

Caldo

Underfloor Heating

INSTALLATION INSTRUCTIONS



**victorian
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About Caldo Underfloor Heating:

All our products are manufactured to the highest standards for quality and safety.

Key Features:

- The control units will make your floors warm just when you need it.
- Our systems keep energy costs to a minimum.
- When heating a modern home, Caldo Mat uses approximately 1p/hour, per square metre.
- Our products are simple to install, extremely tough, resilient and truly exceptional quality.

Heating Mats and Cables

Important- Things to Avoid:

- Under no circumstances should the heating cable be cut to shortened or lengthened.
- Heating cables should be no closer than 5cm to each other and under no circumstances should they cross.
- The joint between the cold connection wire and the heating cable should be installed flat and level and should not be bent i.e. to go up the wall.
- The heating mat should not be installed on an uninsulated concrete floor. Insulate insulated concrete floors for quicker a heat up time.
- Cement boards soak up the heat and cause a longer heat up time.
- The heating cable should not be installed under fixed objects where the heat cannot escape.
- Don't forget to fit the floor probe – it's in the Timerstat box.
- Don't connect a rolled-up mat or cables to the mains – it will be fatally damaged.

Caldo



Mats are faster to install and have a fixed cable space that gives a pleasant even spread of heat over the floor surface. Caldo is powerful at 150w per square metre and is designed for general floor warming.

Technical Information

Caldo is constructed using insulated, twin core heating cable, which includes high performance Teflon insulation, around the heater wires, an earth 'dump' wire and a wrapped metal earth screen, with a further outer layer of polymer insulation. This is then fixed into a special fibre mesh, with the cable spaced at 8cm, to give a regulated heating output of 150w/sqm. The cable complies with industry guidelines for safe use on timber as well as solid sub-floors. All mats have been rigorously tested and surpass all European standards requirements. The mats are normally installed under ceramic, quarry or natural stone tiles. For use under other surfaces, such as hardwood and laminate flooring, simply screed over the cable with self level compound and lay the alternative flooring as normal.

The heating cable of each mat is terminated at one end with a black 4-metre-long cold power supply cable for connection to the Timerstat. Each different size of heating cable has a different fixed resistive length and cannot, therefore, be shortened or lengthened. There are 14 different sizes of mat available, which can be used singly or in a combination to accommodate any floor area by connecting in parallel.

Controls

A Caldo 16amp Timerstat can be used to control a maximum of 3450w/22sqm of mat. More area than this will require a second zone.

Electrical Installation

We strongly recommend that all electrical work is carried out by a qualified electrician and must conform to current IEE wiring regulations. The heating mats should be installed in conjunction with a floor temperature sensing Timerstat control and be connected via an RCD (residual current device) protected circuit.

VP1.0 (150W/0.7A)	-	0.5m x 2m	=	1sq/m	353Ω
VP1.5 (225W/1.0A)	-	0.5m x 3m	=	1.5sq/m	235Ω
VP2.0 (300W/1.4A)	-	0.5m x 4m	=	2sq/m	176Ω
VP2.5 (375W/1.7A)	-	0.5m x 5m	=	2.5sq/m	141Ω
VP3.0 (450W/2.1A)	-	0.5m x 6m	=	3sq/m	118Ω
VP3.5 (525W/2.4A)	-	0.5m x 7m	=	3.5sq/m	101Ω
VP4.0 (600W/2.7A)	-	0.5m x 8m	=	4sq/m	88Ω
VP4.5 (675W/3.1A)	-	0.5m x 9m	=	4.5sq/m	78Ω
VP5.0 (750W/3.4A)	-	0.5m x 10m	=	5sq/m	71Ω
VP6.0 (900W/4.1A)	-	0.5m x 12m	=	6sq/m	59Ω
VP7.0 (1050W/4.8A)	-	0.5m x 14m	=	7sq/m	50Ω
VP8.0 (1200W/5.5A)	-	0.5m x 16m	=	8sq/m	44Ω
VP9.0 (1350W/6.1A)	-	0.5m x 18m	=	9sq/m	39Ω
VP10 (1500W/6.8A)	-	0.5m x 20m	=	10sq/m	35Ω

Preparing the Electrical Supply

We recommend that this work be carried out prior to preparing the sub-floor and laying the heating mat. This work should be carried out by a qualified electrician and comply with IEE regulations. The heating installation can be connected to an RCD protected power ring main and should have a correctly fused twin pole isolation switch nearby. If the ring main is not RCD protected then a combined fused spur/RCD should be installed. A maximum of 4.8Kw of heating can be connected to a 30 milliamp RCD. If the installation exceeds 2000w then a separate power supply is required. All wiring should be chased into the wall and protected by either conduit or plastic trunking.

Please note that the system guarantee is only valid when connected to a correctly rated RCD protected circuit via a correctly fused isolator.

Having decided on the position for the timerstat control, ideally on an inside wall within the room to be heated or an 'outside zone' in a bathroom or outside a bathroom to comply with I.E.E. regulations.

There are three electrical zones for a bathroom that are identified in the IEE wiring regulations:

- Zone 0 is anywhere inside a bath, basin or shower and defined as 'any area within a bathroom that can hold water'. Clearly, nothing electrical should go in this zone.
- Zone 1 is the area directly above Zone 0 to the height of 2.25m from the bottom of the bath or shower. It also covers the width of a shower cubicle or length of the bath. Zone 1 is the 'splash zone', where any installed equipment is likely to get very wet and is not suitable for a Timerstat.
- Zone 2 is an area 600mm outside of Zone 1 be that above or to the sides of the bath or shower. This is typically the area that is least likely to get wet but there is a possibility for it to be splashed and, therefore, not suitable for a Timerstat installation.
- 'Outside zones' (Beyond zone 2). When the size of a bathroom extends beyond zone 2, a Timerstat may be installed in the room.

The Timerstat should be positioned at light switch height for easy viewing. Install a single deep (min 35mm) back box. If more than 2 mats are to be installed, a junction box will be required to connect up the heaters in parallel as the connections on the Timerstat are too small in diameter for more cables.

Preparing the Sub-Floor

The most important consideration when installing a tiled floor, whether it is to be heated or not, is the preparation of the sub-floor prior to tiling. It is essential that it is sound and level and will support the weight without movement or deflection. The following recommendations are a general guide only and you should seek further advice from the Tiler and the tile and adhesive manufacturer.

Timber Floors

The existing floorboards must first be securely fixed and level. This should then be over boarded with either a suitable insulated tile backer board or 18mm W.B.P. plywood. The back and edges of the plywood should be sealed before laying and then, with plated screws, fixed to the floor joists at 200mm centres, plus additional fixings at the board edges. If using a tile backer board, this should be installed following the manufacturer's instructions.

Solid Floors

Concrete floors should be completely dry, which, with newly laid concrete, can take many weeks to fully cure and dry. Remove all traces of old floor coverings and adhesive and ensure that the surface is smooth and level. We recommend the use of insulated tile backer board for improved performance and efficiency of the heating system. For example, the worst-case scenario, is to fit an underfloor heating system to a ground level non-insulated concrete slab. Unless the requisite amount of insulation is included, the heater will try to heat up planet earth as well as the floor surface! To a much lesser degree, fitting an underfloor heating system to a properly insulated concrete floor that complies with current building regulations, means the heater will need to bring the concrete floor mass to the required temperature. The heat up time will be much slower, as will the cool down period but allowances can be made with the Timerstat. On some older properties asphalt or bitumastic compounds were used as a damp-proof membrane. As the heat from the cable may affect that floor membrane, it would be advisable to fit an insulated tile backer board before fitting the heating system.

Timber and Solid Floors

Having now determined the position of the control unit and the direction in which you intend to lay the mat, it is now advisable to cut a groove in to the sub-floor to accommodate the cold power supply cable, as they are slightly larger diameter than the heating cable.

The sub-floor should now be thoroughly cleaned to remove all dust and debris and primed if recommended by the adhesive manufacturer.

Planning the Installation

To calculate the free area available for heating, simply allow for a 100mm (0.1 metre) margin around the full perimeter of your room and any fixed objects and deduct the sum of this from the total area. You should then choose a mat or combination of mats that is equal to or less than this figure. (Remember mats cannot be shortened). The mats should not be laid over or close to any existing hot water service or central heating pipes and bear in mind that all mats are 0.5 metres wide and that opposing runs of matting should be laid approximately 8cm apart, equal to the cable spacing, to maintain a consistent output and avoid hot or cold spots. Remember that areas under fixed objects, such as baths, toilets, shower trays, kitchen units, cookers etc. should not be heated and thought should be given to the final fixing of kitchen units and sanitary ware etc., to avoid fixing screw damage to the heating element.

Testing the Continuity and Resistance

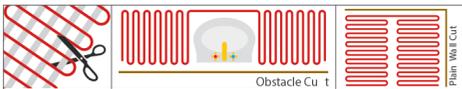
Prior to installing the heating mat always check the continuity and resistance with an Ohmmeter, to ensure that there is a circuit and that the cable is not damaged. The readings should be approximately similar to that on the ratings label on the mat, or as shown in the table on the previous page under electrical installation. The test should also be repeated periodically during installation and prior to, during and on completion of tiling or installing the finished floor.

Installing the Heating Mat

It is a good idea to lay out the installation without securing the mat, to ensure that you have the correct size. Take care not to cut or damage the cable with sharp tools and wear soft soled shoes throughout. Never cross the heating element wire or cross the cold leads or temperature sensor wire underneath or over the top of the mat. The heating cable should not be closer than 5cm to avoid hot spots.

Starting with the cold connection lead as near to the electrical connection point as possible and the mat 10cm away from the wall, roll the mat away from you to the end of the area, when you reach the end of the room, cut across the fabric (taking care not to damage the cable) and roll the mat back towards you, keeping the gap between the wires on opposing runs at approximately 8cm, until the area to be heated is completed.

Note: the mat should always be laid cable up, with its flat face to the sub-floor.



Securing the Heating Mat

The heating mat should now be secured to the sub floor using the in-built self-adhesive tape by removing the protective strip and sticking the mat to the floor. When the mesh is fixed in place, it will help reinforce the tile adhesive or self-levelling compound. Alternatively, the mesh can be secured using a hand stapler on a timber subfloor. Under no circumstances should the heating cable be fixed down using staples as this will cause it to deteriorate with time and will void any guarantee. A layer of self-levelling compound will protect the heating cable from access damage, or cover the area with thick cardboard until tiling.

Installing the Timerstat and Floor Probe

The floor probe is packaged with the timerstat. The timerstat will not work with a probe from a different model. The floor probe has a 3m lead attached, that can be shortened or lengthened with suitable wire. Tape the probe end down to the floor midway between 2 heating wires (4cm from each wire) and run the cable up to the timerstat back-box.

Test the Heaters

Before completing the electrical installation, it is advisable to check that the heater is working correctly. This can be done by temporarily wiring the heater cable to a 3-pin plug. Connect the brown and blue wires to the live and neutral terminals of the plug. The braided earth screen is connected to the earth terminal; the plug should be correctly fused. This can then be connected to an extension lead or convenient 13amp socket. After a few minutes, the heater cable should be warm to the touch. If more than one heater is being installed, repeat the test with each heater. The heater should not be left connected for more than a minute or so during this test. Do not connect the mat to the mains if still rolled up or fatal damage will occur.

Final Connection

The probe and power supply cables can now be connected to the timerstat as per the instructions; a maximum of two heaters can be connected directly to a timerstat. If installing multiple heaters, they should be wired via a junction box as previously described.

Note: Multiple heaters must only be connected in parallel - i.e. blue wire to blue wire and brown wire to brown wire and should never be wired in series to the timerstat or junction box. A single 16amp timerstat may be used to control a maximum of 3450 watts of heater load or 22sqm of mat. The Timerstat can now be finally connected by a properly qualified electrician to the previously prepared RCD protected supply and the installation completed.

Note: At this point and prior to tiling, it is advisable to take a picture of the floor area, showing the position of the heating mat(s) and noting the resistance readings for the mat(s). This should be messaged to the homeowner for future reference. Once the system is installed, homeowners should ensure that the floor is not penetrated where the mat is located.

Tile and Grout

Only use a flexible tile adhesive and grout that is suitable for use with underfloor heating systems, and always follow the manufacturer instructions. Having ensured that the heating mat is firmly fixed to the sub-floor, the mat can either be covered by a layer of flexible tile adhesive or a self-level latex compound, which is allowed to dry before tiling, or lay the tile adhesive and tiles in one operation. Make sure that the tiling covers the whole area of the heating mat. Care should be taken not to disturb or damage the heating mat during tiling, if possible, cut and trim the tiles in a separate area. Ideally, using a plastic trowel spread the adhesive in straight lines, following the run of the matting. Ensure sufficient thickness of adhesive to completely cover the heating mat and allow the tiles to be fully bedded down, without the possibility of any air gaps underneath. (Tiles must be laid on a continuous bed of adhesive otherwise there will be hot and cold spots on the floor when the is heating on). If any tiles need to be lifted for adjustment, care should be taken not to damage the heating cable. Grout the floor as soon as possible after tiling, following the manufacturer instructions. Be careful if any tile joints need raking out as part of this operation so as not to cut through or damage the heating cable.

Note: the tile adhesive should be allowed to fully cure naturally, before turning on the heating, normally a minimum of 21 days.

Finally set the Timerstat to the desired daily program as per the relevant Timerstat instructions.

Alternative Flooring

Caldo was primarily designed to be installed under hard surfaces such as ceramic tiles and marble etc., but can be successfully used under most floor finishes such as hard wood and laminate*. Simply cover the heating cable with suitable self-levelling compound - ideally a minimum of 5mm thickness of cover and lay the flooring as normal. For vinyl flooring and vinyl click planks, 10mm of self-level should be put over the heating cable in order to spread the heat and prevent heat 'photographing' through the vinyl surface.

ET-81 PROGRAMMABLE TIMERSTAT INSTRUCTIONS

The **ET-81** is a smart Timerstat used to control your electric underfloor heating system to minimise energy use.

Technical Specification

Supply voltage: 85-265V 50/60Hz
Maximum switching current: 15A/3.3KW
Standby power: < 1W
IP21

Display Symbols



Functions and User Operation

On/Off

Press POWER to turn on/off

Note: When frost protection mode is active, the timerstat will maintain the frost protection temperature when in 'off' mode.

Temporarily Override Temperature

In 'on' mode, press Δ or ∇ to change the current period temperature setting.
Press \circ to confirm and go back to the normal screen.

The timerstat will revert to the normal programmed settings at the start of the next time period.

Set the Time

In 'on' mode, press and time will be displayed.
Press again to enter day set.

Press or to set hour.
Press to confirm and enter minute set.
Press or to set minute. Press to confirm, then

Press or to set day.
Press to confirm and enter hour set.

press again to revert to normal screen.

Key-lock

Setting key-lock can prevent children and others from switching timerstat parameters.

In 'on' mode, press for 3 seconds to lock the timerstat and again for 3 seconds to cancel.

Holiday mode

In holiday mode, the ET-81 will maintain the frost protection temperature until the holiday period ends.

In 'on' mode, press to enter setting.

Press or to select holiday.

Press to enter holiday days set.

Press or to set the number of holiday days.

Press to confirm and return to the normal screen.

Note: In holiday mode 'HOLIDAY LEFT' days remaining will show on the display. Double press to cancel holiday mode.

Hold mode

The ET-81 will maintain the 'hold temperature' until hold is switched off. In 'on' mode, press to enter setting.

Press or to select hold.

Press to enter hold.

Press or to set hold to ON.

Press to enter hold temperature set.

Press or to set hold temperature.

Press to confirm and return to the normal screen.

Note: Whilst in hold mode, 'HOLD' will show on the display. Double press to cancel hold mode.

Timer setting

Each day of the week has 4 time periods, you should allot a temperature to each time period. Set the temperature above room ambient temperature and the heating will come on until the desired temperature is reached, or, set

In 'on' mode, press to enter setting.

Press or to select edit.

Note: Weekdays are set as a group, Saturday & Sunday individually.

Press to enter period selection.

Press or to select the period to be set.

Press to enter start time set.

Press or to select the start time hour.

Press to enter minute set.

Press or to select the start time minute.

Press to enter temperature set.

Press or to select the temperature.

the temperature low and the heating will not come on during that time period. The default settings are shown in the table below.

Press to enter day selection.

Press or to select the day to be set.

Press to confirm which will also take you back to period selection. Repeat the previous steps for Leave, Return and Sleep.

When all four time periods have been set, press which will take you back to day selection. Repeat previous steps for Saturday and Sunday. Press twice to return to normal screen or allow to time out at any time and your settings will be saved.

Default period settings for time and temperature

Week	Wake	Leave	Return	Sleep
Mon - Fri	07:00 22°C	08:30 19°C	17:00 22°C	22:00 19°C
Sat / Sun	08:00 22°C	08:30 22°C	17:00 22°C	22:00 19°C

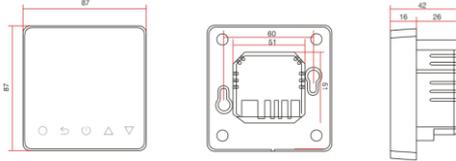
Note: Do not try to remove time periods or the timerstat may be damaged

Troubleshooting - Fault Codes

- E1** = Built-in sensor short-circuit or disconnected.
E2 = Floor sensor damaged/disconnected/clamped on to insulation or incorrect floor sensor installed.

Note: The floor sensor resistance should be in the range of 10K Ohms - please check.

Dimensions



Advanced Settings

Note: These are normally set by the installer.

In 'on' mode, press to enter setting.

Press or to select setup.

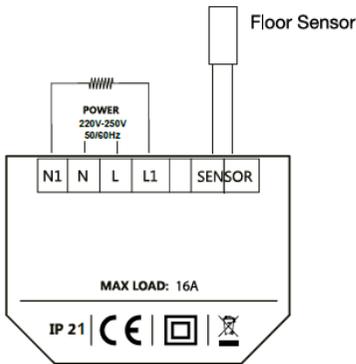
Press to enter advanced setting.

Each parameter can be accessed by pressing and then adjust the values as required.

No	Name	Default	Ranges
1	Temp calibration - Floor sensor - Room sensor	0°C 0°C	-5°C to +5°C -5°C to +5°C
2	Frost protection Frost protection temperature	ON 5°C	OFF/ON -5°C to +15°C
3	Sensor selection	Floor Sensor	Room air sensor/Floor sensor/Both sensors
4	Floor temperature limit	30°C	20°C to 50°C
5	Temperature unit	°C	°C/°F
6	Output delay	0S	0S/30S/60S/90S
7	Temperature tolerance	1°C	0.5°C/1°C/2°C/3°C
8	Brightness	80%	0% - 100%
9	Energy use power rating 3500W	0W	0W - 3500W
10	Schedule	5+1+1	7/5+1+1
11	Adaptive Function	OFF	OFF/ON
12	Factory Reset	Back	Yes/Back

Press twice to return to normal screen or allow to time out at any time and your settings will be saved.

Wiring Instructions



Notes On Advanced Settings

1. Temp calibration: Calibrate the temp detected by room sensor or floor sensor.
2. Anti-frozen function: This option allows you to prevent your room freezing in really cold weather.
3. Sensor select:
Room sensor: Run by room sensor. Floor sensor: Run by floor sensor. Both sensors: Run by room sensor with floor temp limit.
4. Floor temp limit: Always use floor sensor for underfloor heating.
5. Temp unit: °C and °F can be selected.
6. Output delay: This option help you avoid inadvertent operation on heating.
7. Temp tolerance: The value is 1°C. The thermostat starts to heat when the actual temp is 1°C lower than set temp and stops heating when the actual temp is 1°C higher than set temp.
8. Brightness: This option allows you to change the brightness of the display.
9. Energy use: N/A.
10. Schedule: Select a weekly schedule to edit. There are 2 options:
7: each day from Mon to Sun can be set individually.
5+1+1: 5 days from Mon to Fri have the same events, Sat and Sun can be set individually.
11. Adaptive function: After several days of installation and use, Adaptive function ensures that the required temp has already been reached when the next event begins. Only switch on when regular heating pattern is established.
12. Reset: Yes - All parameters are restored to default values.

Installation Instructions

This Timerstat should only be wired by a 'Part P' qualified Electrician as required by IEE regulations. The power supply must be on an RCD protected circuit and connected via a correctly fused switched spur isolator. Guarantee is void if these provisions are not followed.

Before connecting, please test the resistance of the heating cable/s against the values shown in the relevant installation manual to make sure the cable hasn't been damaged. Also test between live/earth and neutral/earth for a zero reading. Check the floor probe resistance is in the range of 10K Ohms

The ET-81 timerstat should be mounted using an 86x86x35mm deep wall box.

Loosen the silver fixing screw on the bottom of the timerstat and separate the front from the back.

Wire the timerstat back section as the above diagram. A maximum of 2 heating cables will go into the wire connectors. More than this should be connected into a junction box with a single correctly sized wire to the timerstat. Main's earth and heating cable earth should be connected behind the timerstat using a block connector. Don't forget to connect the floor probe (not polarised) otherwise the timerstat will not work properly. Reassemble the front to the back and ensure the pins are located in the socket on the back otherwise it will not work and tighten up the silver screw.

