risk of electric shock, electrical wiring and heating panels contained below the floor. Do not penetrate with nails, screws, or similar devices. Do not restrict the thermal emission of the heated floor.



This symbol means **Direct Floor Heating**

Pre-Installation Instructions

Ensure the sub-floor is structurally sound, clean and dry before you begin



Ensure your SmartMat is the correct size before unpacking the product.

Call 01473 559077 if you have any questions.

Important Notes

Keep an accurate record of where the cables are installed to assist you for future reference, (eg, during renovation work).

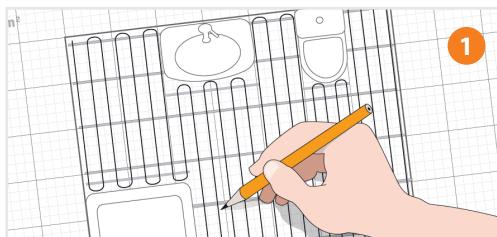
Part P wiring regulations state that a diagram must be placed next to your fuseboard showing where underfloor heating is installed.

Step 1: Planning

Using the grid on pages 10–11, draw a layout of your room – include all obstacles, e.g. drain covers, toilets, sinks etc – then determine the required floor area to be heated.

Decide a suitable position for the thermostat (start point) then calculate your cable spacing and layout (*see page 7*).

Timber substrates should be prepared as required by tiling guidelines, for example, bracing of a timber floor with WBP or tile backer board.



Step 2: Install underlay/insulation boards

Prepare the floor ready for the SmartMat installation. Remove all loose particles, thoroughly clean the floor then treat with any proprietary sealants as normally required.

If your existing floor has a bitumen or asphalt surface it must either be removed or covered with a thin flexible self-levelling compound, sand cement mix or foil faced insulation panels. If installing foil faced insulation panels do so in accordance with the manufacturer's instructions.



Ensure all joints are properly taped & sealed to prevent the cable from slipping in-between insulation panels.

Step 3: Install the flexible tube

Directly below the electrical connection point install a 10mm flexible tube. The flexible tube must be situated in-between two cable runs (*see step 6*).

The floor sensing probe is installed into the flexible tube to monitor the floor temperature. Ensure the tube is installed to allow easy replacement of the sensor probe in case it fails.

- Seal the flexible tube to prevent sand/cement mix or self-levelling compound entering the tube.
- Secure the flexible tube in position with a section of fixing strip or robust utility tape.



Installation Instructions

Read through these instructions carefully before laying your cable

Step 4: Lay the adhesive & measuring tape

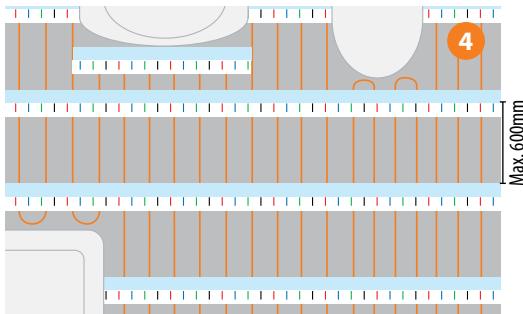
Lay the eFix double-sided adhesive tape across the floor, perpendicular to your proposed heating cable layout, ensuring there is tape at either end of the cable loops and in-between, spaced at a maximum of every 600mm. Then lay the eGauge measuring tape in line with the eFix tape.

eFix

Double-sided adhesive tape

eGauge

Measuring tape



Important Note

Now perform the following tests (see page 9):

- Insulation resistance test
- Heating cable resistance test
- Thermostat floor sensor resistance test

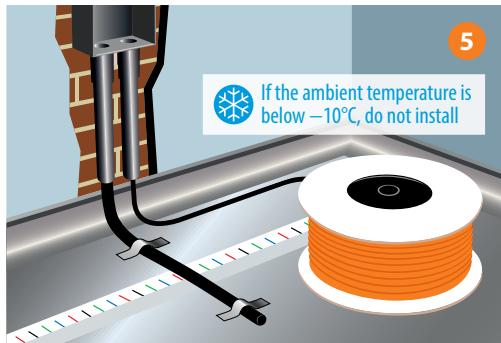
The findings must be recorded on the *Commissioning Record* enclosed in the mat box or your warranty will be invalidated.

Step 5: Connect the floor sensor cable

Remove the securing tape from your SmartMat roll and position at the start of your cable plan with cold tail (power cable) at the electrical back box.

Ensure the separate thermostat floor sensor cable is inserted into the pre-installed 10mm flexible tube and returned to the low level electrical back box.

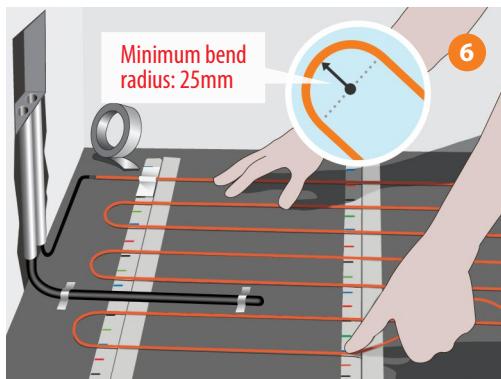
The cold tail joint must be positioned in the floor area.



Step 6: Lay the cable

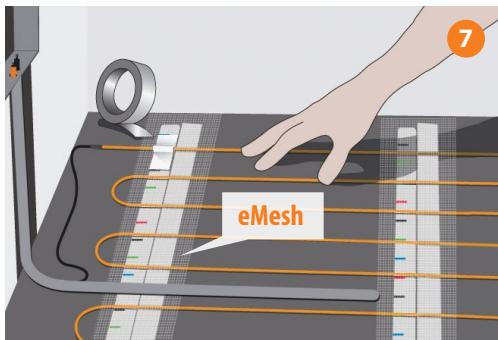
Once the cold tail (power cable) and thermostat floor sensor probe have been positioned you can now start to lay your heating cable. Following your previously drawn layout and spacing, continue to lay and secure your heating cable onto the double-sided adhesive tape using the eGauge for guidance (refer to the eGauge spacing guide on page 7). Continue laying cable until the total floor area is covered. All the heating cable must be used, any excess heating cable must be reconfigured into the floor area by adjusting your cable spacing.

- Do not cut any surplus heating cable.
- Do not leave any excess heating cable spooled or coiled in the floor area.
- Ensure all heating cable is used and spaced evenly across the floor.
- Ensure the cables are not laid in areas where fixed appliances will be positioned, e.g., underneath sink basins or toilet pans.



Installation Instructions

Read through these instructions carefully before laying your mat



Step 7: Lay the eMesh

Lay the eMesh onto the double sided tape to secure the heating cables. Further lengths of eMesh can be used to secure the heating cable between the double-sided tapes, if required.

Important Notes

- Take care not to damage the heating cable.
- Do not disturb the cables from their pre-placed spacing.
- The cables must never be cut or trimmed to fit into a space that is too small.
- Care should be taken to avoid damage during installation, such as dropping heavy or sharp objects, stepping on the cables or careless laying of the screed.

Important Note

The maximum thermal resistance recommended between heater and the room is $0.15\text{m}^2\text{ K/W}$ (1.5 tog).

After the finished floor covering has been laid, perform the following tests again (see page 9):

- Insulation resistance test
- Heating cable resistance test
- Thermostat floor sensor resistance test

The findings must be recorded on the *Commissioning Record* enclosed in the mat box or your warranty will be invalidated.

Register your warranty online:

www.smartmat.co.uk/warranty

Just before covering the SmartMat check the resistance of the mat again (see page 9 for details) to make sure damage hasn't occurred during the installation process.

Step 8: Cover the SmartMat

With the SmartMat laid and secure, it can now be covered with either a flexible tile adhesive or flexible self-levelling compound.

Ensuring there are no air pockets, carefully spread the flexible tile adhesive or self-levelling compound until all heating cables are covered.

You may tile directly over the SmartMat, carefully applying your flexible tile adhesive with a notched trowel, making sure each tile is securely fixed and all cable areas are completely covered with flexible tile adhesive.



Don't switch on your SmartMat system for a minimum of 7 days after tiling to allow tile adhesives and grouts to completely cure.



Don't place flush fitting furniture, including bean bags, rugs or mats on the floor where the heating cable is situated.

Cable Spacing and Layout Instructions

Calculate the cable spacing and work out the layout

It is important when calculating your SmartMat spacing to accurately draw your room area as this will help to save time and ensure a smooth installation. Use the grid on pages 10–11 to sketch your floor plan.

1. Draw your total room area including all fixed furniture such as kitchen units, toilets and sink areas. Mark your drawing with all relevant dimensions.
2. Calculate the total floor area of your room.
3. Calculate the area taken by all the floor obstructions.
4. Calculate the free floor area by subtracting the border area from the total area.
5. Calculate the watts per m² of your installation by dividing the rated power of your flex cable by the free floor area. For example, if you have 4.6m² of free floor and you have a 600W heating cable:

$$600W \div 4.6\text{ m}^2 = 130\text{W/m}^2$$

6. Using the calculated watts per m² of your room, refer to the lookup table below for an indication of the required cable spacing to ensure even cable spacing across the floor and therefore an even heat.

Cable space & wattage per m²

W/m ² of Room	Cable Spacing	eGauge Spacing Guide
80W/m ²	125mm	5.5 spaces
89W/m ²	112.5mm	4.5 spaces
100W/m ²	100mm	4.0 spaces
114W/m ²	87.5mm	3.5 spaces
133W/m ²	75mm	3.0 spaces
160W/m ²	62.5mm	2.5 spaces
200W/m ²	50mm	2.0 spaces

Sketch your **Floor Plan**

using the grid on pages 10 & 11



Fig 1

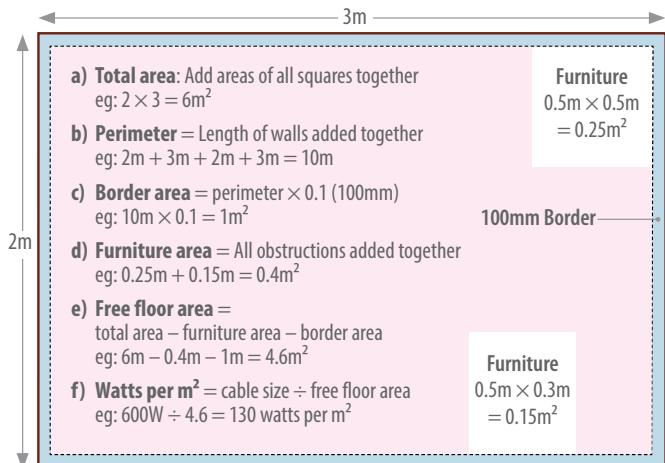
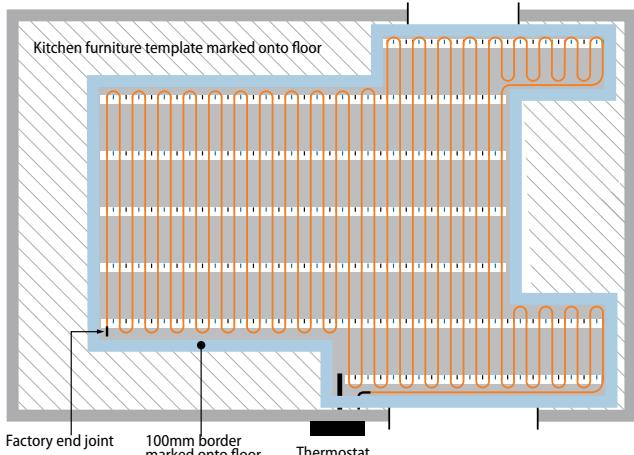
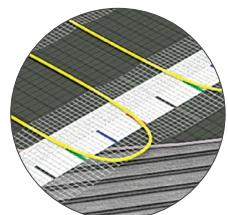


Fig 2



eGauge Measuring Tape

The eGauge tape is set out to give you a guide to evenly space your heating cable across the floor. The coloured marks (green, blue and red) are spaced 25mm apart and indicate one full space, the thin black lines between the coloured spacing indicate a half spacing.



Cable Spacing and Wattage

Calculate cable spacing, wattage and total load

SmartFlex is a Twin Conductor Under Tile Heating Cable
(UTHC-T*FP**-10W).

Product specifications

Quick Find	Length	Wattage	Current	Resistance @20°C (-4/+9%)
13487	5m	50W	0.22A	1058.00 Ω
13488	10m	100W	0.43A	529.00 Ω
13489	30m	300W	1.30A	176.33 Ω
13490	40m	400W	1.74A	132.25 Ω
13491	60m	600W	2.61A	88.17 Ω
13492	80m	800W	3.48A	66.13 Ω
13493	100m	1000W	4.35A	52.90 Ω
13494	120m	1200W	5.22A	44.08 Ω
13495	140m	1400W	6.09A	37.79 Ω
13496	160m	1600W	6.96A	33.06 Ω

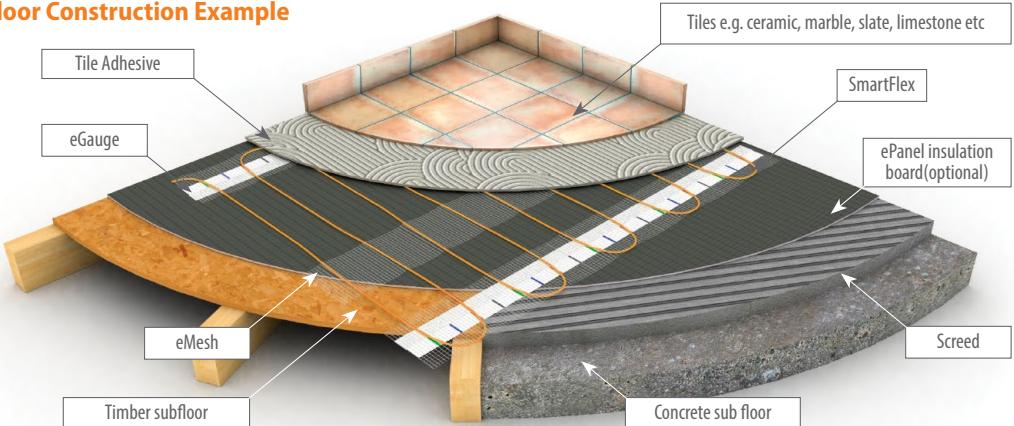
*Twin conductor **Fluoropolymer insulation and PVC sheath.

Calculator

Calculate your total load

Total Load

Floor Construction Example



Testing & Commissioning

The Warranty Validation Procedure must be carried out to validate the warranty



Warranty Validation

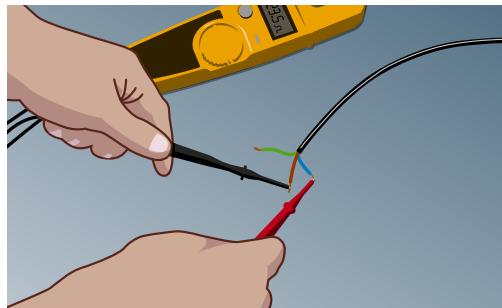
To validate your lifetime online warranty registration you must perform the insulation resistance test, the heating cable resistance test and the sensor resistance test three times during the installation process.

1. Before you lay the cable.
2. After you have laid the cable and before you cover it.
3. After your finished floor has been laid.

This information must be recorded on your Commissioning Record (enclosed in the cable box), otherwise the warranty will be invalidated.

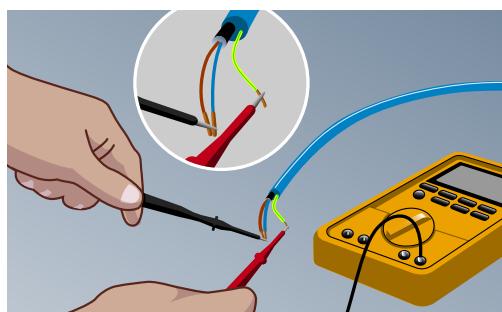
Heating Cable Resistance Test

This test is carried out to prove continuity of the heating element. A low resistance ohm meter should be used (ie Multimeter on ohm setting), connect your meter on to the brown and blue mains lead and confirm resistance value matches that quoted on your specification label on the cable cold lead joint.



Floor Cable Resistance Test

As per the *Heating Cable Resistance Test* above but repeat with floor sensor cable.



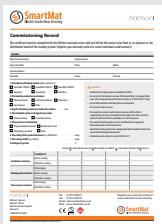
Insulation Resistance Test

This test is performed to measure the insulation resistance between conductors and ensures the cable insulation is not damaged. A low resistance reading indicates a damaged cable and must be repaired or replaced.

The insulation resistance tester should be connected between the conductors (blue and brown cables) and the earth (yellow/green cable). The meter should record a high resistance value e.g. above 100 Meg ohms.

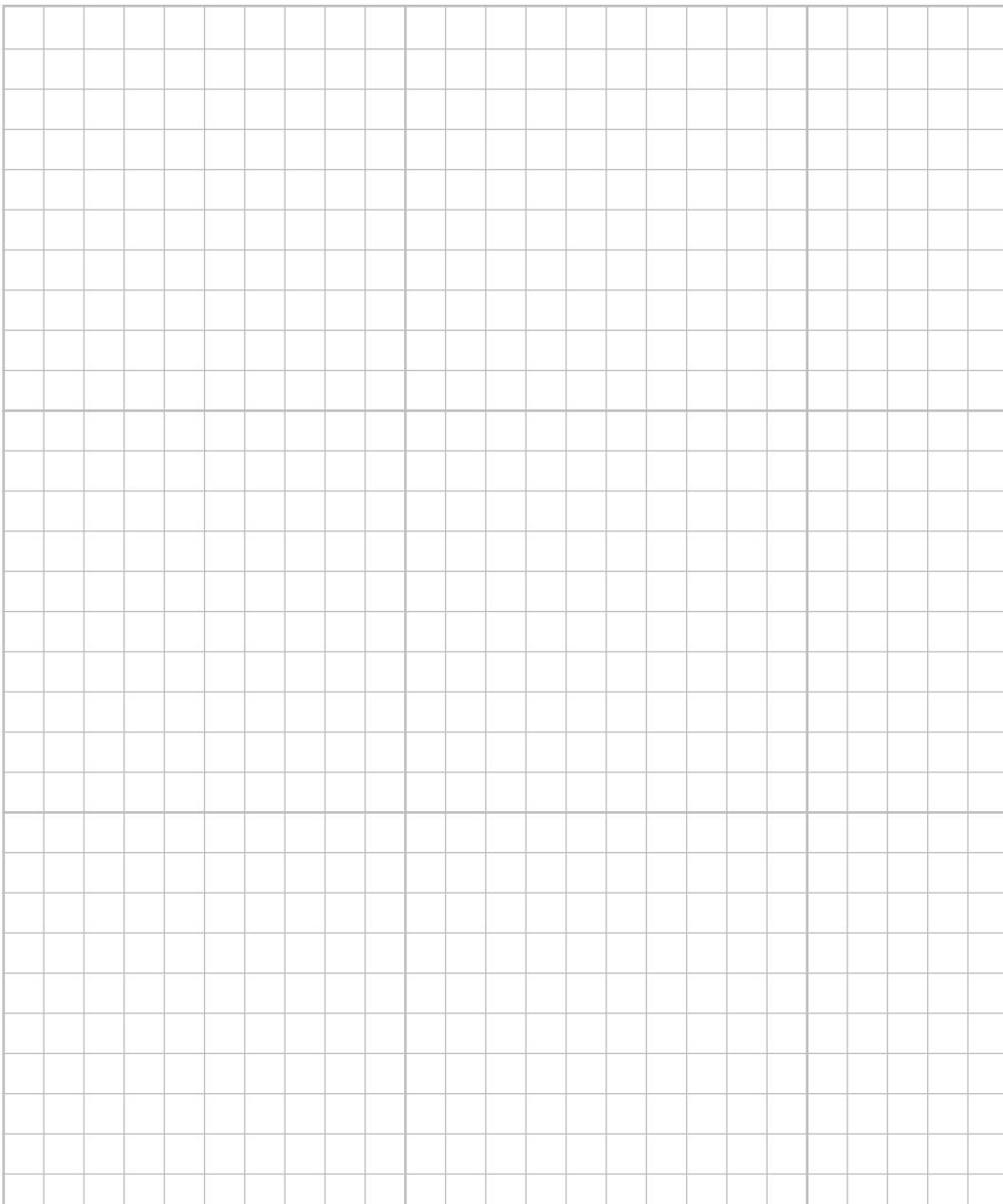
Important Note

The Commissioning Record must be placed adjacent to the distribution board and must contain the location of the installed underfloor heating



Floor plan Sketch

Calculate your total heat area



Floor Plan Sketch

Calculate your total heat area



Scale approx 1:18 (56mm = 1m)

When sketching your floor plan, please work around any permanent / fixed furniture items as these will block the heated areas

Troubleshooting

Refer to the table below and contact us with any questions on 01473 559077.

Symptom	Probable Causes	Corrective Action
Floor does not heat	No power at controller RCD/MCB tripped Thermostat not set correctly Cable not correctly connected with thermostat Floor temperature sensor not connected Faulty sensor/thermostat Heating element cut or damaged	Check power supply Check the circuit is not overloaded Refer to thermostat instructions Refer to thermostat instructions Refer to thermostat instructions Contact the SmartMat Helpdesk 01473 559077 Contact the SmartMat Helpdesk 01473 559077
Floor warming all the time	Thermostat not set correctly Floor temperature sensor not connected	Refer to thermostat instructions Refer to thermostat instructions
Floor not getting warm enough	Thermostat not set correctly Floor sensor too close to heating element	Refer to thermostat instructions Contact the SmartMat Helpdesk 01473 559077

Contact the SmartMat Helpdesk with any questions on 01473 559077

Notes

Use this space to make notes for reference



SmartMat
Edison House
Edison Close
Ransomes Europark
Ipswich, Suffolk IP3 9GU

Tel: 01473 559077
Fax: 01473 276678
Email: sales@smartmat.co.uk
Web: www.smartmat.co.uk

