



# ICE DAM HEAT CABLE ROOF & GUTTER DE-ICING SYSTEM

11mm Self-Regulating Heating Cable

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Freeze  
Protection  
Products  
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# 1.1

## IMPORTANT INSTALLATION GUIDELINES

- Do not energize the heating cable(s) before installation is complete.
- Ensure bus wires are separated. Bus wires will short if in contact when cables are powered.
- Cable ends must be terminated with end seals. Bus wires cannot be left exposed.
- Bus wires and cable terminations should be kept dry before, during, and after installation.
- Ensure drip loops are made to prevent water from trailing into any electrical equipment, junction boxes, or controls.
- Be careful not to break bus wire strands when isolating bus wires during splice connections. Damaged bus wires can overheat or may cause a short circuit.
- Only use Ice Dam Company connection components to make splices and/or end terminations. Ice Dam Company connection components are certified and approved for use with Ice Dam Company self-regulating cables.
- Do not use epoxies or acid-curing silicones to attach roof clips to roof. Epoxies or acid curing silicones are generally not suitable for exterior roof and gutter applications. Consult a roofing contractor in your area for recommendations on proper adhesives for roof material and environmental conditions.
- Observe the maximum circuit lengths of the cable ( Appendix 1 on page 31) and do not exceed this limit during the installation. Exceeding the maximum circuit lengths will result in breaker trips which will prevent the heating cable from turning on in freezing conditions.
- Conduct insulation and resistance tests before, during, and after installation. Refer to testing procedures on page 12 of this guide.
- Testing and visual inspections of the heating cable should be performed after any type of roof maintenance or repair including but not limited to roof / gutter / downspout repair, manual snow removal, and installation / addition of roof features.
- Ensure gutters and downspouts are free of leaves and other debris prior to each winter season.
- Materials used for the housing (ie. junction boxes), support or on which the cables are installed shall be grounded in accordance with CSA and UL standard.
- All installations must be in compliance with the following electrical codes:
  - > Articles 426 and 500 of the NEC (National Electrical Code)
  - > Sections 62 and 18 of the CEC (Canadian Electrical Code)

**ICE DAM COMPANY AND NEC REQUIRE 30mA EQUIPMENT GROUND FAULT PROTECTION ON EACH CABLE BRANCH CIRCUIT.**

# 1.2 BEFORE YOU START

The following tools /materials are required for The Ice Dam Company Roof & Gutter De-icing System installation:

## 1.21 TOOLS

- 1000Vdc megohmmeter
- Multimeter
- Method to payout / unreel the heating cable
- Cutting pliers
- Tools to secure roof clips ( if installing heating cable on roof )
  - > Hammer / Drills ( if using screws / nails to secure the roof clips )
  - > Caulking gun ( if using adhesive to secure the roof clips )

## 1.22 MATERIALS

- Materials to secure the roof clips to the roof and/or gutter (based on the application and installation method):
  - > Suitable adhesive / sealant
  - > Screws / Nails
- Materials needed for electrical connections:
  - > Ice Dam Company approved connection kits
  - > Junction boxes
    - Between breaker panel and junction boxes
    - Between junction boxes and control
- UV cable ties
  - > Only required if heating cable installed on BOTH roof and gutters

# 1.3 SYSTEM COMPONENTS

## 1.31 ROOF & GUTTER DE-ICING SYSTEM OVERVIEW

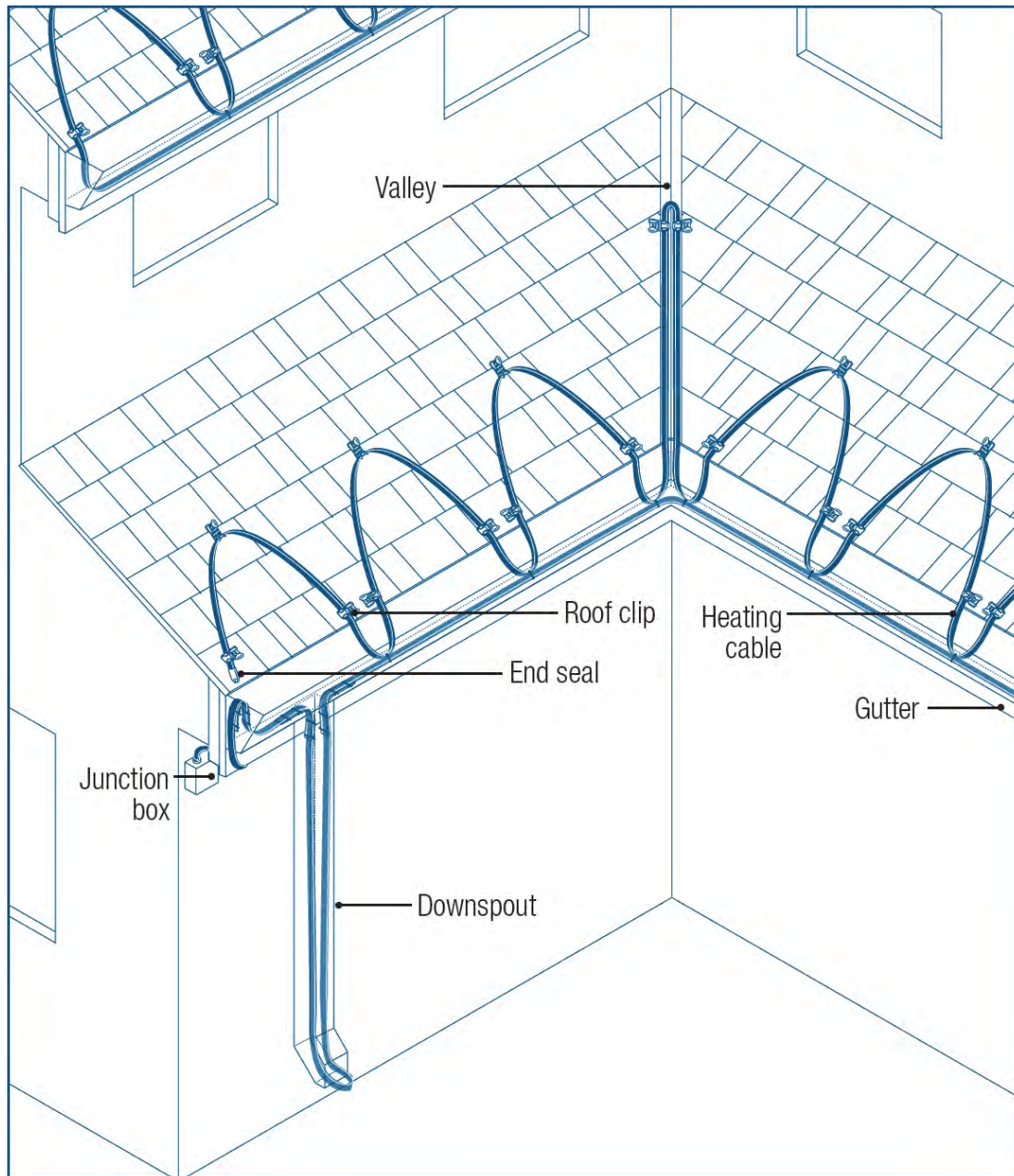


FIGURE 1.31: Roof & Gutter De-Icing System

The Ice Dam Company Roof & Gutter De-icing System creates/maintains drain paths to help remove melt water from roof and gutter systems. This will prevent ice dams and ice build-up that can cause extensive damage to roof and gutter systems.

The Ice Dam Company Roof & Gutter De-icing System is compatible with:

- > Standard gutter/downspout materials
- > Standard roof materials
- Metal
- Plastic
- Wood
- Shake/Shingle
- Rubber/Tar
- Wood
- Metal
- Plastic

# 1.3 SYSTEM COMPONENTS

## 1.32 ROOF & GUTTER DE-ICING SYSTEM

Ice Dam Company self-regulating heating cables are installed inside the gutters, downspouts and / or installed on roofs.

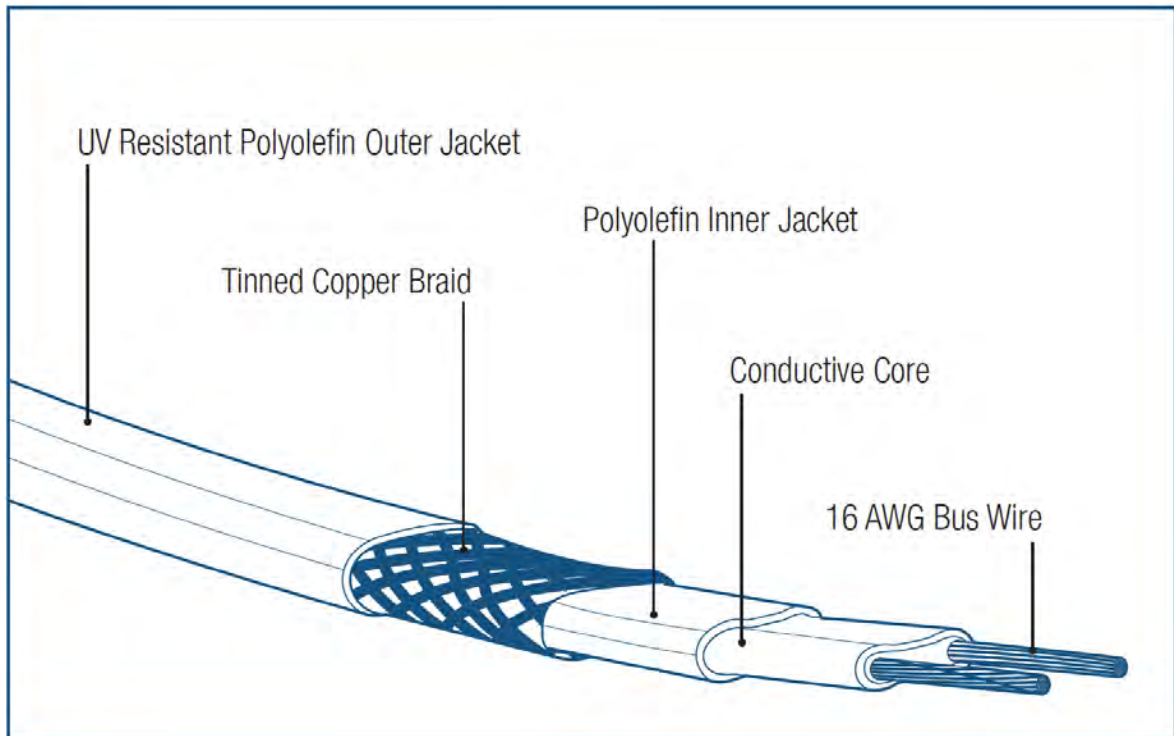


FIGURE 1.32: Roof & Gutter Self-Regulating Heating Cable

## 1.33 POWER CONNECTIONS, SPLICES, END SEALS

Specific kits are required to connect heating cables to power, splicing / splitting to extend heating cable into downspouts, and sealing cable end(s).

## 1.34 SNOW CONTROLLER THERMOSTATS

Snow controllers or thermostats control when heating cables turn on / off. There are several snow controller and thermostat options with varying levels of customization. More information on snow controllers and thermostats can be found on page 30.

# 1.3 SYSTEM COMPONENTS

## 1.35 ROOF CLIPS

The heating cable can be attached to a roof using Ice Dam Company roof clips. Secure Ice Dam Company roof clips to roof using screws, nails or adhesives. If screws or nails are used, weatherproof sealant must cover screws or nail holes to prevent water ingress.

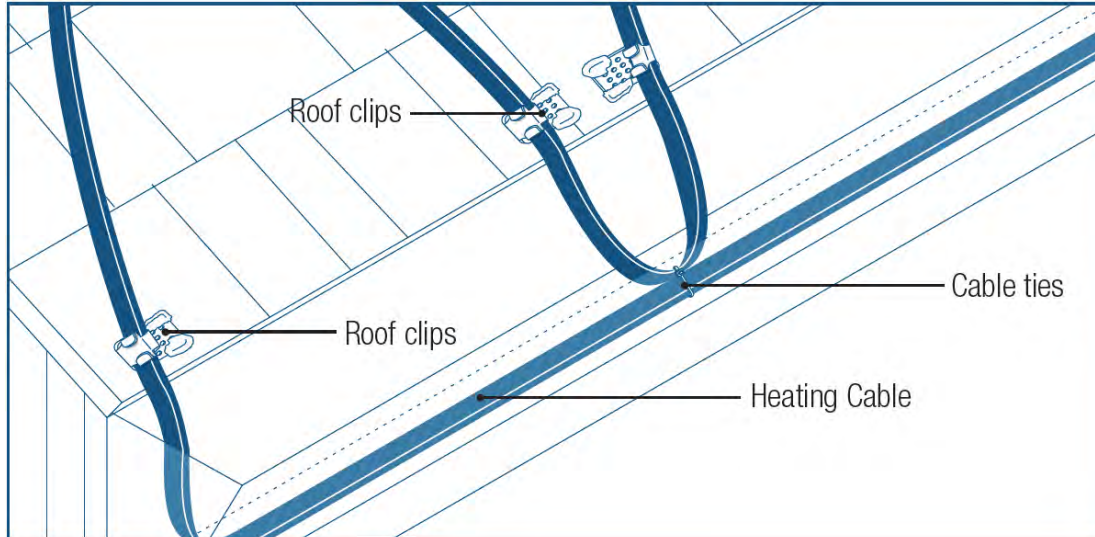


FIGURE 1.35A: Roof Clips

Ice Dam Company roof clips can also be used as spacers inside gutters when multiple runs of cable are used. Secure roof clips to gutter base using weather resistant adhesive.

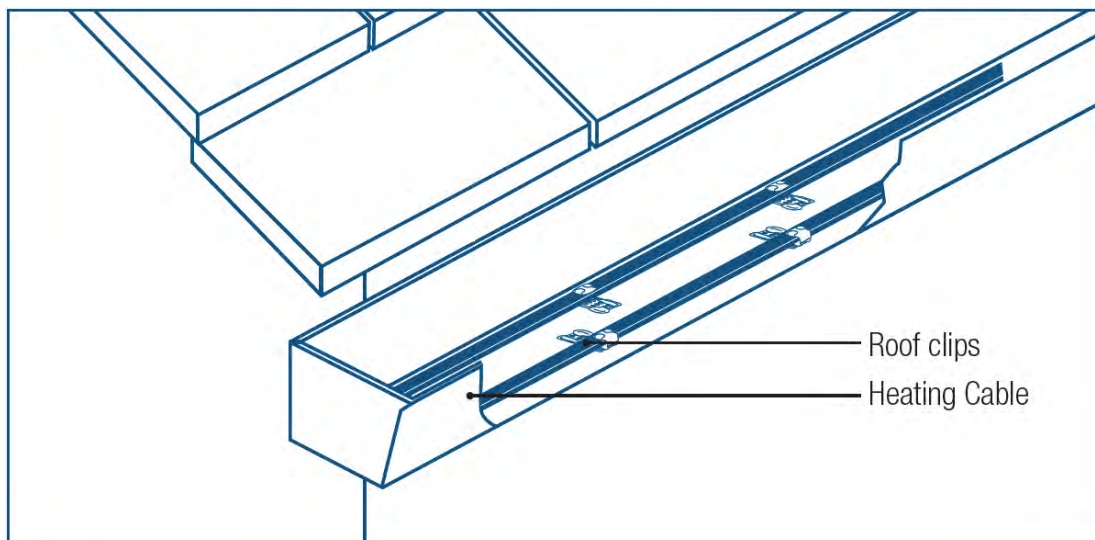


FIGURE 1.35b: Roof Clips



# 1.3 SYSTEM COMPONENTS

## 1.36 DOWNSPOUT HANGERS

Ice Dam Company downspout hangers are required to prevent damage to heating cable as it enters / exits the downspout. Downspout hangers can also be used as spacers inside the gutters when multiple runs of heating cable are used.



**Downspout hangers do not need to be secured to gutters.**

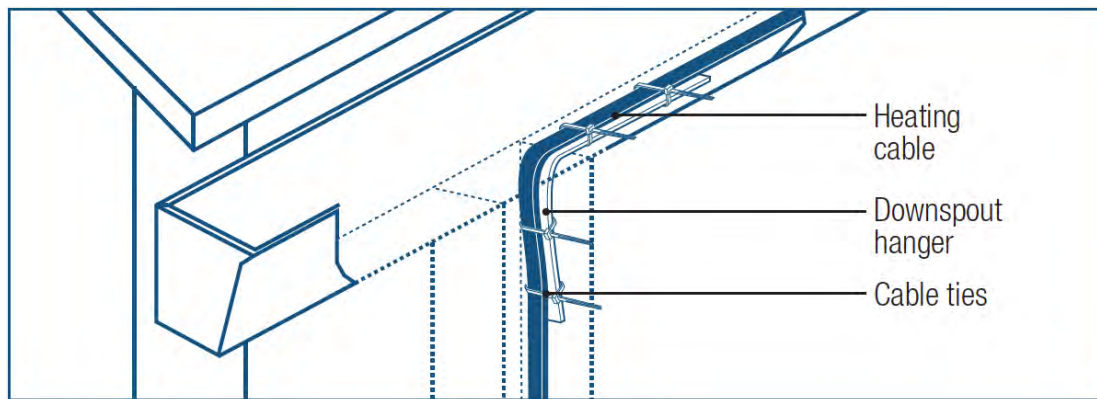


FIGURE 1.36a: Downspout Hanger

When using downspout hangers as spacers in wider gutters, place the hangers at the base of the gutter and angle across gutter width. Run heating cable overtop of hanger and secure to hanger using UV resistant cable ties.

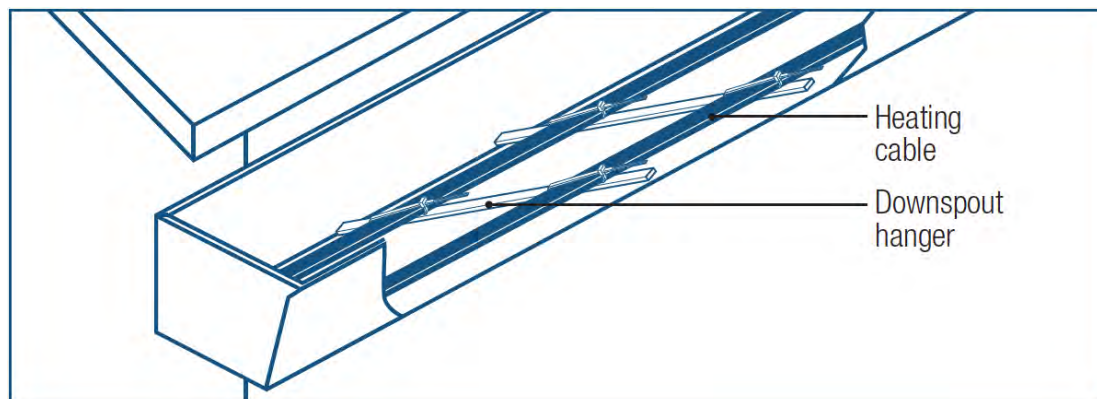


FIGURE 1.36b: Downspout Hanger

## 1.4 INSULATION AND CONTINUITY TESTS

Insulation resistance tests must be performed on each circuit before, during and after installation of The Ice Dam Company Roof & Gutter De-Icing System. Insulation resistance readings must be recorded in the tables in Section 1.5

Before performing any tests, disconnect all electrical components to the heating cable including power, thermostats, and contactors. The two bus wires and metal ground braid needs to be separated prior to conducting any tests.

To separate the bus wires and ground braid:

1. Lightly score around and down the outer jacket 3" from the end of the heating cable. Bend heating cable to break jacket at score; peel off outer jacket.
2. Push back braid to loosen. Spread apart braid, bend the heating cable and work it through the opening in the braid.
3. Position braid on one side of the cable and twist into a pigtail.
4. Lightly score around and down the inner jacket 1.5" from the end of the heating cable and remove.
5. Cut down the center of the conductive core and trim away 1/2" of the conductive core from the tip of the cable exposing the bus wires.

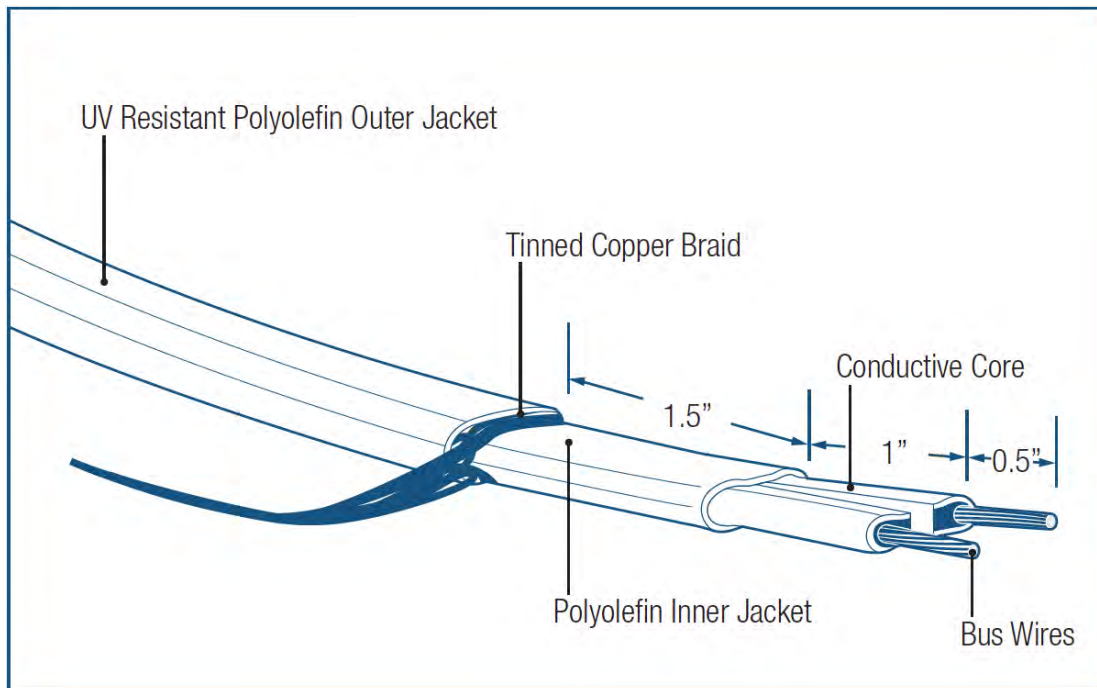


FIGURE 1.4: Separating Heating Cable Bus Wires

# 1.4 INSULATION AND CONTINUITY TESTS

## 1.41 INSULATION RESISTANCE TEST

1. Set the megohmmeter voltage to 0 Vdc.
2. Connect the negative alligator clip to the metallic braid of the heating cable.
3. Connect the positive alligator clip to the both heating cable bus wires.
4. Turn on the megohmmeter and set the voltage to 500 Vdc.
5. Apply voltage for one (1) minute.
6. Check the resistance reading.
7. Confirm that the resistance is greater than 20 megaohms.
8. Record insulation resistance reading in table in Section 1.5.
9. Repeat step 4-7 at 1000 Vdc.
10. Confirm that the resistance value is within +/- 10% of each other regardless of the voltage applied.
11. Record insulation resistance reading in table in Section 1.5.

## 1.42 CONTINUITY TEST

1. Set the multimeter to measure resistance.
2. Twist the two bus wires together at one end of the cable.
3. At the other end of the cable, connect the positive alligator clip to one of the bus wires and connect the negative alligator clip to the other bus wire.
4. Confirm the resistance reading is less than 3 ohms. Resistance readings of 1000 ohms or greater generally indicate damage to the bus wire or improperly installed connection kits.

## 1.43 FREQUENCY TESTING

Insulation resistance and continuity tests should be performed:

- Before installing the heating cable
- After installing connection kits (refer to connection kits instructions)
- Before installing the thermal insulation
- Before initial start-up (commissioning)

Testing should also be included as part of regular system inspections, as well as after any maintenance or repair work.

## 1.44 CIRCUIT LENGTH VERIFICATION TEST

1. Set megohmmeter to measure capacitance and set meter to 200 nF range.
2. Connect positive alligator clip to braid wire.
3. Connect negative alligator clip to both bus wires.
4. Multiply this reading by capacitance factor of the cable to determine total circuit length (in feet).

# 1.5 INSULATION RESISTANCE TABLE

If the reading on the insulation resistance test does not pass the requirements at any point of the installation, halt installation immediately and contact Ice Dam Company Technical Services at 1-866-254-9784.

Record heating cable insulation resistance test in the table below and leave with the end user for warranty purposes:

INSULATION RESISTANCE		BEFORE INSTALLING HEATING CABLE	AFTER INSTALLING CONNECTION KITS	BEFORE INITIAL START-UP (COMMISSIONING)
Run 1	@ 500 Vdc			
	@ 1000Vdc			
Run 2	@ 500 Vdc			
	@ 1000Vdc			
Run 3	@ 500 Vdc			
	@ 1000Vdc			
Run 4	@ 500 Vdc			
	@ 1000Vdc			
Run 5	@ 500 Vdc			
	@ 1000Vdc			

**Failure to record insulation resistance tests in the above table will void The Ice Dam Company Roof & Gutter De-Icing System warranty.**

The Ice Dam Company standard limited warranty for freeze protection products applies to Pipe Freeze Protection and Roof & Gutter De-icing products.

The Ice Dam Company self-regulating cable is eligible for an additional three (3) year warranty (total period of five [5] years) provided the online warranty form (available at [www.icedamcompany.com](http://www.icedamcompany.com)) is fully completed and registered within thirty (30) days from the date of purchase.

# 1.6 PRE-INSTALLATION CHECKLIST

## PLAN INSTALLATION LAYOUT

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- It is VERY IMPORTANT to plan the installation before securing any part of the heating cable system to the roof and / or gutter system. Note the location of the controls and/or junction boxes.

## DESIGN NOTES

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- Review any design notes provided by The Ice Dam Company's Customer Care Team. Note specific installation instructions and plan which direction / sequence the cable will be installed.

## CIRCUIT LENGTHS

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- Observe the maximum circuit lengths of the cable ( Appendix 1; page 31 ) and do not exceed these limits during the installation. Exceeding the maximum circuit lengths will result in breaker trips which will prevent the heating cable from turning on when snow/ice is present.

## ACCESSORIES

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- Ensure you have all the necessary connection / splice kits and accessories including roof clips and downspout hangers ( if applicable ).

## VISUALLY INSPECT HEATING CABLE

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- Unpack and perform visual inspection of the entire heating cable for any visible damage. If the heating cable is damaged, do not begin installation. Contact The Ice Dam Company Customer Care Team at 1-866-254-9784.

## INSULATION RESISTANCE AND CONTINUITY TESTS

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- Perform insulation resistance and continuity tests. Refer to testing procedures on page 12 of this manual.



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# SECTION 2

## INSTALLATION

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# 2.1 INSTALLATION: GUTTERS

Install heating cable along gutter base to prevent ice dams and ice build-up inside the gutter system. Ice build-up can lead to icicle formations which may damage the gutter system, as well as pose a safety risk ( i.e. potential falling icicles ).

## 2.11 SINGLE RUN OF HEATING CABLE

Lay heating cable at base of gutter to create / maintain drain paths for melt water.

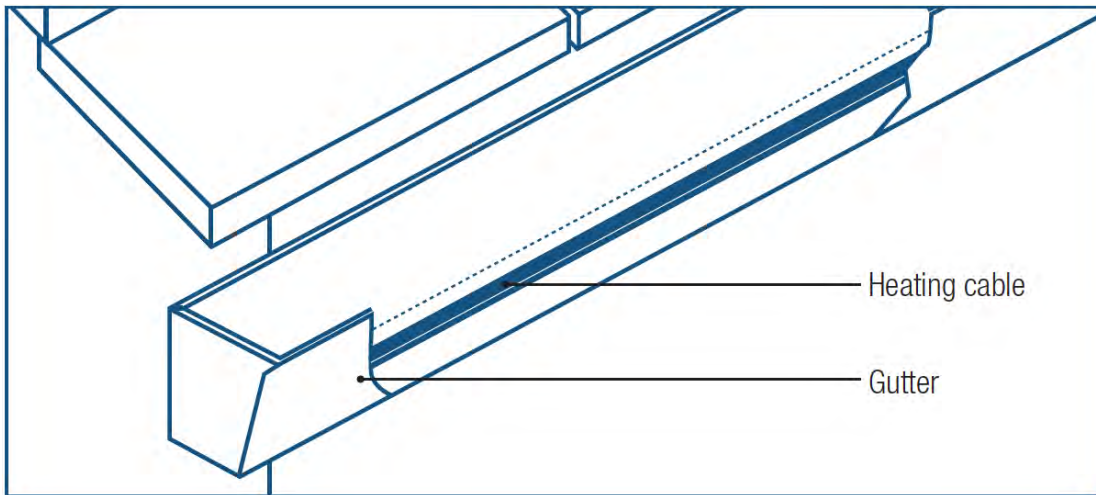


FIGURE 2.11: Single Run in Gutter

## 2.12 DOUBLE RUN OF HEATING CABLE

For gutters wider than 6", use two runs of heating cable inside gutter. To ensure optimal cable spacing of 4"- 6", secure heating cable to downspout hangers or roof clips.

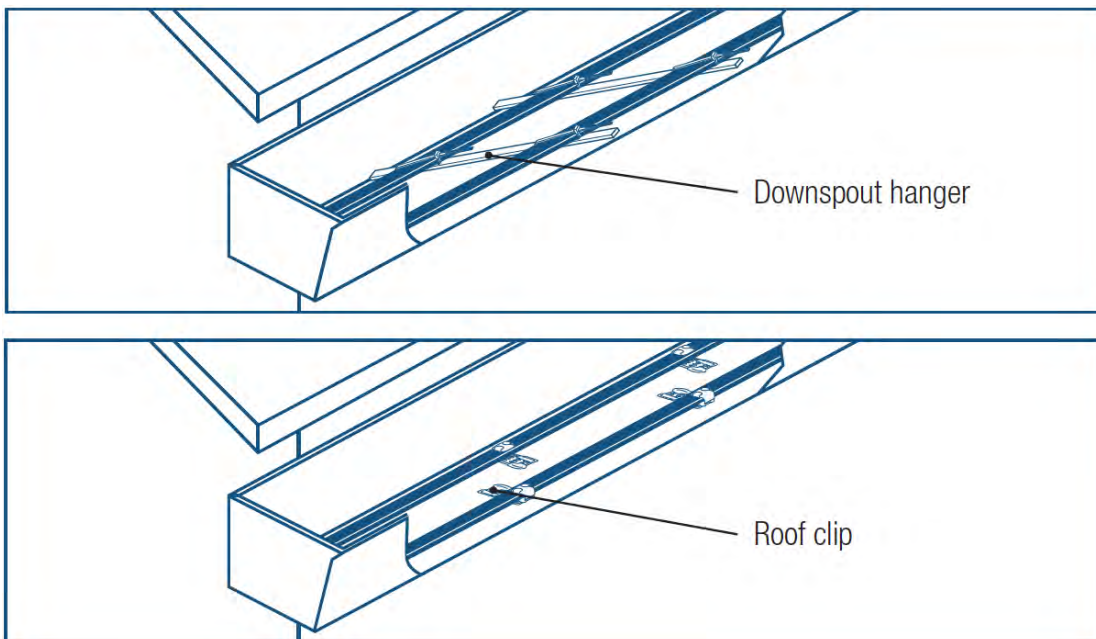


FIGURE 2.12: Double Run in Gutter

## 2.2 INSTALLATION: DOWNSPOUTS

Install heating cable inside all downspouts to prevent ice dams from forming within the gutter system. Heating downspouts will create drain paths for melt water to exit the gutter system and reduce the risk of ice and snow damage.

### 2.21 ENTERING DOWNSPOUT

Install heating cable inside the downspouts to ensure ice does not build-up and prevent melt water from exiting the gutter system.

 **Use downspout hangers to protect cable from sharp edges or protrusions in the gutter.**

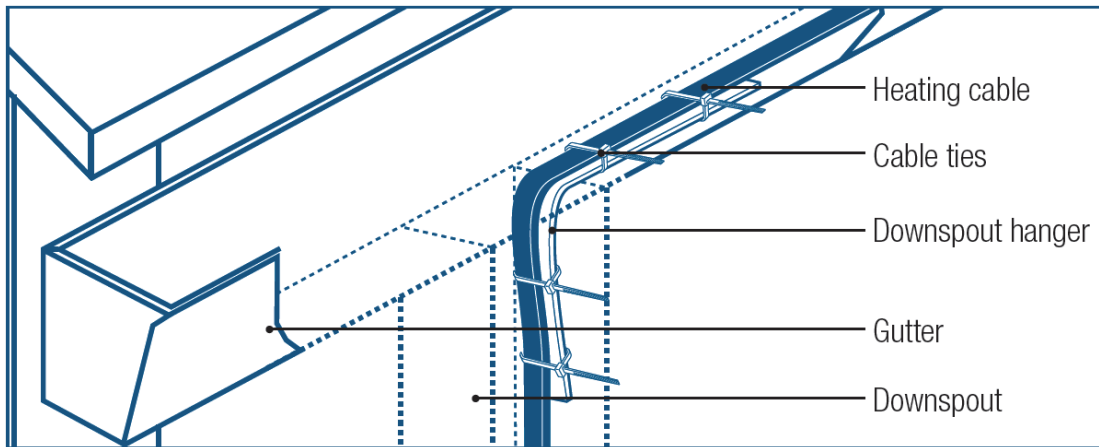


FIGURE 2.21: Heating Cable Entering Downspout

Alternatively, use loop-back method to extend heating cable into downspout. Create a loop in a single run of heating cable. Extend loop into downspout until it reaches downspout exit.

 **Use downspout hangers to protect cable from sharp edges or protrusions in the gutter.**

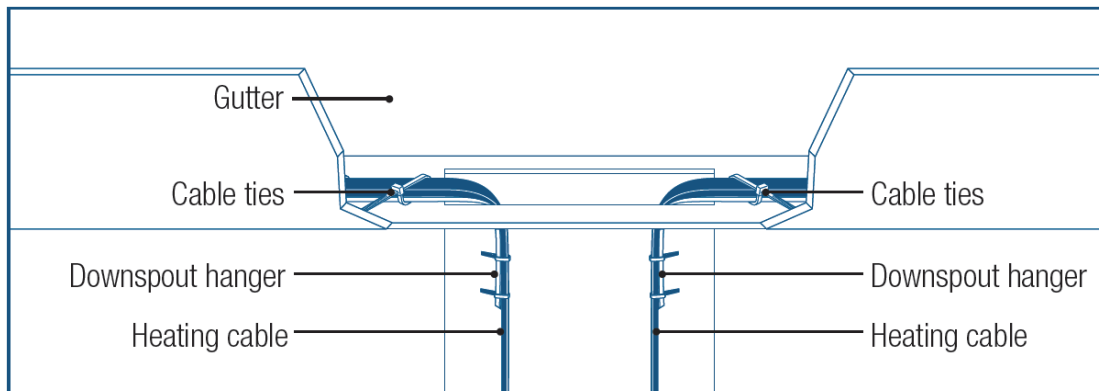


FIGURE 2.22: Double Run in Gutter



## 2.2 INSTALLATION: DOWNSPOUTS

Install heating cable along gutter base to prevent ice dams and ice build-up inside the gutter system. Ice build-up can lead to icicle formations which may damage the gutter system, as well as pose a safety risk ( i.e. potential falling icicles ).

### 2.11 ENTERING DOWNSPOUT: TEE SPLICE METHOD

If necessary, use a Ice Dam Company splice/tee kit to create a tee-splice at entrance to downspout.



**Test continuity of each cable run before installing heat shrinks.**

Install connection components according to installation instructions included in connection kits. Extend a single heating cable run into downspout until it reaches downspout exit.



**Use downspout hangers to protect cable from sharp edges or protrusions in the gutter.**

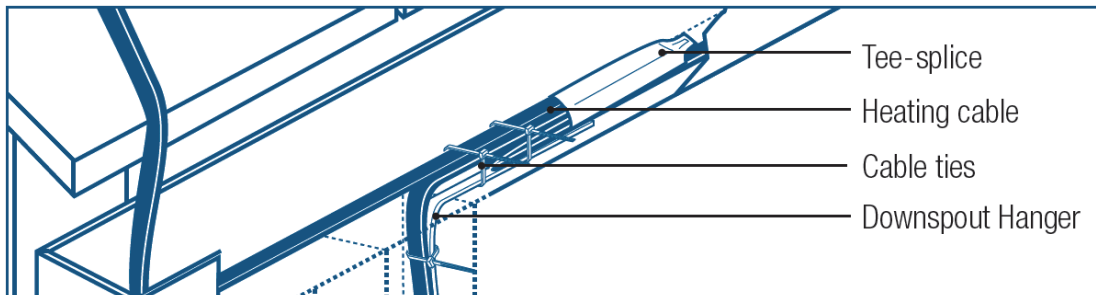


FIGURE 2.22: Tee-Splice Method

### 2.23 EXITING DOWNSPOUT: ABOVE GROUND

If a single run of heating cable is used in the downspout, terminate cable with end seal. Create a drip loop extending 1" past downspout exit. Secure end seal 12" up from downspout exit.



**Use downspout hangers to protect cable from sharp edges or protrusions in the gutter.**

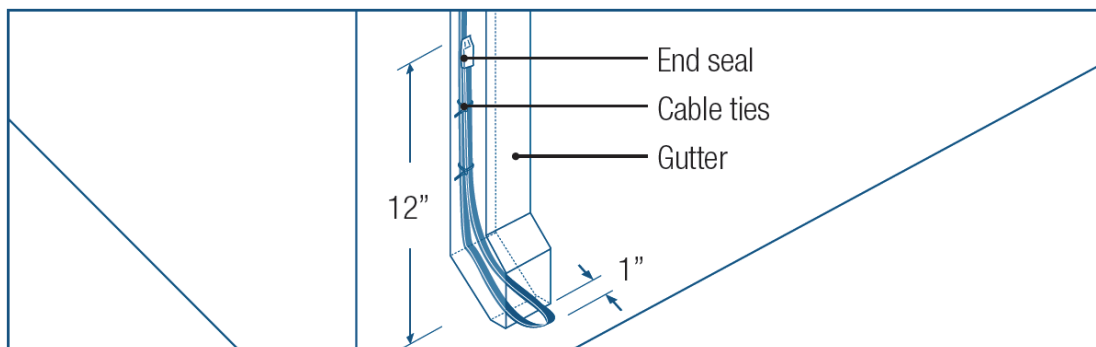


FIGURE 2.23: Exiting Downspout Above Ground

# 2.2 INSTALLATION: DOWNSPOUTS

## 2.24 EXITING DOWNSPOUT: BELOW GRADE

Determine the frost line depth based on the geographic region. If using the loop-back method to extend the heating cable into downspout, ensure the loop of heating cable at the bottom of the downspout extends below the frost depth.

If a single run of heating cable is extended into the downspout, create a drip loop and secure the end seal to the heating cable prior to inserting the cable into downspout.



**Ensure all cable protruding past downspout opening is not susceptible to damage.**

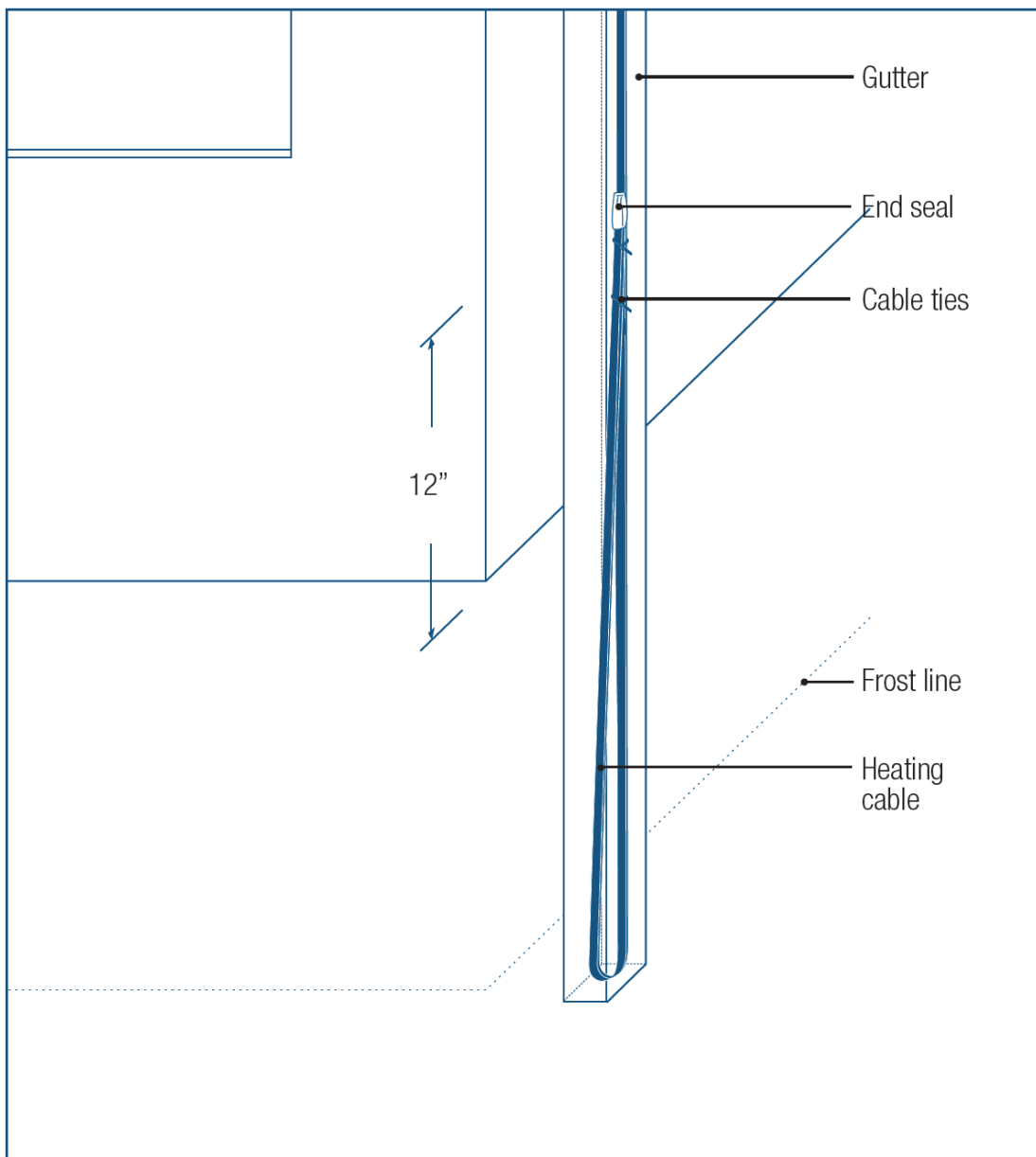


FIGURE 2.24: Exiting Downspout Below Grade

## 2.3 INSTALLATION: ROOF

Ice dams may form at roof edge because the section of roof above overhang is uninsulated. Install heating cable on this section of the roof to create / maintain drain paths for melt water to flow off the roof and into gutter system.

Install connection components according to installation instructions included in connection kits. Extend a single heating cable run into downspout until it reaches downspout exit.

### 2.31 SLOPED ROOF

Attach heating cable to roof using roof clips in a triangular pattern along roof edge. See figure 2.31.



**Ensure top of triangle is approximately 6" past the exterior wall.**



**Ensure distance between triangles is approximately 24"**

Extend drip loops past roof edge into gutter. If heating cable is installed along gutter base, connect drip loop to gutter run using UV-resistant cable ties. This will ensure the melt water has a continuous path from roof to gutter.

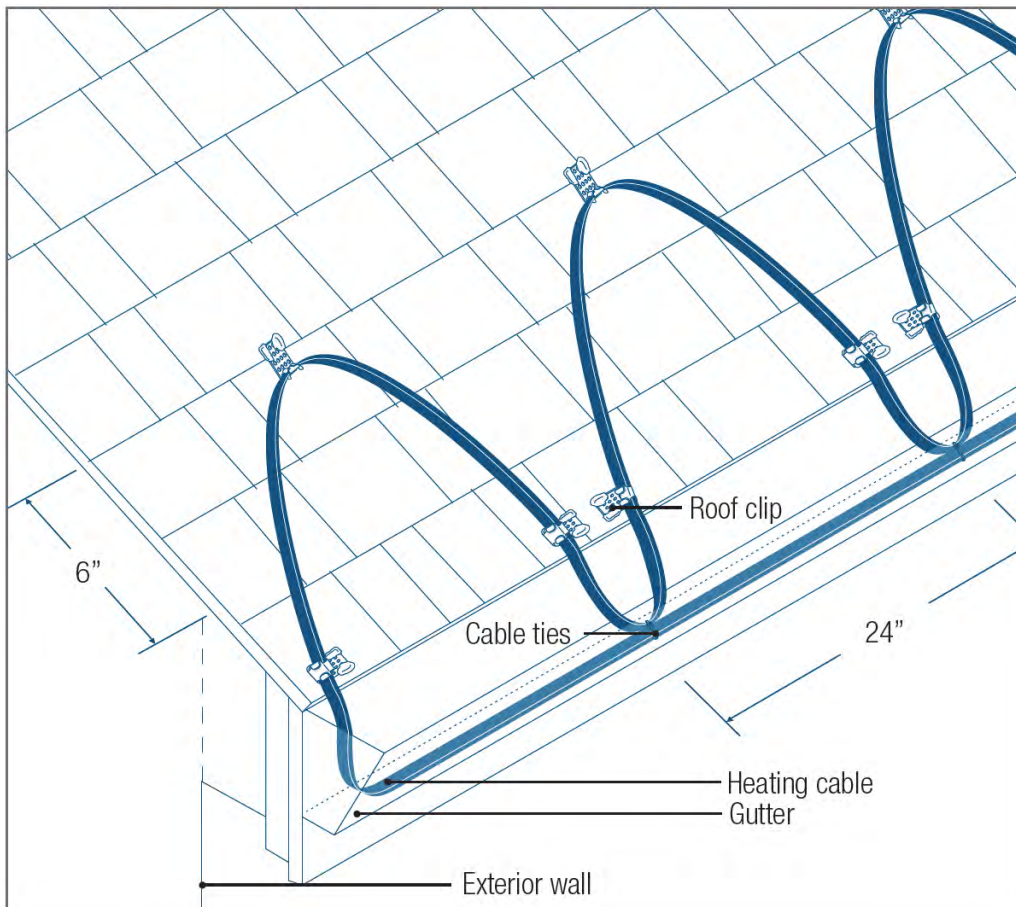


FIGURE 2.31: Sloped Roof

## 2.3 INSTALLATION: ROOF

### 2.32 HEATING ROOF DRAINS

To maintain proper roof drainage and prevent ice damage, install heating cable from roof edge to roof drain. Extend heating cable loop into roof drain, ensuring cable reaches 12" into heated zone below roof.

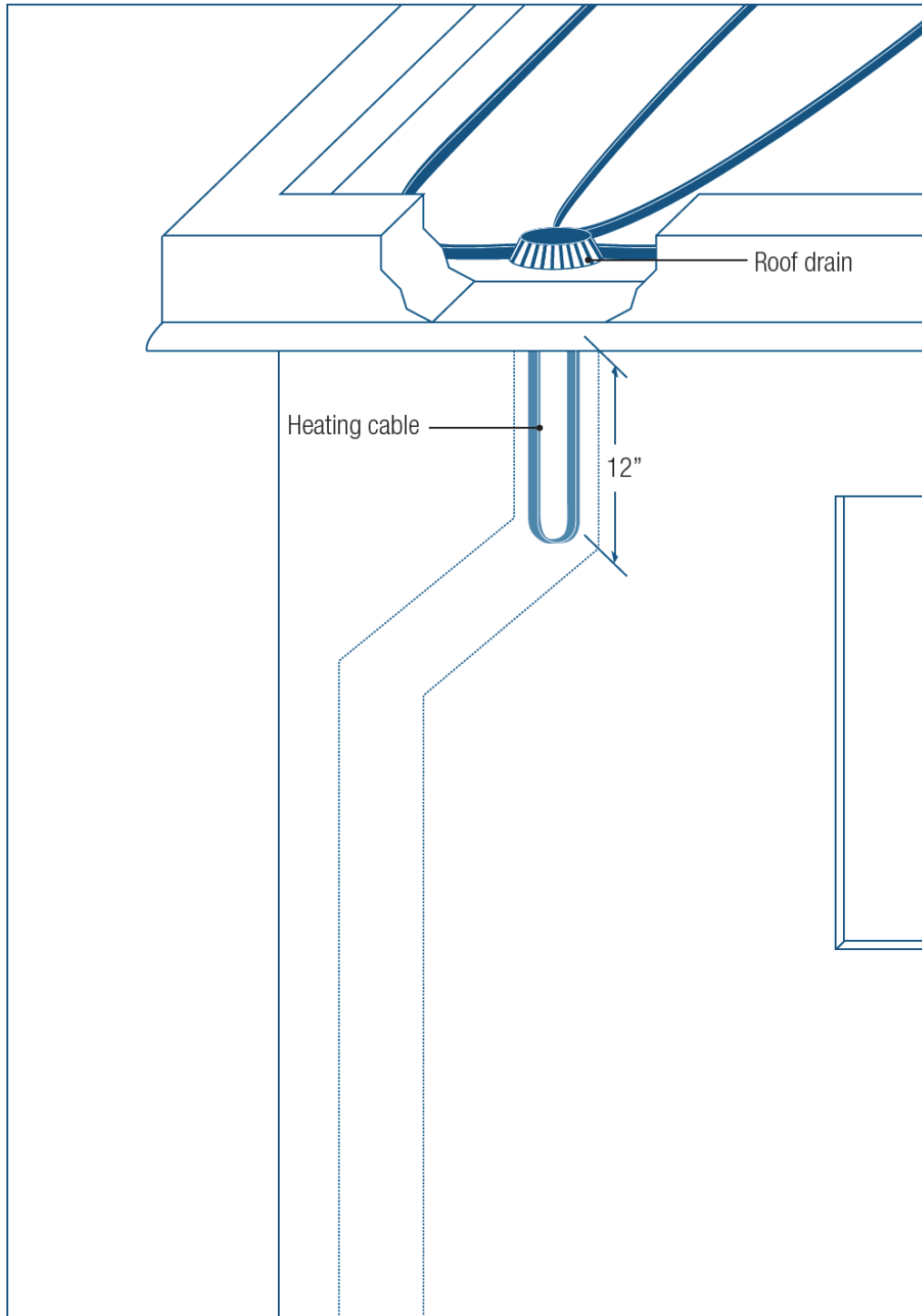


FIGURE 2.32: Roof Drains

# 2.3 INSTALLATION: ROOF

## 2.3.3 FLAT ROOFS

Flat roofs are usually pitched to direct water to roof drains, downspouts or scuppers. Install heating cable around the perimeter and along the melt water path to roof drains, downspouts or scuppers. Use roof clips to secure the heating cable.

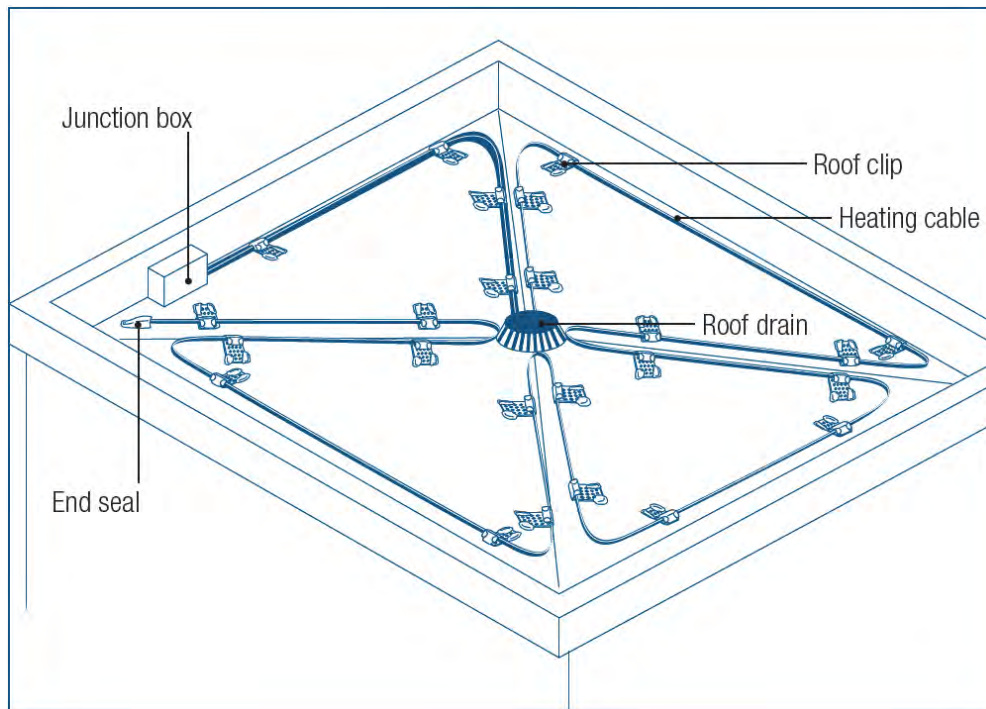


FIGURE 2.33a: Flat Roof to Drain

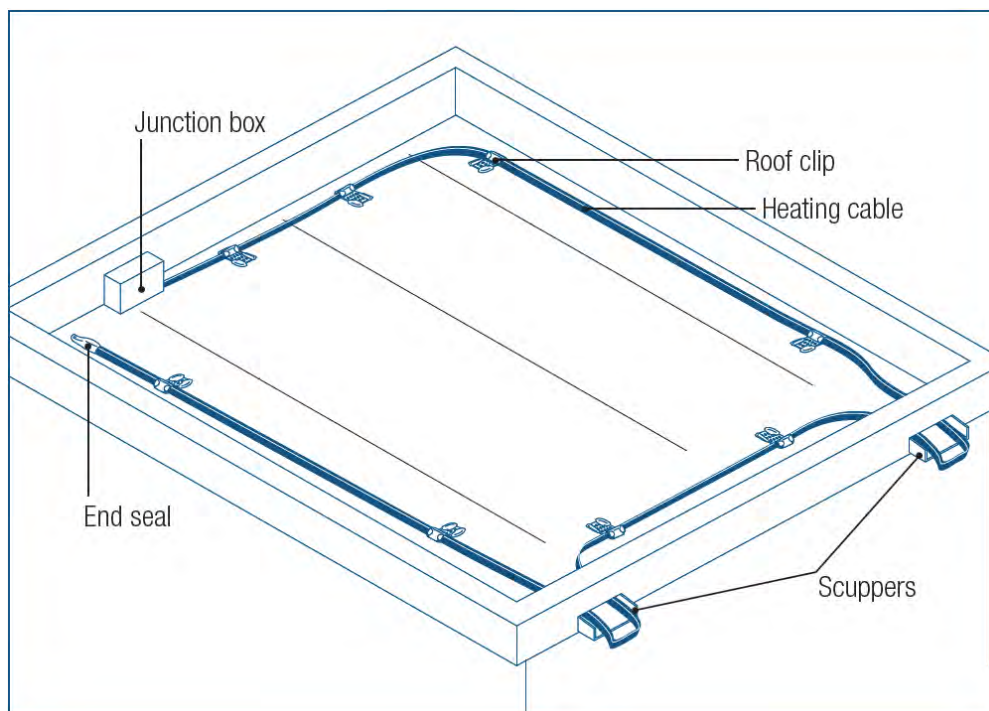


FIGURE 2.33b: Flat Roof to Scuppers

## 2.3 INSTALLATION: ROOF

### 2.3.4 METAL AND STANDING SEAM

Metal/Standing seam roofs are most common in commercial or industrial applications. Typical seam distance varies between 18" to 24". Using roof clips, attach heating cable to roof along seam. Run heating cable over seam and reverse direction. Extend heating cable past roof edge and into gutter. Lay heating cable horizontally along gutter base. Heating cable should be installed along every other seam.



**Ensure loop of heating cable extends approximately 6" up past exterior wall.**



**Distance between cable runs should not exceed 24"**

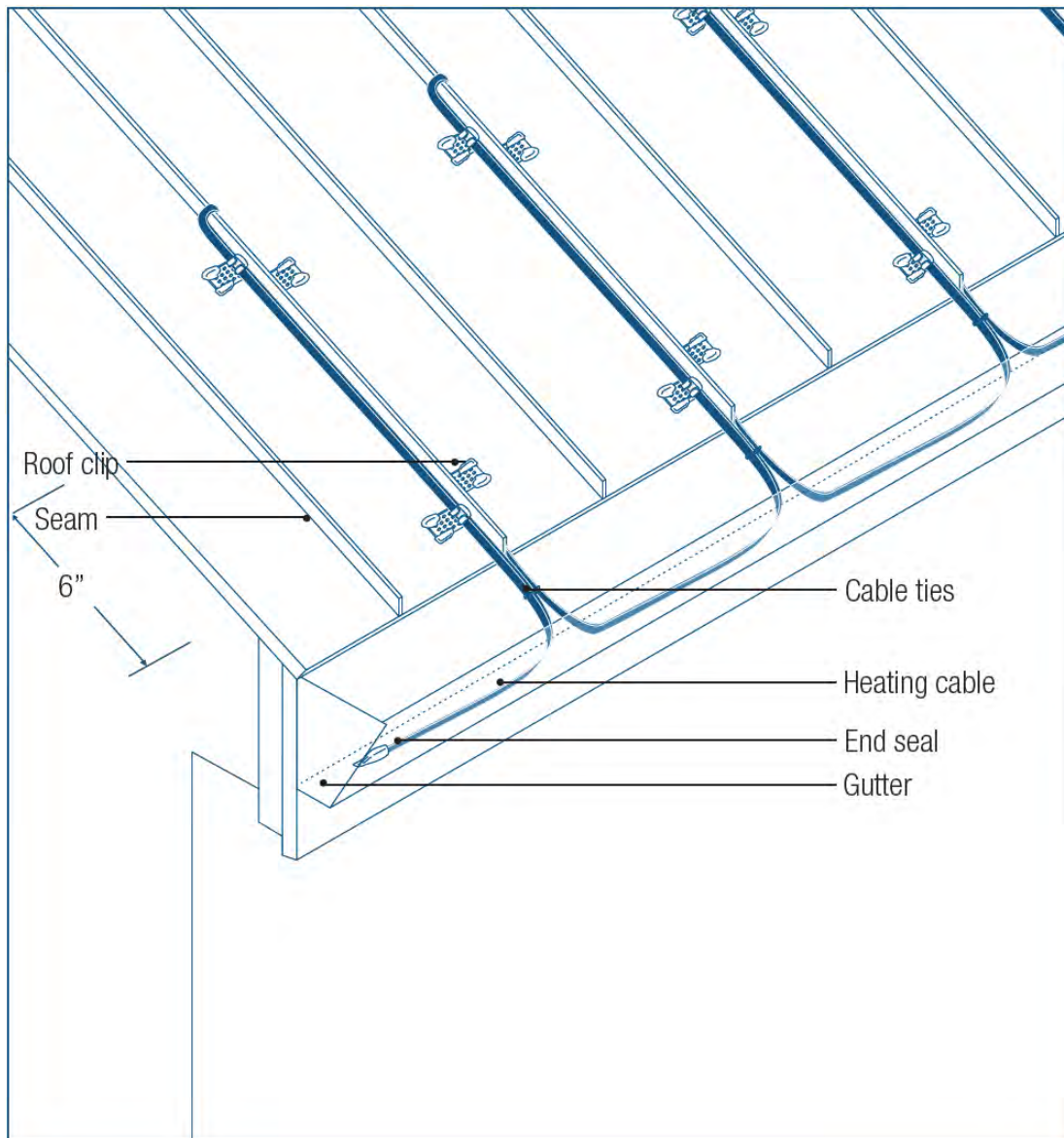


FIGURE 2.34: Metal & Standing Seam Roof

# 2.3 INSTALLATION: ROOF

## 2.35 SLOPED ROOF

When sloped sections of roof meet or are intersected by a wall, the roof forms a valley or wall intersection. In both instances, run the heating cable two-thirds up the valley or wall intersection and back down to maintain drain paths.

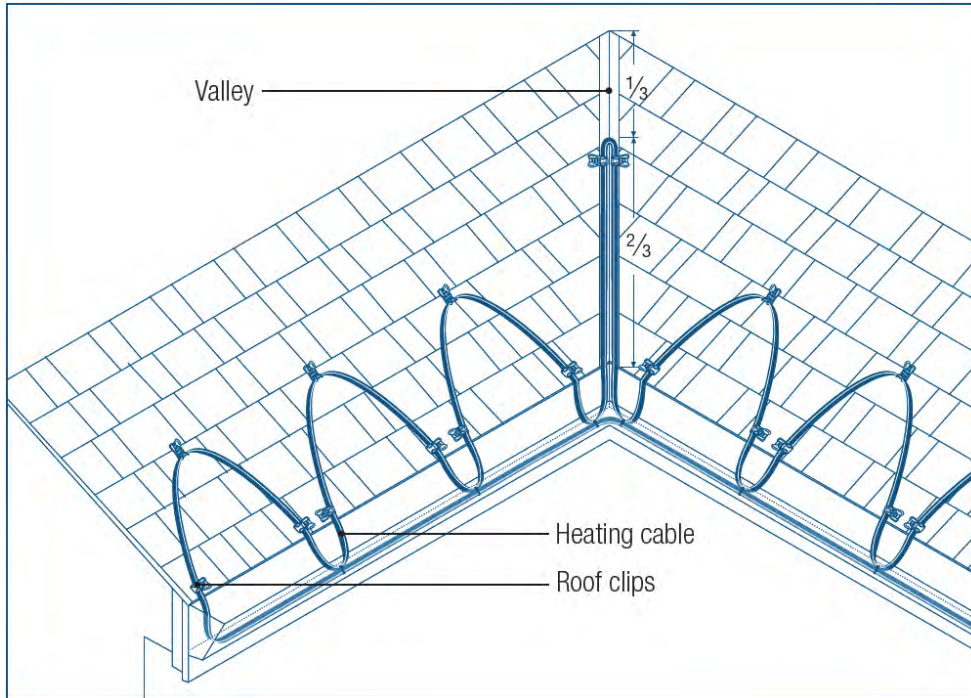


FIGURE 2.35a: Sloped Roof Valley

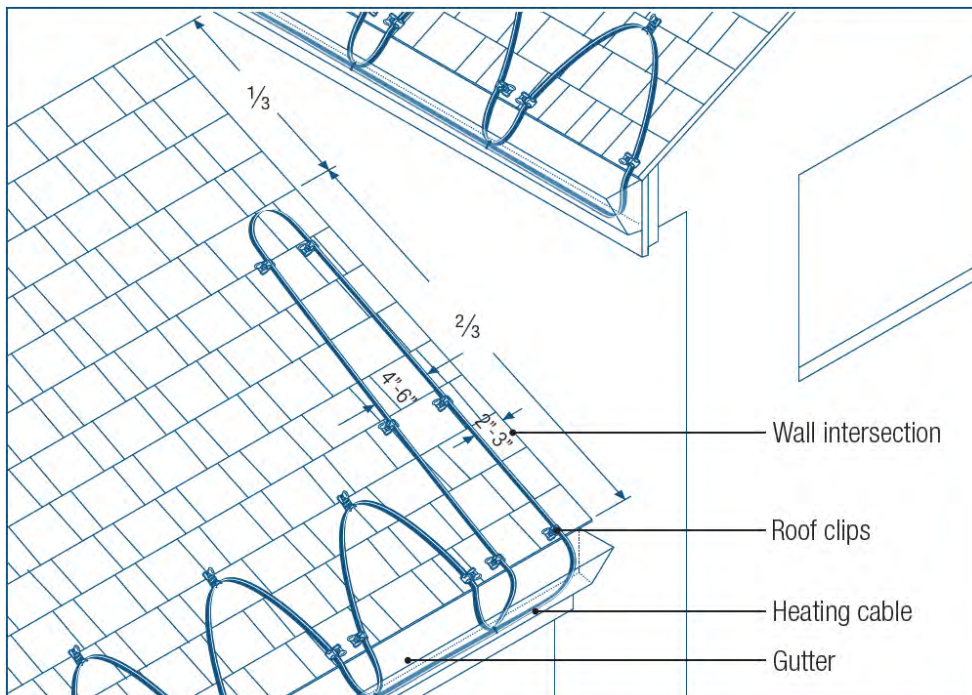


FIGURE 2.35b: Wall Intersections

## 2.4 POST-INSTALLATION CHECKLIST

### DOWNSPOUT HANGERS

- Use downspout hangers to ensure heating cable is protected from potential mechanical damage.

### INSULATION RESISTANCE TESTS

- Perform insulation resistance tests. Refer to testing procedures on page 12 of this manual.

### CIRCUIT LENGTHS

- Observe the maximum circuit lengths of the cable ( Appendix 1; page 31 ) and do not exceed these limits during the installation. Exceeding the maximum circuit lengths will result in breaker trips which will prevent the heating cable from turning on when snow/ice is present.

FIGURE 2.34: Metal & Standing Seam Roof



# SECTION 3

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# 3.1 ELECTRICAL CONNECTIONS

## 3.11 POWER CONNECTION

After heating cable and related accessories are installed, install power connection components according to installation instructions included in connection components.

Visually inspect the entire circuit and perform insulation resistance tests for each circuit before connecting heating cable to power.

## 3.12

Create drip loops to prevent water from trailing into any electrical equipment, junction boxes, or controls.

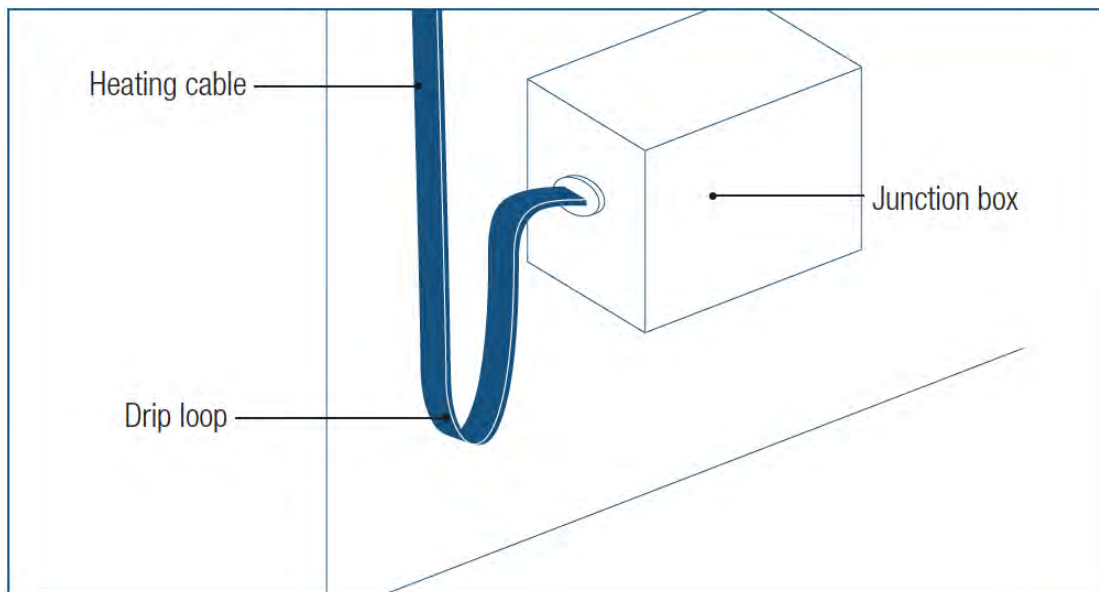


FIGURE 3.12: Drip Loop

FIGURE 2.34: Metal & Standing Seam Roof

# 3.2 TYPICAL WIRING DIAGRAM

ICE DAM COMPANY AND NEC REQUIRE 30mA EQUIPMENT GROUND FAULT PROTECTION ON EACH CABLE BRANCH CIRCUIT.

## 3.21 SINGLE CIRCUIT CONTROL

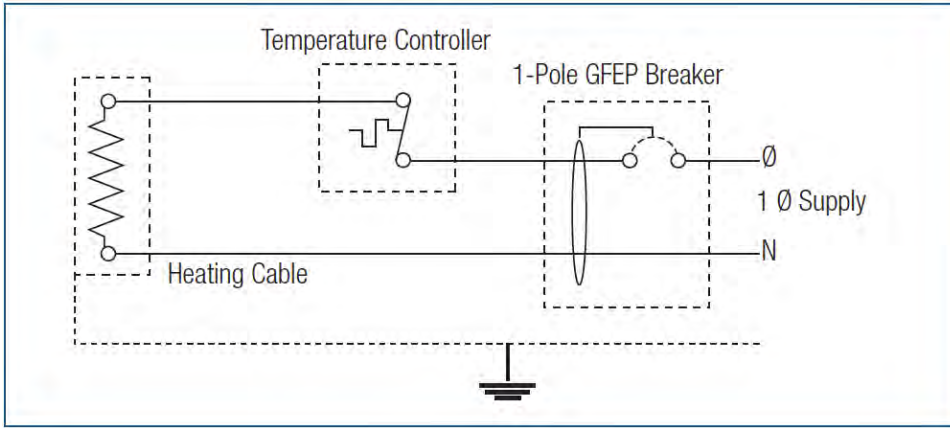


FIGURE 3.21: Single Circuit Control

## 3.22 GROUP CIRCUIT CONTROL

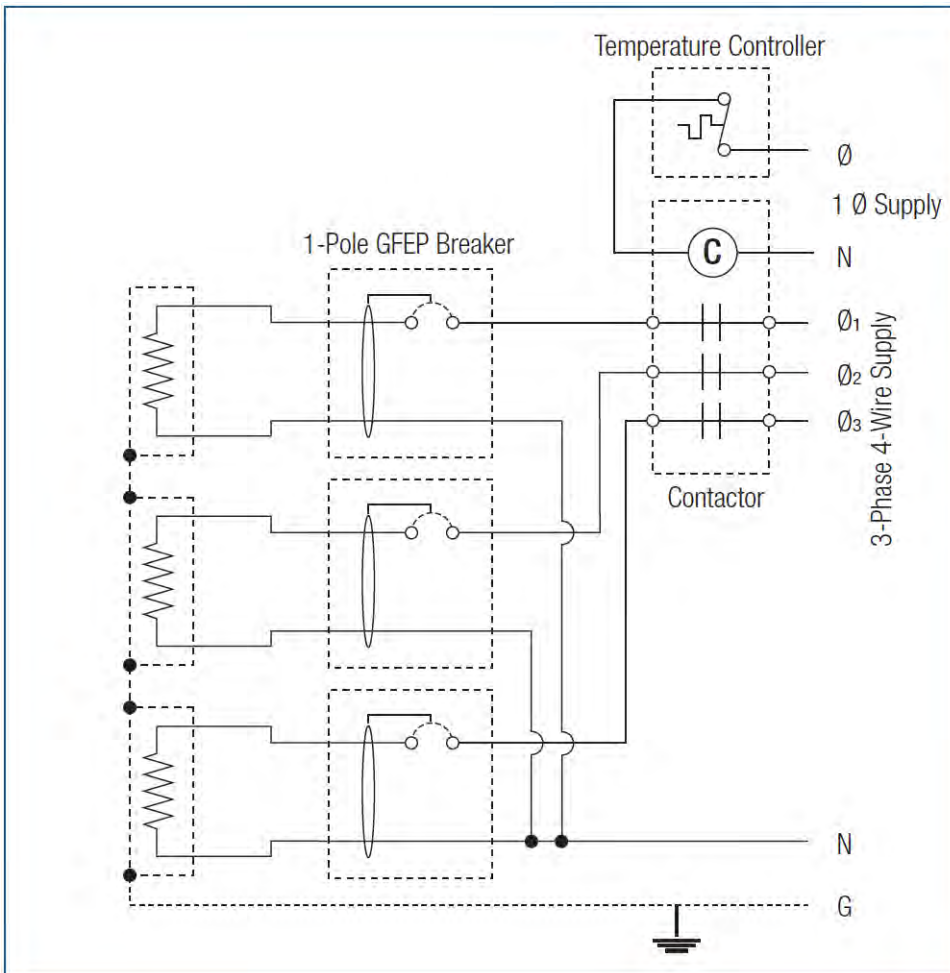


FIGURE 3.22: Group Circuit Control



## 3.3 CONTROL OPTIONS

There are several options available to control The Ice Dam Company Roof and Gutter De-icing Cables. Consult the electrical contractor to determine the most suitable option. Selecting the proper control option will limit the power consumption of the de-icing system by turning on the heating cables only when it is needed.

### 3.31 AUTOMATIC SNOW CONTROLLER

- Activates system when precipitation AND low temperatures are detected
- System remains "ON" once precipitation or low temperature have ceased, allowing the surface to completely dry, preventing the formation of surface ice
- Method to payout / unreel the heating cable

### 3.32 AMBIENT SENSING THERMOSTAT

- Turns on the heating cable when the ambient temperature drops below a preset or user-defined temperature (usually set at freezing point)
- Not as energy efficient as ambient temperature may be below freezing but no precipitation/snowfall is present

### 3.33 MANUAL ON/OFF CONTROL

- Low initial cost
- Recommended only for small areas
- Requires manual monitoring
- Prone to be left on accidentally

Install the controls as per installation instructions that accompany control unit. Ensure controller or contactor being used is appropriate for electrical load.

## 3.4 REPAIRS AND MAINTENANCE

If any part of the cable becomes damaged at any time, please contact The Ice Dam Company Customer Care Team immediately at 1-866-254-9784.

Perform visual inspection, and insulation and continuity tests annually before each winter season. Ensure control system is functioning before each winter season.

FIGURE 2.34: Metal & Standing Seam Roof

# 3.5 APPENDIX 1

## MAXIMUM CIRCUIT LENGTHS

	START UP AMBIENT		120 VOLT				240 VOLT			
	°F	°C	15A	20A	30A	40A	15A	20A	30A	40A
5w/Foot	50	10	215	215	215	215	430	430	430	430
	32	0	190	215	215	215	380	430	430	430
	14	-10	160	215	215	215	325	430	430	430
	-4	-20	140	190	215	215	285	215	430	430
8w/Foot	50	10	145	170	170	170	295	345	345	345
	32	0	125	170	170	170	255	340	345	345
	14	-10	110	150	170	170	225	300	345	345
	-4	-20	100	130	170	170	200	265	345	345

