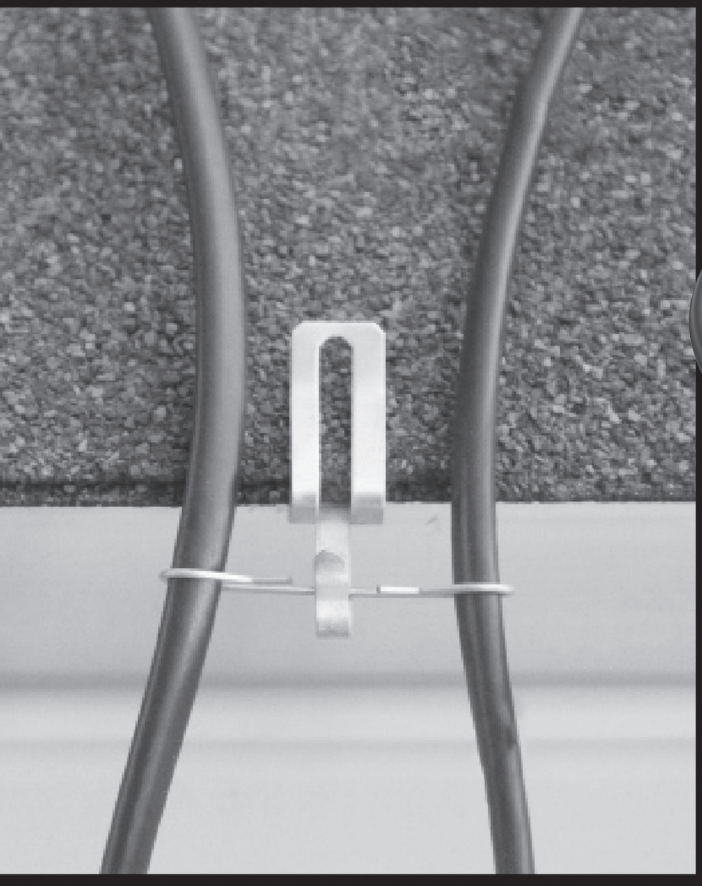
OUELLET BRITECH DELTA-THERM CORPORATION Global Commander Momento

INSTALLATION MANUAL

INS-RF-R-202206-00



120V Preassembled Heating Cable for Roof and Gutter De-Icing

RF-R Series
ORF-R Series
BGDC1-1A Series
RFG-R Series
MRF-R Series
DRF-R Series

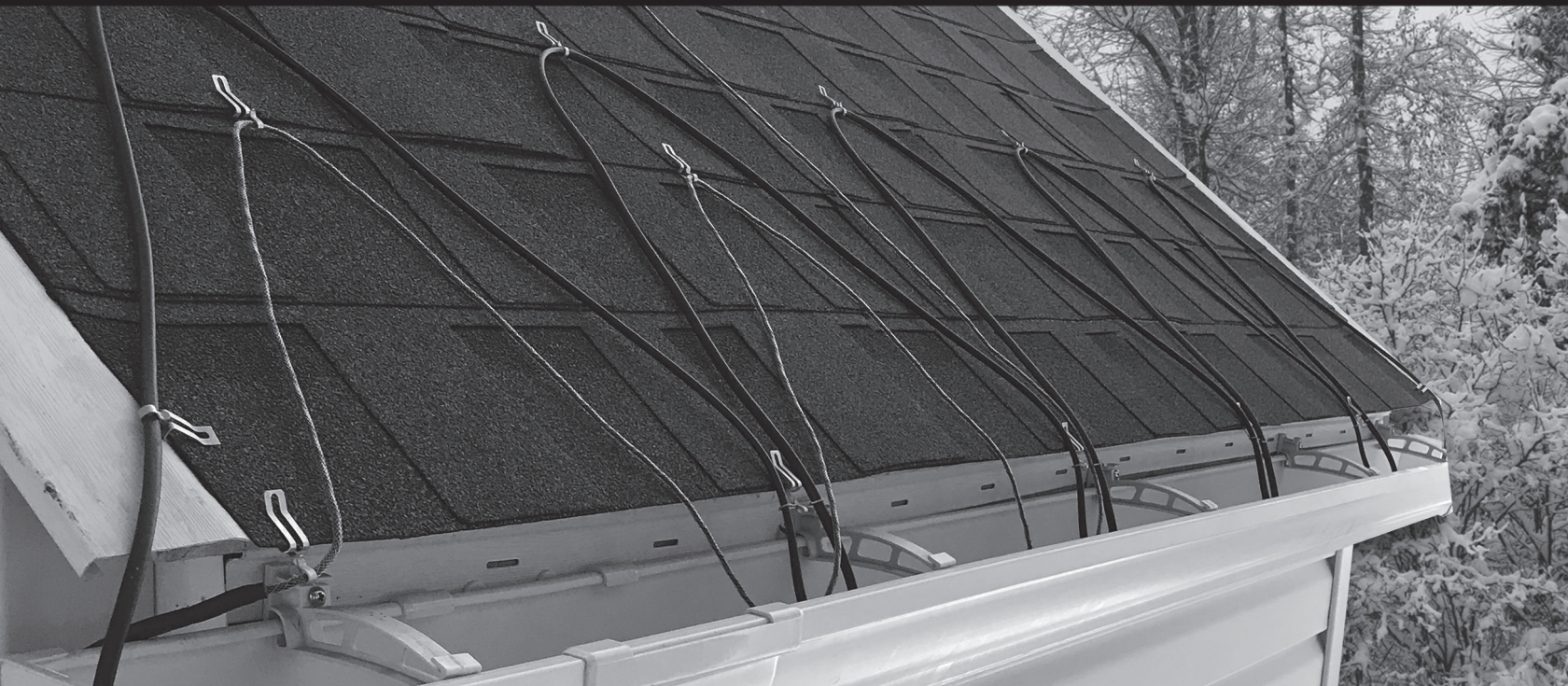


Table of Contents

Read through the entire instruction sheet before you begin.
Make sure you have selected the correct length of heating cable.

Customer service

If you have any questions about this product, please contact our technical support team:

OUELLET	**Canada:** 1 800 463-7043 • info@ouellet.com • www.ouellet.com **USA:** 1 800 525-3622 • USAinfo@ouellet.com • www.ouellet.com
BRITECH	877 335-7790 • info@britech.ca • www.britech.ca
DELTA-THERM	1 800 526-7887 • info@delta-therm.com • www.delta-therm.com
Global Commander	1 800 463-7043 • info@globalcommander.ca • www.globalcommander.ca
Momento	1 800 463-7043 • www.momentoconfort.com

Caution

Warnings:

(This symbol identifies particularly important safety warnings that must be followed. Failure to do so could cause overheating and result in serious fire hazard or electrical shock).

- Failure to handle, improper installation, use, and/or maintenance of electrical heating cable may result in ice dam formation or injury or death from electric shock or fire.
- Do not allow any part of a cable to pass through the inside of any area of a building, including an attic, an exhaust vent, or a chimney. Also, no part of the heat-traced downspout may pass through a building.
- Keep the cable at least 30cm (12in) away from any extra sources of heat.
- Never alter this heating cable in any way. If made shorter, it will overheat. Once cut, the heating cable cannot be repaired.
- Avoid pulling the heating cable jerking or installing against sharp edges. Don't kink or crush the cable, including walking on it or running over it with equipment.
- Never allow heating cable to touch, cross, or overlap itself at any point.
- Do not cover or insulate any part of the cable.
- The bending radius should larger than 12mm (0.5in). Do not bend the heating cable in along the flat plane. Sharper bends than 12mm (0.5in) can damage the heating element.
- Do not paint or expose the cable to chemicals such as glue, caulk, or adhesive.
- Do not operate the cable when outdoor temperatures begin to remain above 10°C (50°F).
- Make sure there is a properly grounded electrical receptacle close enough to plug in the cable. If an extension cord is necessary, use only a properly sized, grounded, CSA/UL Certified cord suitable for outdoor service **in accordance with local codes and per the local authority having jurisdiction.**
- Heating cables must be installed in compliance with the National Electric Code and Canadian Electrical Code. Ground fault protection (GFCI) of power supply circuit is required.
- Approvals are based on the use of *Manufacturer's* specified parts only. Any substitute parts or vinyl electrical tapes are not allowed.
- Do not connect power to heating cable while it is coiled.
- Disconnect the roof and gutter heating cable from its power source during installation.
- While energizing the heating system circuit, regardless of the normal operation, installation period or maintenance, always keep the heating section of the heating cable system away from combustible surfaces at least 2.5cm (1in) interval.
- You may need a professional to install the heating cable on the roof if you are uncertain about the electrical requirements or there are some special considerations for specific roof materials.
- This product may be installed when there is no ice or snow on the roof and in the gutter.
- If separate areas are being treated, it may be more practical to use separate cables.
- Do not install the roof and gutter de-icing heating cable system when the ambient temperature is colder than the minimum installation temperature -18°C (0°F).
- These instructions must be saved and made available to the owner and transferred to future owners.
- If after reading the following instructions, you still have questions regarding installation or for more information, please contact Customer Service.

A. General Information

This guide provides a basis for designing a roof and gutter deicing system. It also covers the installation of Roof and Gutter De-icing Heating Cables in residential applications. This instruction manual includes information on testing and periodic maintenance.

How Heating Cable Work

The Problem

Snow and ice melt as a result of either exposure to the sun or from heat rising from the building. As the water runs into cold gutters and drainpipes, it can refreeze, forming layers of ice. This can create ice dams, resulting in damaged drains and gutters, and can also result in water seeping between shingles. Eventually, water can seep into the building at electrical openings or through the roof material. Additionally, icicles may form and potentially cause injury and damage.

The Solution

A roof and gutter de-icing heating cables system can help prevent ice dams and icicles by maintaining a continuous path for water to drain from the roof. Ice dams should not form as long as a heated path from the roof to a safe discharge area is maintained. The roof and gutter de-icing heating cables system can be used on roofs and valleys and in downspouts and gutters made from many types of standard roofing materials, including metal, plastic, asphalted, and fiberglass shingles.

The roof and gutter de-icing heating cables heating cable is laid in a "zigzag" pattern along the lower edge of the sloping roof. The heating cable should extend at least 30cm (12in) above the level of the outer building wall, or 15cm (6in) above the snow fence, whichever is higher, and extend down into the gutter. This will ensure a continuous run-off path for water.

The cable should only be operated when the outside temperature is between -9^{O}C and 2^{O}C (15^{O}F and 35^{O}F). The cable can work with an optional power ON/OFF switch or Thermostatically Controlled Adapter which is a moisture and temperature sensor control that operates the de-icing cable only when moisture is present, and the temperature drops below freezing.

Caution: In very cold conditions, below -9°C (15°F), the cable may not generate enough heat in some roof sections to prevent melt water from refreezing.

Heating Cable Application

This cable is designed for installation on inclined roofs with non-combustible tab shingles (such as asphalt shingles), metal or plastic gutters, downspouts, and valleys providing a clear path for water to drain.

If previous ice dam problems only occurred in the gutters and not on the roof, install the cable in the gutters and downspouts only.

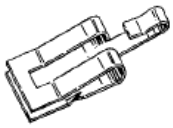
The cable does not have to be installed on every section of the roof, but only in the places that have been susceptible to ice dams in the past. However, always install the cable in valleys that problem areas for snow and ice on the roof.

The marking "WS" indicates the *Roof and Gutter De-icing Heating Cables* system is designed for roof and gutter de-icing applications and is intended for use in locations where it may be subject to water and sunlight.

Warnings:

- Do not use to remove ice dams that have already formed or clear the roof of ice and snow.
- Do not use on roofs with wooden shingles, rubber roofs or composite (tar and gravel) roofs.
- Do not use on wooden gutters or downspouts.
- Do not use for any other purposes, such as melting snow or ice on sidewalks or pipes freezing protection.

Included Material

 Roof and Gutter De-icing Heating Cable	 Cable spacer	 Roof clip	 Caution label

Tools Required

Receipt, Storage and Transportation

Receipt

- Compare the materials against the invoice and check to verify the proper materials have been received. The cable's model number is printed on its label.
- Review your design documents and check the received materials against the lists to verify all the needed materials were received.
- Inspect the heating cable and accessories to ensure there is no in-transit damage.

Storage

- Cables and system components should be stored in a clean, dry area. The storage temperature range is -18°C to 60°C (0°F to 140°F).

Transportation

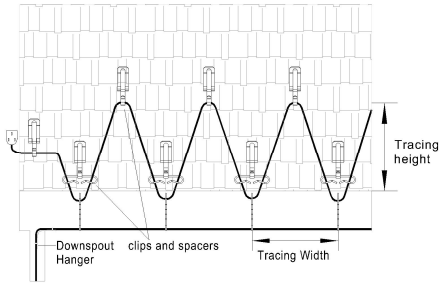
- Transport heating cables and connection components at a clean and dry location.
- During transportation, any contact with chemicals and petrochemical products must be effectively avoided.
- It must be ensured that the heating cables are protected against mechanical damage during transportation.

Before installation

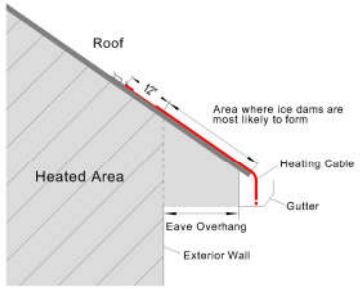
If the heating cable is stiff (due to being cold), first uncoil it and then power it with a 120V receptacle until it is warm and pliable, then unplug the power before attaching it to the roof and gutter.

B. Select the Proper Heating Cable Length

First, several important terms should be defined as below:



Front view of roof with de-icing system

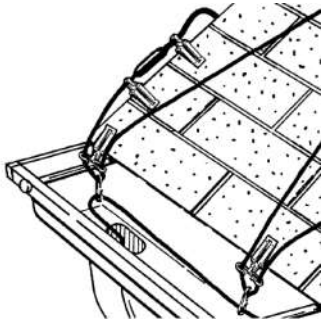


Side view of roof with de-icng system

Specification Table

Heating Length (ft.)	Power Output (Watts)	Amp. (@120V)
20	100	0.83
30	150	1.25
60	300	2.50
80	400	3.33
100	500	4.17
120	600	5.00
140	700	5.83
160	800	6.67
180	900	7.50
200	1000	8.33
240	1200	10.0

- An accurate estimate of the cable length you need is critical because you cannot change the cable length by cutting, splicing, or altering it in any way.

Item	Design	**Attaching the cable** (Use only the clips and spacers provided to attach the cable)
Starting Point	If an electrical receptacle already exists in an appropriate location near the eave, that will be your starting point. Otherwise, select an appropriate starting point and have an electrical receptacle installed.	 First, lay out the cable flat against the roof so it is not twisted or tangled. Second, using the clips, attach the cable to the edge shingles nearest the start point. Using a spacer, arrange the cable to form a drip loop to prevent water from tracking along the and back into the receptacle. **Caution:** Lift the shingle just enough to insert the clip. Press shingle back down firmly.

Roofline

To maintain a continuous path on the roof for water run-off, route the heating cable in a "zigzag" fashion as shown.

The cable must extend above the overhang into the section of the roof above the heated section of the house. Also, to make a continuous path for the water, extend the heating cable all the way down to the gutter.

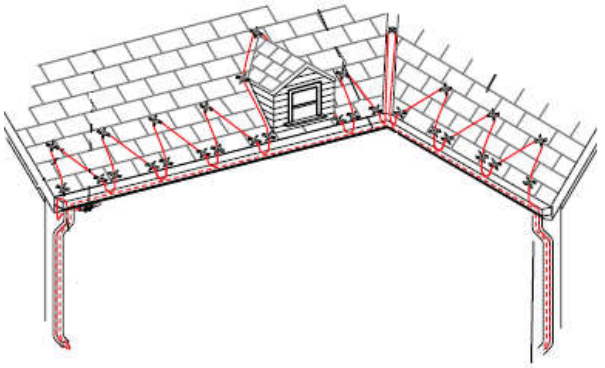
Overhang distance (in/cm)	Tracing Width (in/cm)	Tracing Height (in/cm)	With gutter Multiplier (A)	Without gutter Multiplier (A)
No overhang	15/38	22/56	3.9	3
12/30	15/38	22/56	3.9	3
24/61	15/38	33/84	5.3	4.5
36/91	15/38	44/112	6.8	6
48/122	15/38	55/140	8.2	7.4
60/152	15/38	66/168	9.7	8.9
72/183	15/38	77/196	11.1	10.3

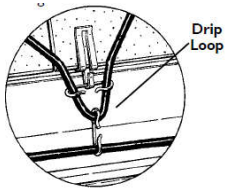
(B): Total length of roof edge

Cable Length required for roofline area: Multiply (A) and (B) to determine the length of heating cable required for roofing.

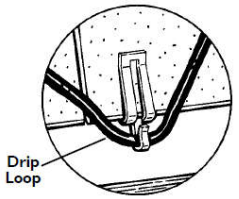
A drip loop extends at least 6 cm (2.5in) from the roof edge to direct water into the gutter or to the ground.

Caution: There should be a minimum of 5 cm (2in) between the bottom of the drip loop and the bottom of the gutter.

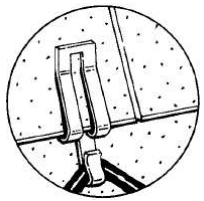




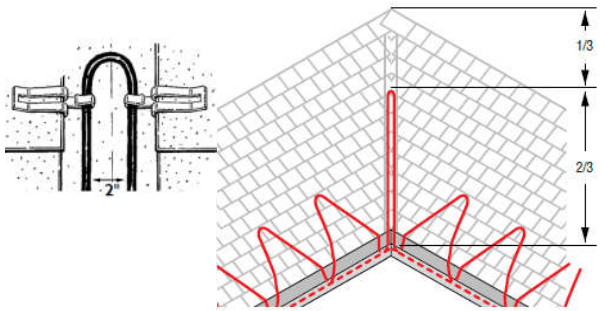
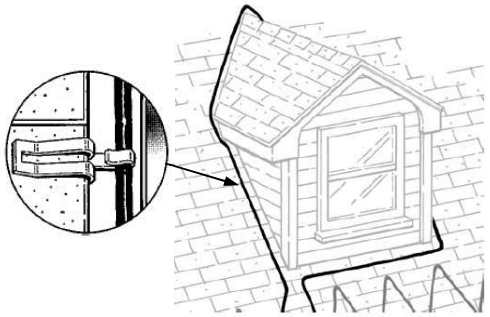
Bottoms of triangles (With gutter)

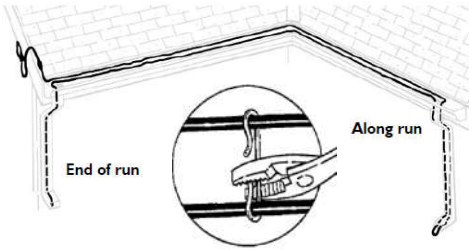


Bottoms of triangles (Without gutter)



Tops of triangles

Valleys	Lay heating cable up to two-thirds of the length of each valley, a minimum of 91cm (3ft.), and return to form a double run of heating cable in the gutter. Extend the cable higher if the heated area of your house below your roof is farther up the valley. (C): Number of valley (D): Valleys length ***Cable Length required for valleys:*** (C) **x** (D) **x** (2/3)	 Attach the heating cable up and down the valley and keep two parallel lines at least 5cm (2in). away.
Dormers	For a problem dormer area, the cable should be arranged up and around the dormer. ***Cable Length required for dormer:*** Distance around dormer	 Attach the cable with the clips in every 91cm (3ft) when the cable is running vertically around a dormer.
Gutter and Downspout	1. The heating cable needs to be installed along the treated roofline through the gutter. Install the cable down into and back up the inside of any downspouts. If there is a downspout at the end of the roofline, you need only route the cable down the inside of the downspout but not back up. 2. If your icing problems are only in the gutter, the cable would be routed only in the gutter and downspouts using a "double run"	 Fasten the gutter cable to the bottom of each drip loop by using a spacer. Secure the cable in the gutter, but keep it off the

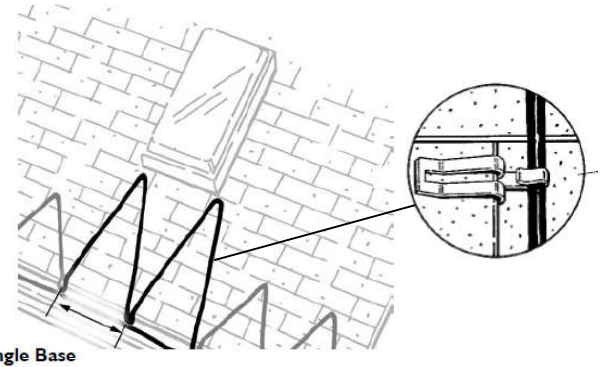
	of cable 3. Sometimes in a wide gutter, width > 15cm (6in), snow and ice can bridge over a single heating cable creating a runnel that prevents water from getting into the gutter and downspouts. To maintain a continuous path for water run-off, use two parallel heating cables in the gutter. ***Cable Length required for gutter:*** Length of gutter × (1 or 2) ***Cable Length required for downspouts:*** Number of downspouts × Length of downspout × 2	 bottom of the gutter to prevent heat loss. When using two parallel runs of heating cable, separate the two runs of heating cable with a spacer every 15cm (6in). Route the cable under and over the gutter spike to keep the cable suspended off the bottom of the gutter. Another way to keep the cable suspended off the bottom of the gutter is using clips and spacers to external gutter straps. Determine the total length of cable needed to go down and back up the downspout as accurately as possible. Then install spacers and feed the cable into the downspout. Take care to avoid snagging or cutting the cable on sharp edges when feeding it into the downspout. To assist the cable down into the downspout, use a weighted string. **<u>Cautions:</u>** ● Spacers must be attached to the cable every 15cm (6in) so that the cable does not touch itself in the downspout. ● Tighten the spacers with pliers. Squeeze gently and use care to avoid pinching, crimping, cutting into the cable. Do not use a hammer to tighten the clips and spacers. ● Do not wrap the cable around the downspout or otherwise attempt to attach it to the outside. No cable may be extended out the end of the downspout.

<table>
<tr>
<td>Skylight

(Special roof areas)</td>
<td>When installing the heating cable around special roof area such us skylight, use a “zigzag pattern”. Maintain the triangle base at 38cm (15in). However, the height of the triangles needs to be greater than those along the roofline. Increase the triangle height till it extends to about 15cm/6in into the roof section above the heated portion of the house.

<u>Caution:</u> Triangle heights must not exceed 6m (20ft). For special areas that are more than 6m/20ft from the roof edge, a professional installer should install a commercial-grade de-icing cable.

Cable Length required for Skylight (Special roof areas): Distance from the roof edge to bottom of special roof area × Width of ice dams that form along special roof area × Special Roof Area Multiplier

<table>
<tr><td colspan="2">Special Roof Area Multiplier</td></tr>
<tr><td>For a Roof Without Gutter</td><td>For a Roof With Gutter</td></tr>
<tr><td>1.6</td><td>2.6</td></tr>
</table>
</td>
<td> 
Triangle Base
(15 inches)

For triangles that are larger than 91cm/3ft in height, also attach clips every 91cm/3ft up the height of the roof.</td>
</tr>
<tr>
<td colspan="2">Cable Length required for roofline area
+Cable Length required for valleys
+Cable Length required for dormer
+Cable Length required for gutter
+Cable Length required for downspouts
+ Cable Length required for Skylight (Special roof areas)

=Total cable Length required</td>
<td></td>
</tr>
</table>

C. Installation instructions

Pre-Installation Check

- The heating cable should be tested to ensure electrical integrity with at least a 500 Vdc megohmmeter (megger) between the grounding pin and any of the other two pins. Minimum resistance should be 20 megohms. Readings below 20 megohms indicate the electrical insulation has been damaged and the heating cable must be replaced.
- Ensure that the service voltage available is correct for the heating cable.
- Clear all gutters and downspouts of combustible debris such as leaves, pine needles, seeds, or windblown trash.
- All sharp edges that may come in contact with the heating cable should be smoothed by either filing or bending them down. Alternately, use a fixing bracket to protect the heating cable from damage by the sharp edge such as gutter edges, downspout fittings, or screws.

Laying Out the Heating Cable

- Please refer to section **B, "Attaching the cable".**
- While the cable is being laid out on the roof, loose attachment of the clips and spacers is recommended in case adjustments must be made.

Final installation step

- For excess cable, triangles can be made larger or cable loops in valleys can be extended. Alternatively, if a downspout is present at the end of the roofline being treated, the cable may be routed back up the downspout to take up the excess.
- For slight shortages, triangles can be made smaller on areas of the roof that are less susceptible to ice dams.
- Check that the heated portion of the cable has not been moved from its intended position.
- Place the caution labels on the circuit breaker/fuse panel or on the ON/OFF switch.

Remove the cable

- To remove the cable, wait for suitable weather conditions. Then unplug the cable. Open the clips with pliers and remove the cable. Take care when removing cable from a downspout to avoid snagging or cutting the cable on sharp edges.

Electrical Requirements

- This cable must be plugged into a 120 Volt A/C outdoor receptacle that is grounded.
- The indicator light on the power plug will be illuminated when your cable is energized. This allows you to know the cable is energized in cold weather and, on the other hand, reminds you to turn off the cable in warm weather, which will avoid overheating and reduce energy usage.
- Make sure that the heating cable load you are connecting is within the rating of your electric control system.
- The cable or extension cord should be plugged into a permanently installed outdoor-use receptacle protected from rain, snow, or other elements.
- To ensure the heated portion of the cable is entirely on the roof, the outdoor-use receptacle should be within 183cm (6ft) of the starting point. This will help avoid contact with people or equipment that move or damage the cable.
- Ground fault circuit breakers (GFCI) are required on all heater constructions per the National Electric Code. Use circuit breakers that incorporate 30 mA ground-fault circuit protection or provide equivalent levels of ground-fault protection.
- Two copies of a caution label indicating the presence of electric de-icing and snow-melting equipment on the premises are packed with this unit. One caution label must be posted at the fuse or panel and the other on or next to the on/off control for the cable unit. Both caution labels must be clearly visible.

Warnings: Do not use this cable on a circuit whose circuit breaker or fuse is rated at more than 20 amps.

Warnings: Do not modify the plug provided with the cable. If it does not fit the receptacle, have a proper receptacle installed by a licensed electrician.

Testing

- After the installation but before energizing the circuit, another insulation resistance (megger) test should be repeated. This should draw attention to any damage to the heating cable that may have occurred during installation.
- It is the installer's or electrician's responsibility to perform a series of tests on the heat tracing system at the start of and during installation of the heating cable.
- Once power is connected, before putting the system into operation, verify all heating cable testing and documentation have been completed for each heat tracing circuit. This will ensure that the system has been installed per the manufacturer's recommendations.

Maintenance

- While the cable is operating, check to ensure a complete path is available for water to get to the ground. There should be no ice buildup above the cables, and icicles should not form at the roof edge.
- Inspect the cable, including the plug at the beginning of every heating season and monthly during operation. Clear all gutters and downspouts of combustible debris such as leaves, pine needles, seeds or windblown trash.
- Remove and dispose of the cable if it shows any evidence of damage or deterioration, including cuts, brittleness, charring, cracking, discolored surfaces, or bare wires.
- Check the heated portion of the cable has not been moved from its intended position.
- Preventive Maintenance: A preventive maintenance program is needed encompassing both visual and electrical checks of the system. These should be done not only before initial operation of the system, but also on a scheduled basis. The checks should also be done after any maintenance has been performed.
- Turn off or disconnect the power when the heating season ends. Reconnect before the start of the next heating season.

Warnings: Disconnect the power connection before inspecting.

D. Troubleshooting

Symptom	Problem causes	Correction
Circuit Breaker Trips	Circuit breaker is undersized	Replace the circuit breaker if defective or improperly sized.
	Defective circuit breaker	Check to see if existing power wire sizing is compatible with larger-sized breakers.
	Parts of the electrical circuit become wet	Use a weatherproof receptacle.
	Physical damage to the heating cable may be causing a direct short	Check for where there may have been maintenance work done. Replace damaged heating cable.
	GFCI is undersized	Replace undersized GFCI with 30 mA GFCI.
Low insulation resistance	Nicks or cuts in the heating cable.	Replace the cable with a new one.
	Short between the braid and heating cable core or the braid and metal gutters or downspouts	
Icing problems persist	The cable layout pattern does not prevent ice dams	Observe and record these conditions. Adjust cable pattern when conditions are suitable. Rearrange and supply more cable to the needed areas or reduce the cable in an area that is not as susceptible to ice dams.
	Loss of power	Check the power supply to the cable.