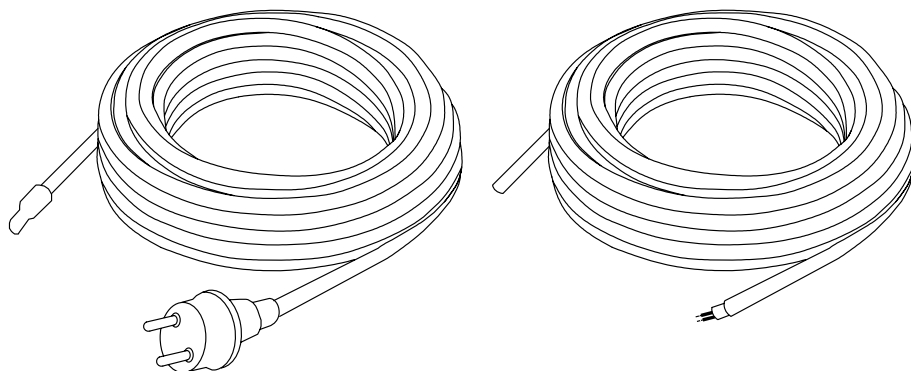


Warmup[®]

The World's **best-selling** floor heating brand™



Installation Manual

Self-regulating cable 20W/m (W20SR)



TECHNICAL HELPLINE
0845 345 2288



IMPORTANT

Read this manual before attempting to install your heating system. Incorrect installation could damage the heating system and will void your warranty.

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1 - Introduction

The Warmup self-regulating cable is the ideal solution for installation in roofs, gutters and downspouts for melting ice and snow. For other applications please contact a Warmup office or representative.

2 - Safety Guidelines

1. The system must always be installed according to local regulations as well as the instructions in this installation manual.
 - Any other installation might affect the cable functionality or present a safety risk, and will void the warranty
2. The heating cables must always be connected by a qualified electrician as per the current electrical regulations, and using a fixed connection.
 - All power circuits must be de-energized before installation and service
 - Each heating cable must be earthed according to local electrical regulations and protected by a residual current device (RCD) with a maximum trip rating of 30mA
 - The installation must be equipped with a correctly sized fuse or circuit breaker in accordance with local electrical regulations.
3. The location/presence of the heating cables must be made evident by affixing caution signs or marks at the power connection and frequently along the circuit line where clearly visible.
 - The control card must be completed and fixed at distribution board indicating the location of the heating cables installed
 - This information must be stated in any electrical documentation following the installation
4. Incorrect design, handling, installation, could damage the system and may result in inadequate frost protection or electric shock. To minimize these risks and to ensure that the system performs reliably, read and carefully follow the information, warnings, and instructions in this guide.
5. Bus wires will short if they contact each other. Keep bus wires separated.
6. Connection kits and cable ends must be kept dry before and during the installation.
7. Damaged bus wires can overheat or short. Do not break bus wire strands when scoring the jacket or core.
8. Damaged heating cable or connection kits can cause electrical shock, arcing or fire. Do not attempt to repair or energize damaged cable. Remove damaged sections at once and replace them with a new length. Replace damaged connection kits.

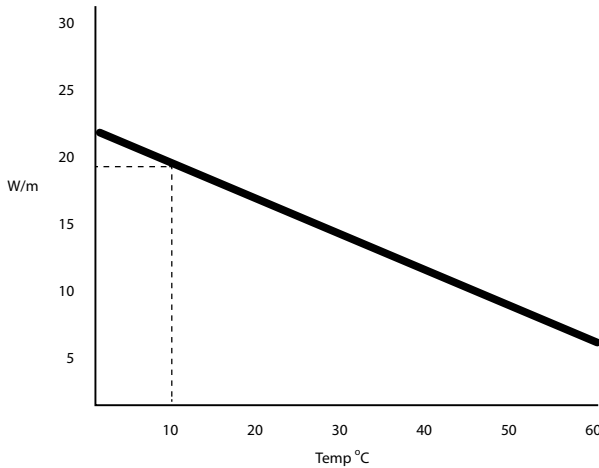
3 - Product Information

The cable has the ability to vary heat output in accordance with ambient temperature, and resulting levels of snowfall and ice buildup is what makes the self-regulating cable beneficial when compared to constant wattage cables. The resulting lower energy consumption and costs are major advantages.

When the temperature at the site of installation decreases, the cable will react by increasing its heat output. Contrarily, when the ambient temperature increases the cable will decrease its output. The intention is to maintain a constant temperature above freezing for the protected object, which eliminates damage from cracks, icicles or blockages.

As the cable regulates its wattage, the current will vary with the ambient temperature. When selecting the length of cable to be used, it is necessary to calculate the current that will be loaded onto the 16A thermostat relay. For this reason, there is a maximum circuit length, which cannot be exceeded. For this cable length calculation, refer to the table below.

When properly installed and operated, this product creates a path for melted snow and ice to drain from the roof to the ground.



Maximum length of cable at 230V AC		
Temperature	Fuse amperage: 10A	Fuse amperage: 16A
10°C	79m	110m
-15°C	49m	71m
-20°C	42m	58m

Technical specifications

Voltage	220-240V AC, 50Hz
Power output	20W/m at 10°C
Bus bar	Coated copper
Minimum Installation Temperature	0°C
Outer Diameter	10,6mm x 5,9mm
Minimum Bending Radius	25mm
Inner insulation	Thermoplastic elastomer
Metal sheathing	Coated copper
Outer sheath	Thermoplastic elastomer
UV resistant	yes

Range specification

Model	Form	Cable length (m)	Wattage (W) at 10°C
W20SR500	Terminated with Schuko plug	25	500
W20SR600	Terminated with Schuko plug	30	600
W20SR1000	Terminated with Schuko plug	50	1000
W20SR1600	Terminated with Schuko plug	80	1600
W20SR***	Terminated with Schuko plug	cut to length	20x length

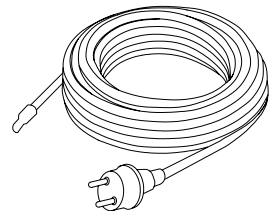
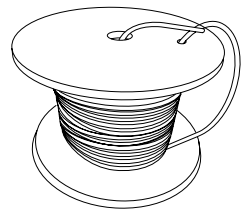
Due to the parallel power supply to the cable's heating core, it is possible to cut the cable at any point along its length, making project planning and installation easier.

To maximise the benefits of this feature, Warmup offers self-regulating cable in 3 formats:

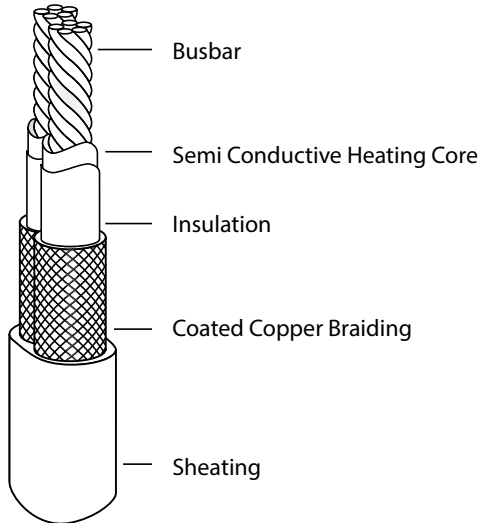
1. Terminated with the Schuko plug for easy installation
2. 500m on the reel, unterminated (see image to the right)
3. Bespoke cut to length service for unterminated cable:
 - a. Minimum 20m
 - b. Maximum 500m (a full reel)
 - c. Increments in lengths of every metre

Power and end termination kits are available to connect a cold lead for supply connection and to seal the end of the circuit respectively.

For details on cable termination see pages 18-21.



Cable construction



Applications

The cable is ideal for installation in roof, gutter and downspouts but can also be used in pipe-frost protection when it is required a higher wattage.

4 - Planning the installation

Before you commence installation, ensure that you have carefully took all measurements required for the application. Draw a plan detailing the cable positioning and location of the power connections, sensors, controllers and connection boxes (if applicable). It is important to know the precise location of the components for future reference in case of troubleshooting and repair.

When planning the installation please observe the following:

- ensure the safety guidelines are being met - see section 2
- ensure the installation guidelines are taken into account - see section 5
- calculate the correct length of cable required
- ensure the possible mechanical protection of the cold leads are in accordance with local regulations

5 - Installation Guidelines

1. Properly prepare the installation site by removing sharp objects, dirt, or any other foreign objects. The installation surface must be even, stable, dry and clean.
2. Before installing the heating cable, please observe the following:
 - Inspect the heating cable: if physical damage is found, the entire damaged section must be removed.

- a suitable 230V AC electrical supply must be available.
- all wiring or controls must be capable of handling the load of the heating system - refer to the tables on page 4 and 5.
- Installation of the heating cable should not be undertaken if the ambient temperature is below 0°C.
- The heating cable minimum bending radius of 25mm should not be exceeded
- Bend the cable only in upright position (see figure below). The heating cable does not bend easily in the flat plane. Do not force such a bend, as the heating cable may be damaged.

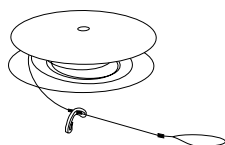


6 - Preparing the installation

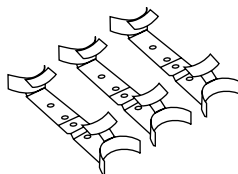
Items for installation

Depending on the installation type, the following items are required:

- Heating cable: W20SR
- Accessories: roof clips (WRC), gutter bars (WGB), aluminum adhesive tape (TAPEFH), downspout hangers (WDSH), end and power termination kits (SR-TK), inline and T-connectors



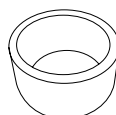
Downspout hangers (WDSH)



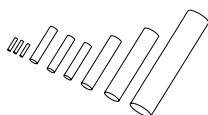
Roof clips (WRC)



Gutter bars (WGB)



Aluminum adhesive tape (TAPEFH)



End and power termination kit (SR-TK)



T-connector



inline connector

Installation considerations

Before commencing the installation ensure that you have carefully measured the objects to be heated. The heating cable must be arranged so that it routes melted water from warm areas (where ice on the roof usually melts first) to cold areas.

The heating cable is specifically intended for problem areas and does not need to be installed on all areas of the roof – install only in the sections that have been susceptible to ice dams in the past. If a gutter is present it must also be heated to allow for the drainage of melted snow/ice.

For a shingled roof installation of the self-regulating cable should only be done between 0 and 27°C. Below 0 °C shingles are brittle and may break off when lifted to install roof clips. Above 27°C shingles may be warm and may tear when lofited to install roof clips.

Start the installation at the junction box, leaving a drip loop where the cable exits the junction box.

Estimating the amount of cable needed

The length of cable required will obviously depend on the project requirements and the location on the building to be heated.

The most typical installations are covered in this manual

Area	What to measure	How to calculate
Roof edge	Overhang Length of Roof	Length of roof x overhang multiplier
Dormer	Distance around the dormer	Nr of dormers x distance around the dormers
Valley	Number of valleys	Number of valleys x 1.8 metres
Gutter	Length of gutter	1m of cable per metre of gutter, if wider than 15cm use double run of cable
Downspouts	Number of downspouts Length of downspouts	Number of downspouts x Length of downspout x 2

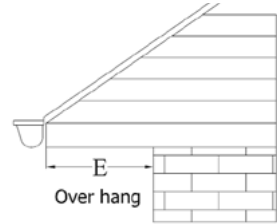
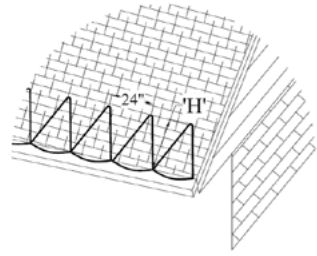
Table for overhang multiplier

Roof overhang (cm)	Multiplier for roof with gutter	Multiplier for roof without gutter
Less than 30cm	4.0	3.0
30	4.0	3.0
60	5.3	4.3
90	6.8	5.8
120	8.1	7.1
150	9.6	8.6
180	11.2	10.2
Downspouts	Number of downspouts Length of downspouts	Nr of downspouts x Length of downspout x2

Note: For overhangs that are not listed estimate multiplier. e.g. For an overhang of 45cm with a gutter, multiplier will be approx 4.7.

Triangle heights

Overhang (cm)	Triangle height (standard shingle row = 14cm)
Less than 30cm	3
30-46	4
46-60	5
60-76	6
76-91	7
91-106	8
106-120	9
120-137	10
137-152	11
152-167	12
167-183	13



When heating a roof the cable is laid along the roof line arranged in a triangular pattern. The triangles must extend above the overhang into the warm section of the roof. To determine height of the triangles, please see the above table. The distance between the peaks of each triangle is always 610mm or 24" wide.

Installation patterns

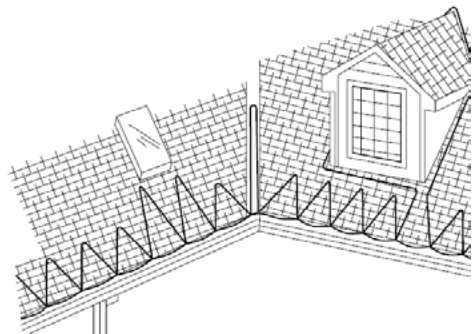
Methods for arranging the cable pattern for different parts of the roof can be found on the following pages.

Always install cable in valleys that are a part of any problem area on your roof. You may or may not need to install cable along the roof line or near skylights or dormers.

1. Roof Line Pattern

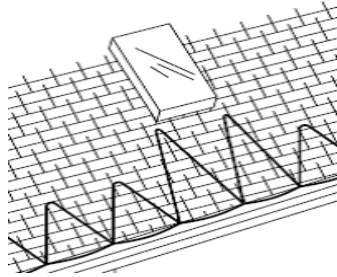
For installation in eaves the cable should be laid along the roof line in a triangular pattern. The cable must extend above the overhang into the warm section of the roof. The height of each triangle will be dependant on the size of the roof overhang. Measure the depth of the overhang and use the table on section XXX to determine the height of the triangle.

Note: The triangle heights are measured by the number of shingle rows from the edge of the roof (based on a standard shingle size of 14cm). This method allows for the heating cable to extend at least one shingle row into the roof area.



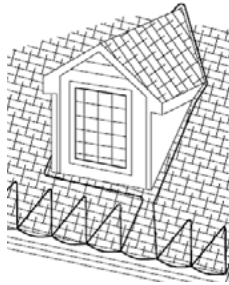
2. Skyline Pattern

Problem skylight areas should use the “triangle pattern” approach. However, the height of the triangles may need to be greater than those along the roof line. Increase the triangle height so that it extends to the base of the skylight.



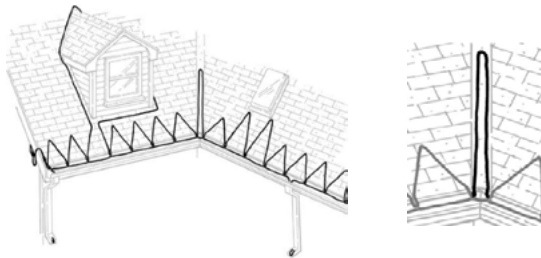
3. Dormer Pattern

To treat a problem dormer area, the cable should run up and around the dormer.



4. Valley Pattern

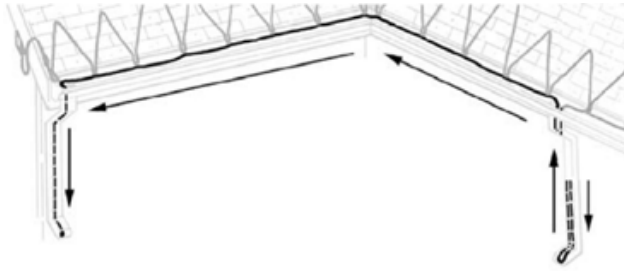
If a valley exists in a problem area of your roof, you must route cable up and back down the valley a minimum of 1 meter. Extend the cable higher if the warm area of your roof is higher.



7 - Application: Gutter

If a gutter is present, all gutters below the heated areas of the roof must also be heated to allow for the drainage of melted snow/ice.

If a downspout is present along the route of the gutter, the cable should run down the



downspout and back up in a loop and continue along the gutter.

The simplest installation occurs when the project requires only de-icing of a gutter.

1. To attach the cable properly it must lie flat in the gutter. The cable should be uncoiled ensuring it is not twisted or tangled.
2. The cable should be held tightly.
3. Once the length of cable required is determined, the terminated cable end should be attached to the gutter using an appropriate method, ie aluminium adhesive tape. Permanent methods such as glue or adhesive should not be used.

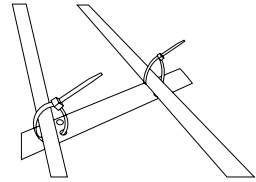


Figure 1. Gutter bar & cable ties

4. For this installation the gutter bars are used (fig 1). UV resistant cable ties are pushed through the holes on the bar and fasten loosely so that the cable is held, but not secured.
5. Repeat previous step with as many bars as required for the gutter length, using 1 bar every 20cm of gutter.
6. For round gutters the bar will need to be bent around the edge of the gutter, and the inside profile. Pliers can be used for this (fig 2).

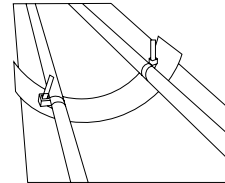


Figure 2. Bar attached to gutter

7. Once all bars are attached along the cable, begin adhering them to the inside surface of the gutter. Check the spacing and use the aluminium adhesive tape to hold the bars down (fig 3).

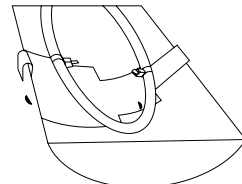


Figure 3. Bar adhered to gutter with aluminium tape

8. All cable ties should be tightened and trimmed as in figure 2.

Note: The parallel runs of cable should be kept separate, and evenly spaced throughout.

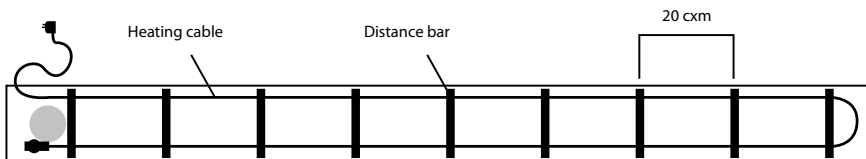


Figure 4. Final installation in a gutter

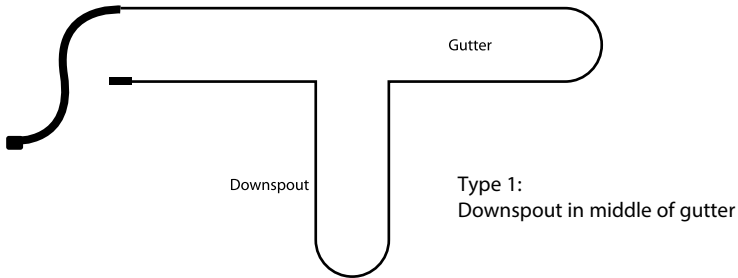
8 - Application: Gutter and Downspout

There are 2 types of downspout installations:

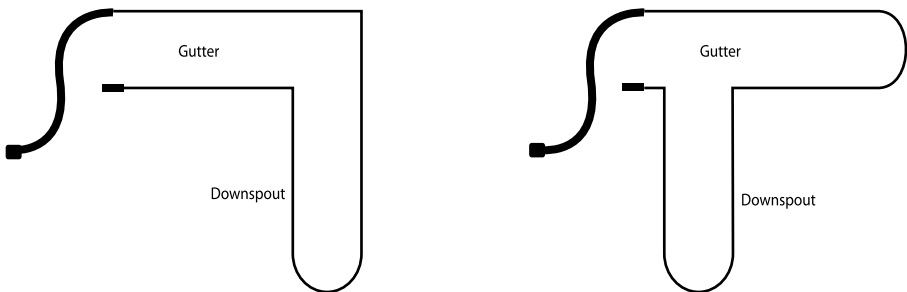
- those where the downspout is in the middle of a gutter length and
- those where the downspout is at the end of the gutter run

Where the downspout is in the middle of a gutter run, the cable will need to route down and back up, to continue along the gutter. The cable should not extend beyond the end of the downspout. Take this into account when calculating cable length for the project.

Remember to avoid overheating the cable, as this increases the risk of fire or electric shock. No part of the downspout should be inside a building.



1. For downspout installations running along the gutter, the cable should be routed down the pipe and back up.
2. Once the length of cable required is determined, the terminated cable end should be attached to the gutter before the downspout using an appropriate method, ie aluminium adhesive tape. Permanent methods such as glue or adhesive should not be used.



3. The length of steel wire needed should be measured from the looped end of the downspout hanger reel. This includes the length of gutter leading to the downspout, and for the downspout itself. The cable should be flush with the end of the spout.
4. The cable is then attached to the downspout hanger using the clips (see fig 3 in the next page). The clips are spaced at 40mm intervals.

5. On the end of the hanger reel is a looped end for holding the run in place and keeping the steel wire tensed. Attach this loop to a secure object which will not break or fall off with the weight of the cable being supported in the downspout.
6. Where the downspout is at the end of the gutter to be heated, parallel runs of the cable will be supported via the steel wire, and return via the same gutter. Where the gutter continues after the downspout, the cable will only have parallel double runs in the downspout itself, and will continue along the gutter as required.
7. Once all parts of the cable are clipped in, the cable with the steel wire can be dropped into the downspout, ensuring the steel wire is in tension to keep the cable in paralleled equal spacing.

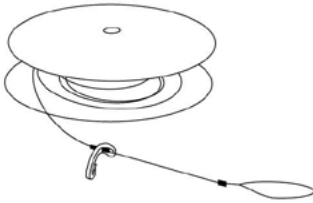


Figure 1. Downspout hanger

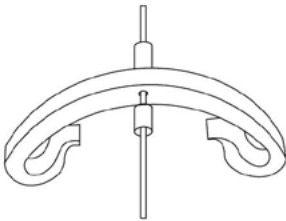


Figure 2. Downspout hanger clip

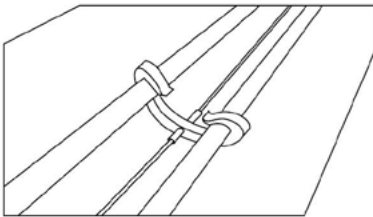


Figure 3. Downspout hanger clip holding cable

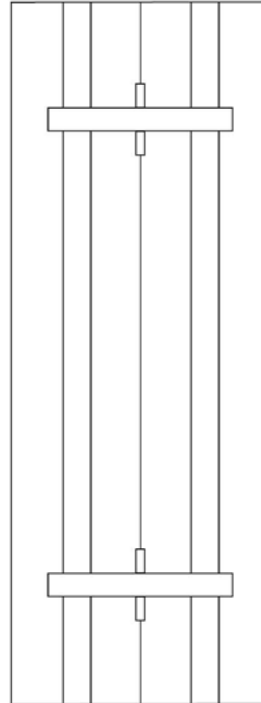
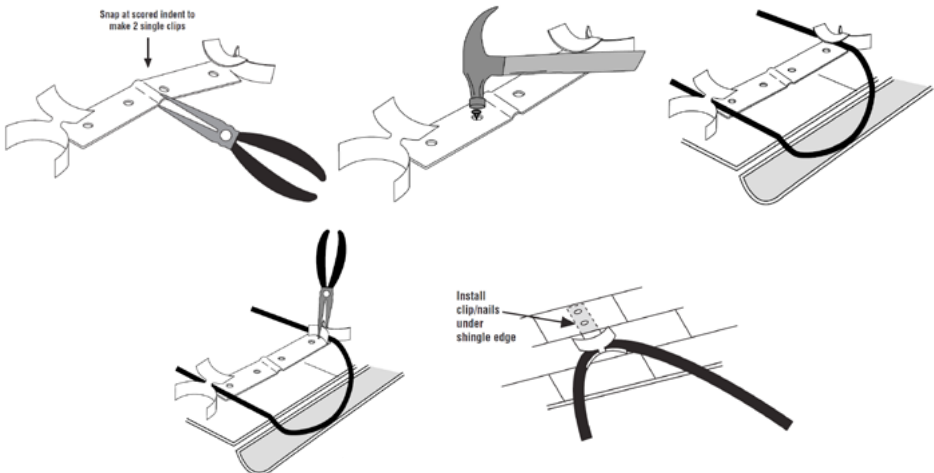
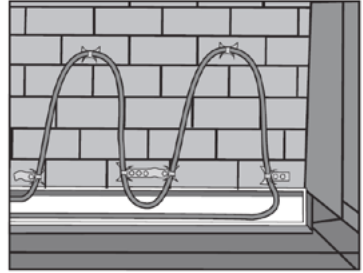


Figure 4. Cable held in parallel in the downspout

9 - Application: Roof and Gutter

For effective heating along the roof line, the cable is arranged in a triangular pattern. The triangles must extend above the overhang into the warm section of the roof. To determine height of the triangles, please refer to the tables in pages 8 and 9.

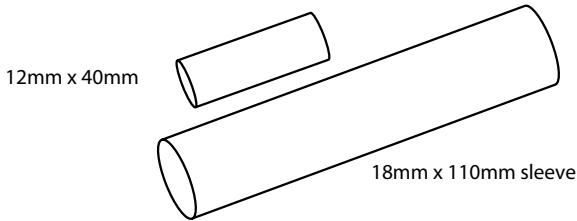
1. For installations on the roof and gutter, the roof clips are used. Using the information on this page and page 9, calculate the height of the triangle formation for the roof heating. The triangle width is fixed at 60cm from peak to peak. The amount of overhang the roof has from the building will affect the height of the triangles.
2. Determine the total length of cable required for the project.
3. Draw out a plan for the project and mark the positions of triangle peaks on the roof using chalk. This will make installation easier.
4. Also mark the cable with any points where the peak of a triangle is or wherever the cable is to be fixed to the roof.
5. A double clip is used to secure the heating cable looped at the roof edge, ensuring a drainage channel to the gutter.
6. A single clip is used to fasten the cable at the stop of the saw tooth arrangement.
7. Fasten the clips to the roof with roofing nails or screws, applying silicon sealant under the clip to provide a water proof sealant.
8. After installing the clips on the roof, thread the heating cable around the clips. Use extra clips in any location where the cable is subject to excess stress or movement.
9. Use pliers to close the clips firmly around the cable, taking care not to crush or damage the cable.



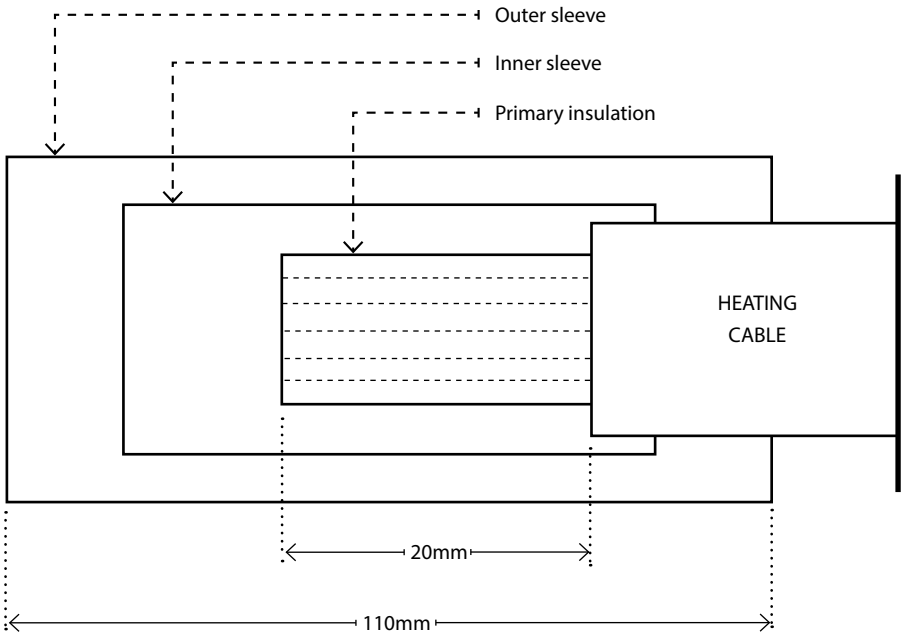
10 - Cable termination

The Warmup termination kit contains 2 sets of sleeves and crimps, one for terminating the end of the cable, and one for terminating the power connection.

End termination



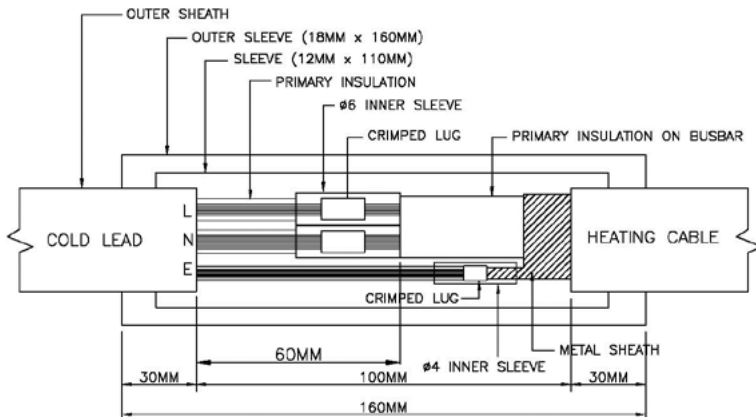
1. Remove 40 mm length of outer sheath of heating cable.
2. Unravel the exposed metal braid.
3. Cut extra metal braid up to outer sheath of heating cable.
4. Slide 12 mm x 40 mm sleeve over end of the cable to cover about 10 mm of cable outer sheath and shrink by hot air gun.
5. Slide 18 mm x 110 mm sleeve over preshrink inner sleeve and also shrink outer sleeve by hot air gun.



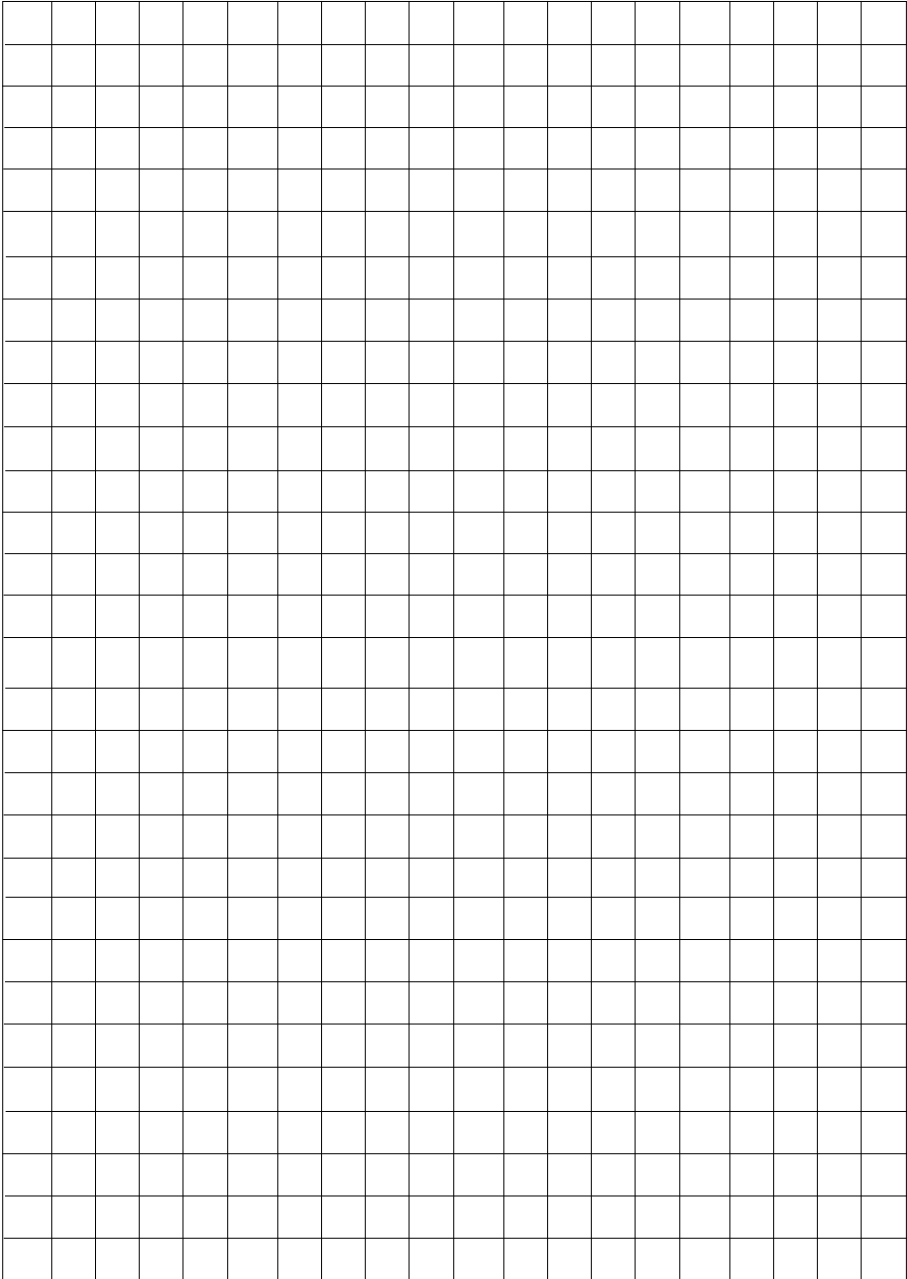
Power termination

To connect the heating cable to the cold lead the following steps should be observed:

1. Cut heater tracer cut off at a required length.
2. Remove tracer outer sheath approximately 50 mm from the end.
3. Unravel metal braid up to outer sheath.
4. Twist and cut the braid leaving approximately 10 – 15 mm near outer sheath.
5. Strip about 20 mm insulation and semi conductive material over both the bus bars
6. Remove about 90 mm outer sheath over cold lead.
7. Cut approximately 60 mm insulated Neutral and live cold cores (brown and blue).
8. Strip all the three cores for approximately 10 mm.
9. Slide 18 mm x 160 mm sleeve over cold lead and then slide 12 mm x 110 mm sleeve over cold lead. Don't shrink the sleeves.
10. Slide 4 mm x 30 mm sleeve over earth core.
11. Slide lug over twisted metal braid and slide stripped earth core in to lug. Crimp lug by using crimping tool.
12. Slide 4 mm x 30 mm sleeve over lug to keep lug in mid of sleeve and shrink the sleeve by hot air gun.
13. Slide one 6 mm x 30 mm over neutral core of cold lead and one 6 mm x 30 mm sleeve over live core of cold lead.
14. Slide one lug on one bus bar and slide another lug on other bus bars.
15. Slide Neutral core in to lug of one bus bar and live core in to lug of another bus bar and crimp both lugs by using crimping tools.
16. Slide both 6 mm x 30 mm sleeves over the crimped lugs to keep lugs in mid of the sleeves and shrink the sleeves by hot air gun.
17. Slide 12 mm x 110 mm sleeve over the terminations and shrink by hot air gun.
18. Slide 18 mm x 160 mm sleeve over preshrink sleeve and shrink.



Plan



11 - Control Card

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

Warmup
The best underfloor heating - **guaranteed**

Heating cable location _____

Total wattage _____

Caution!

Risk of electric shock
Snowmelt heating cable installed below floor.
Do not penetrate floor with sharp devices that may damage the heating cable.

Attention:

- Do not cut or shorten the heating element.
- Ensure that all of the heating wire including the joints completely embedded in the concrete/sand.
- Ensure that the heaters are used in conjunction with a 30mA RCD at all times.

Cable Model	Location

Date _____ Signed _____ Company stamp/name _____

This form must be completed as part of the Warmup Guarantee. Ensure that the values are as per the instruction manual.

This card must be situated close to the consumer unit in a visible place.

Note: Draw a Plan showing the layout of the heater.

Warmup Plc 702 & 704 Tudor Estate Abbey Road London NW10 7UW T: 0845 345 2288 F: 0845 345 2299 www.warmup.co.uk

12 - Warranty



Warmup® Self-Regulating Cable is guaranteed for a period of 5 years by WARMUP PLC ("Warmup") to be free from defects in materials and workmanship under normal use and maintenance, and is guaranteed to remain so subject to the limitations and conditions described below:

The 5 year Guarantee applies:

1. Only if the unit is registered with Warmup® within 30 days after purchase. Registration can be completed online at www.warmup.co.uk. In the event of a claim, proof of purchase is required, so keep your invoice or receipt – such invoice should state the exact model that has been purchased.
2. Only if the heater has been earthed and protected by a 30mA Residual Current Device (RCD) at all times.
3. Only if the heaters have been tested and electrical work and connections have been undertaken by a qualified electrician in accordance with IEE regulations and in accordance with these installation instructions.

During the period of guarantee, the manufacturer will arrange for the heater to be repaired or (at its discretion) have parts replaced.

If the heater fails due to damage caused during installation, this guarantee does not apply.

THE MANUFACTURER SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO EXTRA UTILITY EXPENSES OR DAMAGES TO PROPERTY.

WARMUP® PLC is not responsible for:

1. Damage or repairs required as a consequence of faulty installation or application.
2. Damage as a result of floods, fires, winds, lightning, accidents, corrosive atmosphere or other conditions beyond the control of the manufacturer.
3. Use of components or accessories not compatible with the units.
4. Normal maintenance as described in the installation and operating manual.
5. Parts not supplied or designed by the manufacturer.
6. Damage or repairs required as a result of any improper use, maintenance, operation or servicing.
7. Failure to start due to interruption and/or inadequate electrical service.
8. Any damage caused by frozen or broken water pipes in the event of equipment failure.
9. Changes in the appearance of the product that does not affect its performance.

Warmup®

The World's **best-selling** floor heating brand™

Warmup PLC

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