



Underfloor Heating Cable Installation Manual

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

SAFETY INFORMATION

-  Perform a site inspection. You will need to confirm that all measurements and other requirements on site match your working drawings.
-  Inspect the site for possible hazards that could damage the heating cable, such as nails, staples, materials or tools. Ensure that during the course of the installation no damage is caused to the heating cable by falling or sharp objects.
-  Ensure all electrical connections conform to the current BS 7671 National Wiring Regulations. Final connections to the main electricity supply **MUST** be completed by a Part P qualified electrician.
-  Ensure the system is protected by a dedicated 30 mA RCD/RCBO or an existing RCD/RCBO). Time delay RCD's must not be used.
-  Ensure the Control card, EcoDesign compliance card at the back of the manual, layout plan, and all electrical test records are completed and affixed to the consumer unit, following the current BS 7671 standards.
-  The subfloor must be pre-insulated unless it is an intermediate floor. Ensure the subfloor is prepared to an SR1 Surface Regularity. The subfloor must be smooth, dry, frost-free, solid, suitably weight-bearing and dimensionally stable.
-  Ensure suspended timber subfloors are prepared in accordance with national standards and that manufacturer instructions are properly followed to avoid subfloor movement to prevent any damage to the system.
-  Install the floor sensor centrally between two closest parallel runs of heating cable and away from other heat sources such as hot water pipes, lighting fixtures, chimneys etc.
-  Before installing the floor finish, its suitability for use with underfloor heating and its maximum operating temperature should be checked against required operating conditions. Ensure the heat output of the floor meets your requirements.
-  Install floor coverings which are at least 5 mm thick. For floor coverings other than tile, lay a minimum 10 mm levelling compound over the heating cable first. Check with flooring manufacturer for suitability with floor heating.
-  Ensure the floor surface is smooth, clean and dry before priming the floor, ensuring good ventilation during application and drying of the primer.
-  Underfloor heating performs the most efficiently with conductive, low resistance floor finishes such as stone and tiles. Consideration should be given to the thermal resistance and temperature limits of the chosen floor covering and its impact on the system heat output.
-  Ensure all furniture installed over underfloor heating has feet, creating a minimum 50 mm ventilated space beneath it to allow heat flow into the room.
-  The heating must be separated from other heat sources such as luminaires and chimneys.
-  This heater incorporates an earth connection for functional purposes only.
-  This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

SAFETY INFORMATION

-  The coldtail can be cut / extended where required. This heating cable has a type Y coldtail attachment, therefore if the coldtail is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
-  Heating cables must not cross building expansion joints. If a heated floor is divided by expansion joints, use separate systems for each area. However, the coldtail can cross the joint within a 300mm conduit.
-  Levelling compounds must be suitable for single pour installation depths of at least 10 mm.
-  DO NOT cut, shorten or extend the heating cable, it must be fully installed within the layer of tile adhesive or levelling compound. The heating cable must not be installed over another cable run, over coldtails or the floor sensor.
-  DO NOT leave surplus heating cable rolled up under units or fixtures, use the correct size system for your installation.
-  DO NOT attempt a DIY repair if you damage the heating cable, contact us for assistance.
-  DO NOT tape over manufactured joints or the sensor tip. Doing so will cause air pockets and damage the heating cable and sensor. The manufactured joints and heater must be covered with a full bed of flexible adhesive directly beneath the heated floor.
-  DO NOT install items above the heating system which have a combined resistance of more than 0.15 m²K/W. Such items include bean bags, heavy rugs, flat furniture, animal beds or mattresses.
-  DO NOT bend the heating cable under 25 mm radius.
-  DO NOT switch on the system until the tile adhesive and grout has fully cured. DO NOT use the heating cable to accelerate the drying process of the adhesive or levelling compound.
-  DO NOT install the heating cable in temperatures less than - 10 °C.
-  DO NOT install the system on irregular surfaces such as on stairs or up walls.
-  DO NOT use staples to secure the heating cable to the subfloor.
-  DO NOT install cables in locations where they will increase the ambient temperature of any existing electrical installation above its rated value.

Symbols used in manual

WARNING! Radiant direct floor heating system.

Risk of shock or fire

Failure to comply with local wiring regulations or the contents of this manual may result in electric shock or fire!



Installation in concrete or similar material



Important information



BEFORE YOU BEGIN INSTALLATION...

Choice of floor covering

The SunStone system has been designed primarily for use with stone or tile floors. For floor coverings other than tile, lay a minimum 10 mm levelling compound over the heating cable first. Check with flooring manufacturer for suitability with floor heating.

Electrical Installation: a job for the professionals

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 BS 7671, the current IEE Wiring Regulations.

Installing an RCD

The SunStone undertile 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 7.5kW 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.

Testing of the Heater

One of the most important steps to be taken when installing the heating system is the testing process. The system should be tested before, during and after its installation:

Before: Using a multi-meter, check the resistance of each heater prior to installation to ensure that it has not been damaged whilst in transit to the installation site. Make a note of the resistances in the Control Card, supplied as part of this manual.

During: Test the resistance of each heater again once they have been secured to the subfloor to maintain that no damage occurred during installation.

After: Test again after the floor covering has been laid to ensure that no damage has been done during the setting of the tiles.

ABOUT THE SUNSTONE HEATER

Wire Composition:



Element Core

Insulation

Metallic Earth Braid

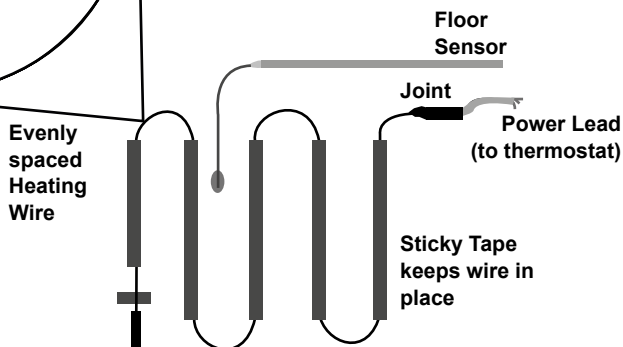
PVC Insulation

Floor Sensor:

For the thermostat and heating system to work properly, installation must be correct.

Before embedding in adhesive, position the sensor at least 150mm into the heated area, exactly between two runs of heating element. Keep the sensor tip away from drafts, sunlight, radiators, hot water pipes or other sources of heat fluctuations.

Heater Layout:



The joint which connects the heater wire and power lead 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 and floor sensor.

Adapting the heater to room shapes

The heater is flexible enough to follow the shapes of units, so that the maximum area of coverage is achieved. Take care not to damage the wire in any way. If you believe you have cut the wire, call the helpline immediately.

REMEMBER!

If you have any question regarding the installation of your heater, please call the helpline on 0345 034 8272.

ELECTRICAL INFORMATION

A dedicated 30mA RCD is compulsory and each thermostat must be protected by a fused spur. Combination RCD/fused spurs should be used if the electrical circuits are not protected by a RCD.

It is possible to run the heater(s) from an existing circuit but check with an electrician if the circuit is RCD protected and can handle the load.

The heater must be separated from the power supply by suitably rated circuit breaker that disconnects all poles with at least 3 mm contact separation. Use MCB's, RCBO's or fuses for this purpose. Final connections to the main electricity supply **MUST** be completed by a qualified electrician.

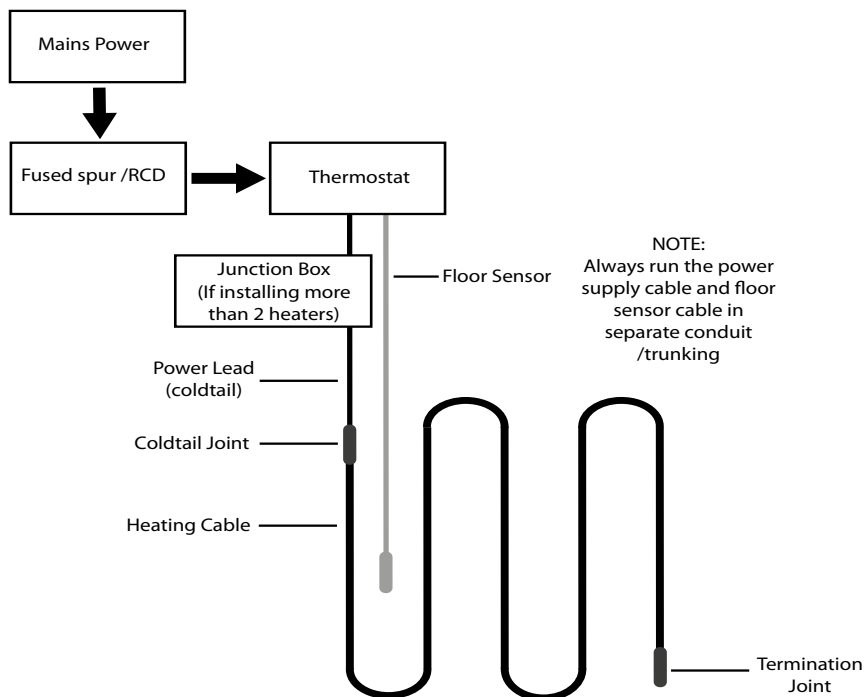
Electrical housing

A 35-40mm deep backbox is required for the thermostat and if more than two heaters are being installed, a junction box will also be needed. The wiring from the heater to the thermostat should be chased into the wall and protected by conduit or plastic trunking.

Thermostat connection

To install, follow the instructions in the thermostat box. Connect the thermostat to the main electrical supply via a fuse or circuit breaker according to wiring regulations. The thermostat should be installed within the room or area to be heated, except where electrical regulations prohibit e.g. within the bathroom itself. In such cases, the thermostat should be fitted to the outside of an internal wall of the bathroom, as near to the heating power supply wires as possible.

Wiring Overview:



TESTING YOUR HEATING SYSTEM

Check the resistances of your heater AT LEAST THREE TIMES during the installation process to ensure that it is working. This is best done before installation work begins, while fixing the heater and just before tiling.

BEFORE INSTALLING

Check the resistance of each heater in case damage had occurred during the freight. Note the resistances in the table provided below.

DURING INSTALLATION

When each heater has been fixed to the subfloor, test again for damage occurred during installation.

AFTER INSTALLING

To check that no damage has been done during the setting of the tiles, test once more after the floor covering has been put down.

If you are unsure of your readings or think that there is a problem, call the helpline right away on 0845 034 8272.

How to test with a multi-meter

The resistance (ohms) of each heater 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 0-2k ohms for testing.

The readings should be within +/- 5 % of the values given in the Technical Specifications page 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 50MΩ 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.

PREPARATIONS

SUBFLOORS

Wooden Subfloors

Make sure that there is enough underfloor ventilation.

Secure existing floorboards and if need be, make them even first with a latex/cement self-levelling compound to give a flush fit for the subsequently applied WBP plywood.

Refer to BS 5385: Part 3, clause 14.4 regarding sealing the backs and edges of the plywood.

Fixing ply directly to joists will not always provide a sufficiently stable floor finish for accepting tiles; fitting tongue & groove flooring and then over-boarding with ply or tile backer board is recommended. A rigid base is essential.

The above recommendations apply to small areas as advised in clause 14.4 of BS 5385: Part 3.

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.

After attaching the board to the subfloor, the undertile heating system may be laid directly on top of the board, and then tiled over. It is important to ensure that the tile adhesive and grout used are flexible and that the tile backer/building board has been fitted as per the manufacturer's instructions. High quality, cement-based adhesives with their flexible additives are most suitable.

Uncoated insulation boards are not recommended for use with loose wire systems as there is a greater risk of the wire becoming embedded into the board and creating a lagging effect; which can lead to overheating and hence damaging the wire.

However, where uncoated boards have already been specified, a thin layer of latex screed must be used to cover the boards. The use of a self-levelling layer (minimum 8mm) over the board will help to reduce the risk of lagging and overheating.

HEATER LAYOUT

1. Show key locations on subfloor with permanent marker

- Designated spots of units and fixtures. Do not install the heater in any of these areas.
- Positions of the power lead cables and the floor sensor.
- Points where the wires will need to be turned when laid.

Please refer to page 10 for example layouts and wire spacings.

2. Mark a start point

Mark up a start point as close as possible to the power supply, but no further than 2.5m from it.

3. Check resistances

Perform the first test for each heater as explained on page 7.

4. Dry fit the heater(s)

Lay the wires out according to your plan so you can still make any last minute adjustments in the layout before fixing them. Avoid stepping on or kinking the heater to prevent wire fracture.

After installation, you must allow the tile adhesive and any self-levelling used to cure naturally before powering up the heating system. This takes 10-14 days depending on the amount of materials used. Failure to await the correct length of time may result in damage to the system and may also cause the adhesive and grout to dry too quickly, hence becoming brittle, leading to tiles lifting and/or cracking.

INSTALLATION

HEATER INSTALLATION

1. Fit the Heater(s)

Starting at the point where the power supply cable joins the heating wire, gently unreel the cable and lay wire out around the perimeter. Only lay the wires in parallel lines.

2. Install Floor Sensor

The floor sensor that comes with the thermostat should now be placed centred between two runs of heating elements and secured in place using double-sided tape. Now check the resistance of the floor sensor using your multi-meter. You may need to change the setting on your meter in order to accommodate for the higher readings. If you do not get a reading, your sensor may be damaged. If so, call the helpline for a replacement.

3. Fit the Power Leads

Each heater has a single power lead for connecting the system to the thermostat. To keep the power leads at the same height as the heating element, a channel can be created in the subfloor. Take care not to damage the heating wire. Tape the leads in place. DO NOT tape over the manufactured joints. These must be in direct contact with the tile adhesive or levelling compound being laid over.

4. Install Thermostat

Instructions for fitting the thermostat can be found in the thermostat box.

5. Check resistances again

Perform the second test as explained on page 7.

NOTE: Ensure that all of the heating element including the joints are covered in adhesive and tiled over. Do not tape over the joints as this will create air pockets that can cause the heater to fail.

TILING

When all your heaters are installed and the power leads and floor sensor have been fixed, begin laying your tiles using one of two methods:

One-Step Method:

Apply a thick layer (5-10mm) of tile adhesive directly onto the heaters and lay the tiles onto the adhesive layer.

Dual-Step Method:

1. Completely cover the heating wires with a smooth layer of flexible adhesive or latex self-levelling compound and allow to dry; it will normally take 1 day per mm.
2. Apply a thin layer (3mm) of flexible adhesive and tile as normal.

To decide on which method, consider the following:

- It is easier to lay mosaic tiles using the dual-step method
- If this is your first installation, you may find it easier to use the dual-step method
- If the floor will not be tiled right away, the dual-step method offers better wire protection
- The one-step method is usually used by experienced installers of this heating system

Check final resistances

Perform the third and final test as explained on page 7.

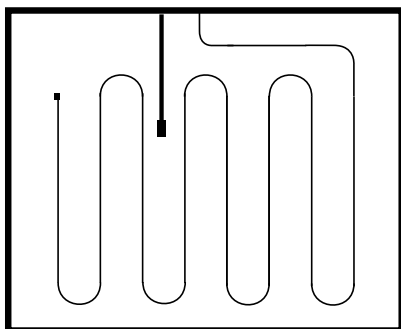
POSITIONING THE HEATER

Use the example guides below to work out where the wires are to be placed.
The wires must only be used in the lengths supplied and must not be cut or joined.

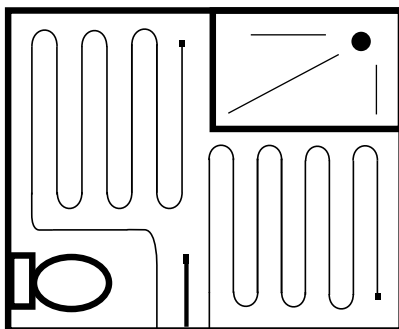
When laying more than one heater, do not allow the heating wires to touch or cross. Only join heaters in parallel, NOT in series.

For best efficiency, space the wires equally (refer to spacing guide below).

Single Heater in Regular Room



Two or More Heaters in Room with Fixtures



Sunstone Loose Wire System - Spacing guide

Product code	Cable length (m)	Heat output				
		200W/m²	≈175W/m²	150W/m²	≈125W/m²	100W/m²
		c/c Spacing				
		60mm	70mm	80mm	95mm	120mm
		Perimeter Spacing				
		80mm	85mm	90mm	97.5mm	110mm
Heated area, m²						
SSW150	12.5	0.75	0.88	1.00	1.19	1.50
SSW300	25.0	1.50	1.75	2.00	2.38	3.00
SSW450	37.5	2.25	2.63	3.00	3.56	4.50
SSW600	50.0	3.00	3.50	4.00	4.75	6.00
SSW750	62.5	3.75	4.38	5.00	5.94	7.50
SSW900	75.0	4.50	5.25	6.00	7.13	9.00
SSW1500	125.0	7.50	8.75	10.00	11.88	15.00

TECHNICAL SPECIFICATIONS

Product code	SSWx <i>x = Total wattage</i>
Operating voltage	230 V AC: 50 Hz
Protection	Class II 
Earth type	Functional earth  (Metal braiding surrounding heating cores)
Connection	3.0 m coldtail (2-core & earth)
Coldtail size	2Cx0.75 mm ² (Up to 6.0Amps) 2Cx1.0 mm ² (>6.0A to 10.0Amps)
IP rating	X7
Output rating	150 W/m ² (@80mm spacing)
Specific power	12 W/m
Heating cores	Dual core, multi-strand heating element
Inner / Outer insulation	ETFE / PVC
Minimum installation temperature	-10 °C

Sunstone Loose Wire System

Product code	Cable length (m)	Power (W)	Current (A)	Total Resistance, Ω @20°C		
				Min.	Nom.	Max.
SSW150	12.5	150	0.65	335.0	352.7	370.3
SSW300	25.0	300	1.30	167.5	176.3	185.2
SSW450	37.5	450	1.96	111.7	117.6	123.4
SSW600	50.0	600	2.61	83.8	88.2	92.6
SSW750	62.5	750	3.26	67.0	70.5	74.1
SSW900	75.0	900	3.91	55.8	58.8	61.7
SSW1500	125.0	1500	6.52	33.5	35.3	37.0

Disposal information



Do not dispose with regular domestic waste! Electronic equipment must be disposed of at local collection points for waste electronic equipment in compliance with the Waste Electrical and Electronic Equipment Directive.

PRODUCT WARRANTY

YOUR STATUTORY RIGHTS WILL REMAIN UNAFFECTED BY THIS WARRANTY.

This SunStone undertile heater is backed up by our 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 undertile heater 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. This warranty must be registered.
2. The heater must have been installed and used in full accordance with the installation manual.
3. The heater must have been earthed and protected by an RCD at all times.
4. The heater is used in conjunction with a thermostat or control system approved by SunStone.
5. The warranty is returned to SunStone within 30 days 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, agents shall have the right to levy reasonable charges for the work undertaken by them.
8. **All electrical regulations are complied with and electrical work is undertaken by a qualified and Part P certified electrician.**

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 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:

CONTROL CARD

Warning!

Radiant direct floor heating system.

Risk of shock or fire

Flexible sheet heating units are installed within the floor. DO NOT penetrate with nails, screws, or similar devices. DO NOT restrict the thermal emission of the heated floor. DO NOT affix materials other than those recommended



Checklist - Installer

Is the heating system, including manufactured joints, underneath the floor covering embedded in adhesive/levelling compound? ☐

Can you confirm that the manufactured joints and floor sensor tip, have **NOT** been taped over during installation? ☐

Model	Location	Power	System resistance			Insulation resistance test	Sensor resistance
			Before	During	After		

Installer name, company:

Installer signed: Date:

Checklist - Electrician

Is the heating system protected by a dedicated 30 mA RCD/RCBO or an existing RCD/RCBO? ☐
Time delay RCD's must not be used.

Is the system separated from the power supply by suitably rated circuit breaker that disconnects all poles with at least 3 mm contact separation, for example, MCB's, RCBO's or fuses? ☐

Model	Location	Power	System resistance	Insulation resistance test	Sensor resistance
			Pre-connection		

Electrician name, company:

Electrician signed: Date:

This form must be completed as part of the Guarantee. Ensure that the resistance values are as per the instruction manual. This control card, a layout plan and EcoDesign compliance information card must be left permanently fixed near the consumer unit.

Sunstone T: 0345 345 2288 F: 0345 345 2299 www.sunstone.co.uk
704 Tudor Estate ■ Abbey Road ■ London ■ NW10 7UW ■ UK
Ottostraße 3 ■ 27793 Wildeshausen ■ DE



ECODESIGN COMPLIANCE INFORMATION CARD

This product is an electric underfloor local space heater and, in order to be compliant with the mandatory EcoDesign requirements set out in Commission Regulation (EU) 2024/1103, needs to be complemented with a control providing at least the following control functions:

Type of heat output/room temperature control (one of)

TD	Electronic room temperature control plus day timer (Minimum of 3 control options required)	☐
TW	Electronic room temperature control plus week timer (Minimum of 1 control options required)	☐

Other control options (multiple selections possible)

f2	Open window detection	☐
f3	Distance control option	☐
f4	Adaptive start control	☐
f7	Self-learning functionality	☐
f8	Control accuracy	☐

Room temperature control power consumption

The control must have an off mode, standby mode or both and must comply where the function exists

In off mode	$P_o \leq 0.5W$	☐
In standby mode (select one)	$P_{sm} \leq 0.5W$	☐
	$P_{dism} \leq 1.0W$ (if control has an active display in standby mode)	☐
	$P_{nsm} \leq 2.0W$ (if control has a network connection in standby mode)	☐
In idle mode (select one)	$P_{idle} \leq 1.0W$	☐
	$P_{nidle} \leq 3.0W$ (if control has a network connection)	☐

Below are examples of thermostats which would be compliant and include these control function codes.

A typical programmable thermostat with a 1 or 5/2 Day schedule and:

- Adaptive Start
- Open Window detection
- An accuracy of better than $\pm 2^\circ C$

Control function code: TD (f2/f4/f8)

A typical Programmable Thermostat with a 7 Day schedule and:

- An accuracy of better than $\pm 2^\circ C$

Control function code: TW (f8)

NOTE: Manual thermostats alone are not compliant.

For the combined heat output of all local electric space heaters attached to an individual control please refer to the technical specification page of this manual.

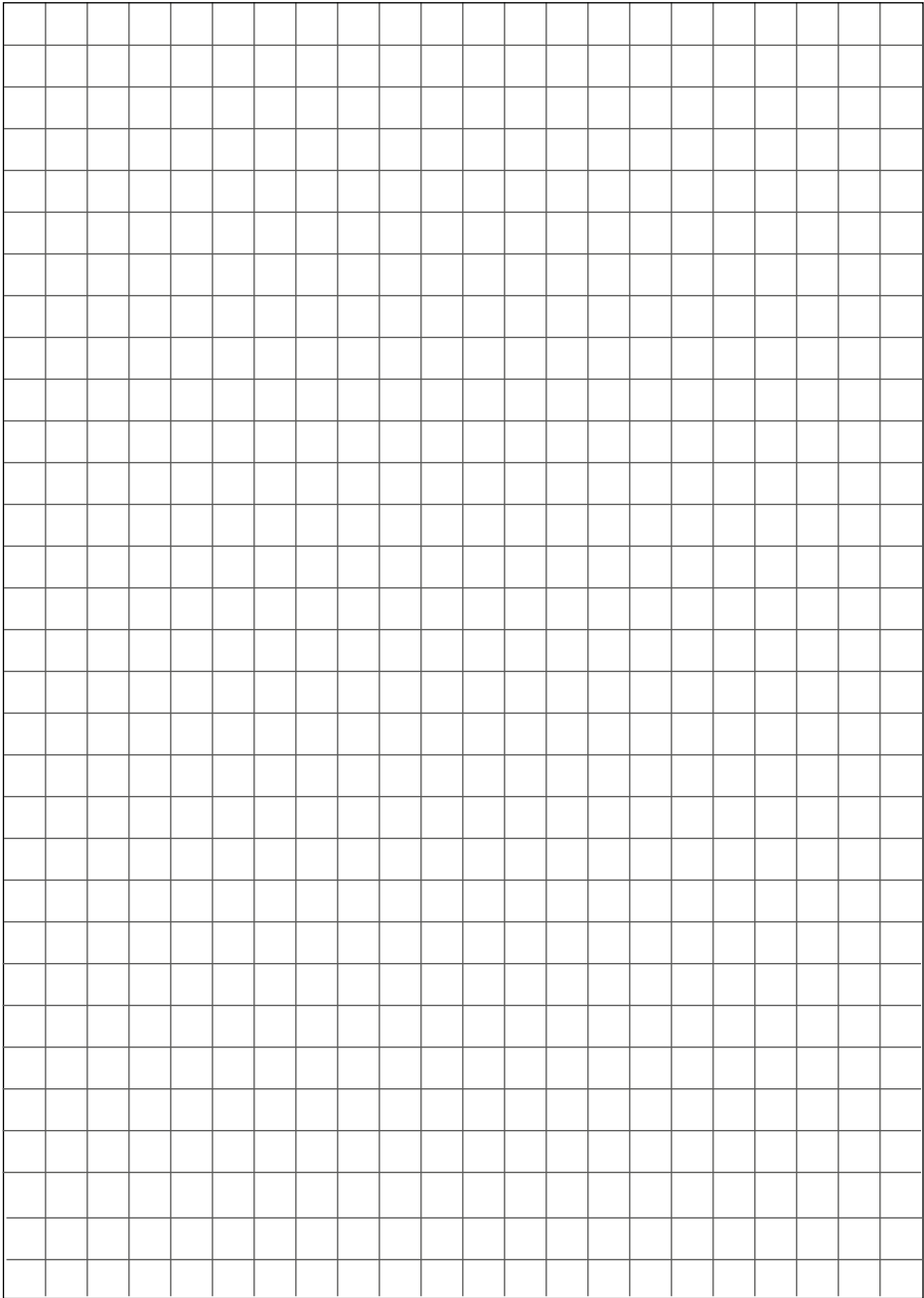
You must complete the above card according to the definitions of the control function codes specified in Regulation (EU) 2024/1103 to ensure compatibility with this local electric space heater.

Only functions that are active after the control has been commissioned can be declared and used for compliance.

Control function codes (Required to be in manual as part Regulation (EU) 2024/1103)

Type of temperature control	Code of temperature control (TC)	Control functions							
		f1	f2	f3	f4	f5	f6	f7	f8
Type of temperature control	Single stage, no temperature control	NC							
	Two or more manual stages, no temperature control	TX							
	Mechanic thermostat room temperature control	TM							
	Electronic room temperature control	TE							
	Electronic room temperature control plus day timer	TD							
	Electronic room temperature control plus week timer	TW							
Control functions	Presence detection	1							
	Open window detection		2						
	Distance control option			3					
	Adaptive start control				4				
	Working time limitation					5			
	Black bulb sensor						6		
	Self-learning functionality							7	
	Control accuracy with $CA < 2$ Kelvin and $CSD < 2$ Kelvin								8

HEATER LAYOUT





SunStone Underfloor Heating

Tel: 0345 034 8272

www.sunstone.co.uk

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Sunstone ■ Ottostraße 3 ■ 27793 Wildeshausen ■ DE