

# Instructions for Installation of Electric Underfloor Heating – In Screed *Cable*

**Before you begin installing please read through these instructions carefully & check that you have all the components required.**

This system is designed for installation with new concrete screeds or directly below thick stone floors. When installed in new screed, any floor finish suitable for use with underfloor heating can be used (always check with flooring supplier/manufacturer concerning suitability). If used as the sole heat source for the building, we recommend that a heat loss calculation is carried out prior to installing to ensure that you have the correct system for your requirements.

## ***Contents of heating kit***

- 6mm twin conductor heating cable
- Digital thermostat & separate floor sensor
- Guarantee Certificate



## **Installation Notes:**

- *The system requires a mains voltage 230/240v & must be connected in compliance with **building regulations Part P approved document**.*
- *The system is intended for installation in new insulated screed floors. The recommended output is dependent upon the application, but is typically 50-100% increase on the buildings net heat loss. This will be approximately 100-150W/m<sup>2</sup> in a new construction & between 150-200 watts in a conservatory or other area of high heat loss.*
- *The cold cable connected to the orange heater cable is double insulated & the first outer sheath (coloured black) carries an earth screen (the silver coloured braid). The cable also contains a built in return meaning that the cable only has to be connected to the thermostat from one end. Within the earth screen there are 2 wires, these are the live & neutral.*
- *For larger areas, if two or more cables are supplied, these can usually be connected together at the thermostat or by using a small blank fronted connection box.*
- *The system is suitable for installing onto an existing insulated concrete sub-floor, or directly onto either foil backed or cement coated insulation boards, such as **Kingspan, Celotex or Marmox**. It may also be installed over standard polystyrene, but in this case the cable must be fixed to a mesh grid to ensure that the cable does not come into direct contact with the polystyrene.*
- *The screed should be allowed to fully cure before turning on the system, this could take up to 1 day per mm (a 75mm screed therefore should be left 75 days). Refer to screed manufacturers instructions for drying times.*
- *The electrical & electromagnetic fields generated are negligible & well within all recommended European & International guidelines.*
- *The orange heater cable **MUST NOT** be cut, or cross at any point.*

## Heating Guidelines:

Installation of the heating cable will vary depending on the application, but the following can be taken as a general guide:

New concrete floors of new well-insulated buildings: **100-170W/m<sup>2</sup>**

Conservatories or areas of high heat loss: **160-200W/m<sup>2</sup>**

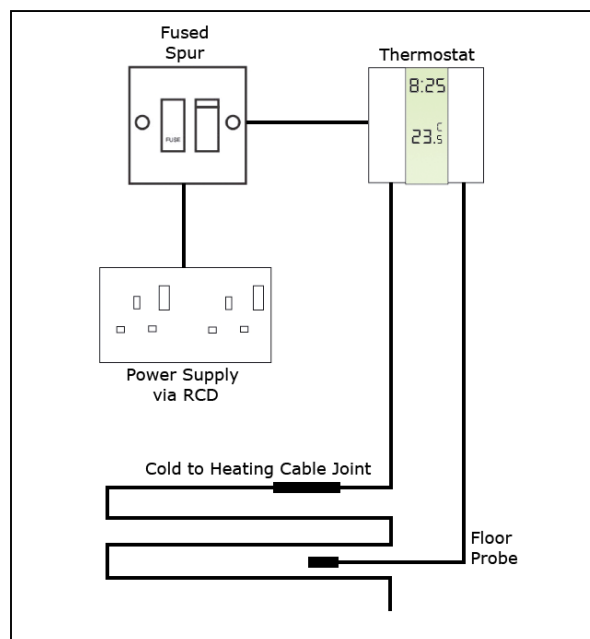
Outdoor defrosting of drives & pathways: **200-250W/m<sup>2</sup>**

Please note these values are meant as a general guide, actual requirements will depend on insulation levels, floor construction & type of floor coverings. When installing as a primary heating source we strongly recommend that a full heat-loss calculation is undertaken prior to commencing the project in order to determine the requirement for the building.

## Electrical Provision:

Before starting the installation you should make provision for the electrical connections. For smaller areas this should be possible by means of a fused spur or combined RCD spur from an existing circuit – see Fig 1. However, for larger areas a separate circuit from the distribution board is recommended – you should **always consult with your electrician concerning your requirements.**

**Note – if installing in a bathroom or other ‘wet’ room the thermostat must be located OUTSIDE of the room.**



Typical installation for systems below 3000W

### Important Notes:

The system **MUST** incorporate a 30mA RCD protection either at the distribution board or by replacing the fused spur with a combined fused spur/RCD.

The orange heater cable **MUST NOT** be cut, or cross at any point – only the black ‘cold’ cable & the floor probe can be cut or lengthened.

The joint between the orange heater cable & the black cold cable **MUST** be located under the final floor covering.

For larger areas a separate circuit will be required – always consult your electrician concerning your individual requirements.

The thermostat has a rating of 15amps – loads in excess of **15amps** (3.45kw approx) will either, require further thermostats or need to be connected via a suitable switched contactor - consult your electrician on this.

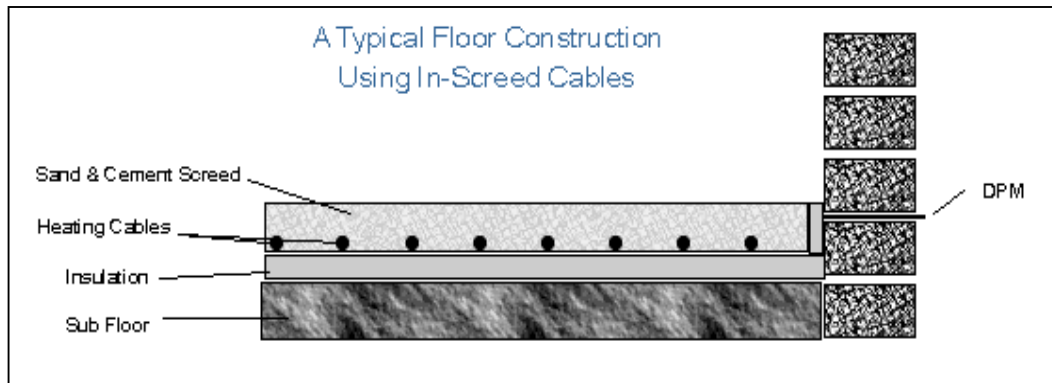
The thermostat is rated to IP20 and **MUST NOT** be located in a bathroom.

## Insulation:

The insulation levels of a floor will affect both the performance & running costs of an underfloor heating system. Suitable insulation boards are available from your underfloor heating retailer/supplier or from your local builders’ merchant. Note – if using a non-construction strength insulation board such as Celotex or Kingspan a minimum screed depth of 50-75mm is recommended. It may be possible to use a thinner ‘latex’ type screed over construction boards such as Marmox – always consult with your supplier or industry standards concerning specifications of floor construction.

## Typical floor cross-section:

Installation directly over foil backed insulation board with 50mm sand & cement screed:



## Insulation boards:

If installing over foil-backed insulation, install the insulation board in accordance with the manufacturer's instructions. All new floors must also incorporate a DPM (damp proof membrane) as per building regulations

## Installation

### Methods of fixing

- Onto foil faced insulation fixed in place with a self adhesive PVC-cloth tape (Duct Tape).
- Onto sub floor or foil faced insulation fixed in place with cable fixing strip. Fixing strip installed @ approximately 1m spacing.
- Onto sub-floor foil faced insulation or standard polystyrene insulation fixed to re-enforcement mesh with cable ties.

### Step 1

Before laying the cable you must mark out any areas where the cable is not being installed, e.g. where the floor is likely to be drilled or the areas of any fixed units etc.

This should be done clearly with bright coloured paint.





## Step 2

If using the metal cable fixing strips these should be laid out over the area to be heated at intervals of approx 1 metre. The fixing should be laid at right angles to the direction of the cable & can be fixed down with masonry nails or double-sided tape.

If using a re-enforcement mesh, this can be laid onto the floor without fixing.

## Step 3

### Calculate the cable spacing

This is a very important step & **MUST** be done correctly to ensure all the cable is used up & avoid extra work later.

First measure the area to be heated in sqm (do not include the area taken up by fixed objects such as baths/showers & kitchen units.), also allow a perimeter of 5-6cm around the edge of the room then divide this area by the length of the cable shown on the drum. The cable is 20W per linear metre so a 3000 watt kit contains 150 metres of heating cable.

The spacing is calculated by dividing the total sqm of the area to be heated by the cable length in metres (see example opposite)

When planning the layout, the cable loops should be no closer than 5cms from the room perimeter.

Example room: 5m x 4m (20m<sup>2</sup>)

The recommended cable for this area would be a 3000W giving 150W/m<sup>2</sup>

The calculation would therefore be 20sqm ÷ 150m = 0.13 The spacing guide is therefore 13cms apart.



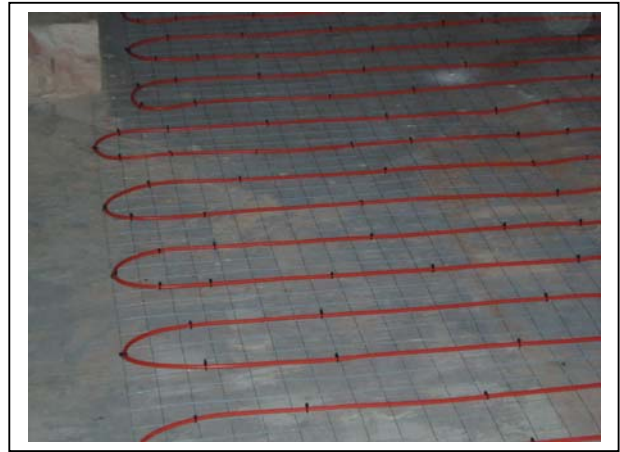
## Step 4

Test the resistance of the cable prior to installing and ensure that the reading is as per manufacturers design reading. This can be found on the silver label on the packaging or printed on the PVC sheath (±10%) Make a note of the reading.

**DO NOT** screed over the cable without first testing it.

## Step 5

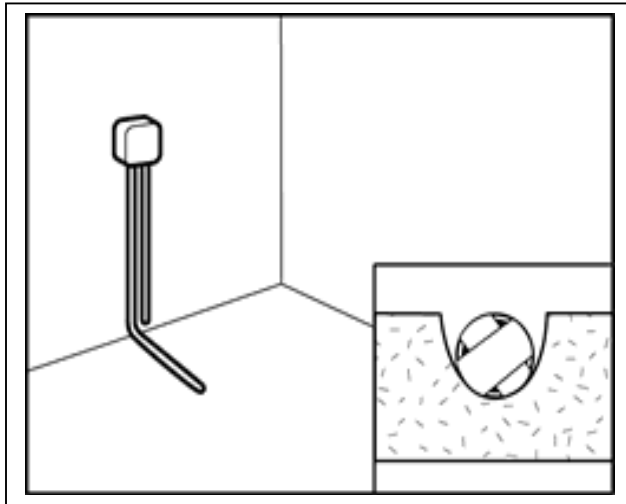
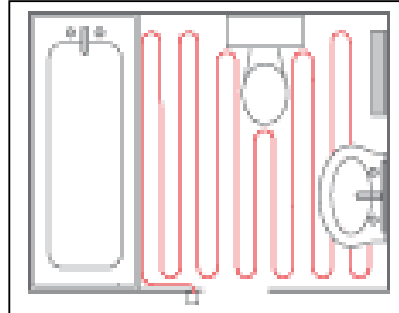
Starting at the thermostat or point where the cables are to be joined, lay out the cable across the floor area, fixing into position as you go. As the cable has a built in return you do not have to bring it back to the starting point, you simply finish laying at the opposite corner of the room ensuring that the black 'crimped seal' on the end remains under the floor.



*Installation onto re-enforcement mesh shown*

## Step 6

Document the position of the cables by taking photographs or making sketches - include the location of the orange/black cable joints and the cable ends.



## Step 7

Test the resistance of the floor probe. Refer to the label on the floor probe packaging for desired resistance readings. Make a note of the reading. Position the floor sensor between two runs of cable and fix into position. The sensor wire can be shortened or if necessary, lengthened with 2core flex cable. If you need to cut the sensor wire, you must only cut the end containing the wires. **DO NOT** cut the end which contains the plastic sensor. The connections to the thermostat can now be made (See separate thermostat instructions). **DO NOT** turn the system on until the floor has been laid and has had adequate time to dry.

## Step 9

You can now screed over the cable. Avoid using tools with sharp edges near the cable as these may cause damage to the PVC insulation. Once application of the screed is complete, leave to dry (refer to screed manufactures instructions for curing times). **DO NOT** use the heating cable to accelerate curing time as this could compromise the integrity of the screed.

## Step 10

Test the resistance of the cable and floor probe one last time to ensure that neither has been damaged during screeding. Record final readings and complete the guarantee certificate. If this is not completed the guarantee is invalid. Retain the certificate for your records.

## Step 11

### Before turning on the heating

Wait for the screed to fully cure before turning the heating on – the usual recommendation is 1 day per mm of screed. If the heating is turned on before the screed is cured, the integrity of the floor could be compromised.

Once the floor is fully cured the system can be turned on. Program the system to operate as desired. See separate thermostat instructions for programming.

The system may be slow to react at first especially if installed in a new-build application or if used as in-slab heating. Start by setting the floor temperature at around 20-22° C & build up by 1 degree per day until your desired temperature is reached

Because of the nature of an in-screed/in-slab heating system, where by the floor structure is heated and energy released over time, it is advisable that the system be programmed to take full advantage of off-peak electric periods. Consult your electricity supplier for further information.

## **DO'S & DONT'S**

- DO** – Read through these instructions carefully before beginning work
- DO** – Use flexible adhesives & grouts if tiling
- DO** – Test the cable and floor probe BEFORE & after screeding
- DO** – Be careful not to damage or dislodge the cable during screeding
- DO** – Ensure the cable is spaced no closer than 50mm between loops
- DO** – Try to protect the cable with boards during screeding
- DO** – Wait the required time before turning the system on
- DO** – Read the separate installation & operating instructions for the thermostat
- DO** – Ensure that the joint between the black & orange cable is beneath the floor

- DON'T** – Attempt to cut the orange heater cable at any point
- DON'T** – Allow the wires to cross or touch
- DON'T** – Allow excessive foot traffic over the wire before screeding
- DON'T** – Place tools or heavy objects on the cables at any time.

### Need assistance in finding an electrician?

Visit the NICEIC Website - [http://www.niceic.org.uk/common/contractor\\_search.html](http://www.niceic.org.uk/common/contractor_search.html)