Roof Ice Melt (RIM2) System
Installation and Operation Manual
# CONTENTS

1. General Information ................................................................. 3  
   1.1 Use of the Manual ................................................................. 3  
   1.2 Safety Guidelines ................................................................. 3  
   1.3 Approvals ................................................................. 3  
   1.4 Warranty ................................................................. 3  

2. RIM2 System Installation Instructions ........................................... 4  
   2.1 Tools & Materials Required .................................................. 4  
   2.2 Panels, Cables & Components .............................................. 4  
   2.3 General Procedures .......................................................... 7  
   2.4 Panel Base Installation ........................................................ 7  
   2.5 Heating Cable Installation & Insulation Resistance Test .......... 15  
   2.6 Cover Panel Installation .................................................... 20  
   2.7 Final Insulation Resistance Test ............................................ 26  
   2.8 Temperature Sensor Installation ........................................... 27  

3. Operating Procedures ................................................................. 28  
   3.1 General Description ............................................................ 29  
   3.2 Fall Testing ................................................................. 29  
   3.3 Winter Start Up ............................................................... 29  
   3.4 Unusual Winter Conditions .................................................. 29  
   3.5 Spring Shutdown .............................................................. 30  

4. Trouble Shooting ........................................................................... 31  

5. Installation Log Sheet ................................................................. 32
1. GENERAL INFORMATION

1.1 USE OF THE MANUAL

This manual covers installation of the nVent RAYCHEM Roof Ice Melt (RIM2) systems only. For additional information contact your local nVent Representative or contact:

nVent Thermal Management
Tel: +1.800.545.6258
Fax: +1.800.527.5703
thermal.info@nvent.com
nVent.com

Important: For warranty and agency approvals to apply, the instructions that are included in this manual and the product packages must be followed.

1.2 SAFETY GUIDELINES

The safety and reliability of any heating cable system depends on proper design, installation and maintenance. Incorrect handling, installation, or maintenance of any of the system components can cause underheating, overheating, or damage to the heating cable system and may result in system failure, electric shock, or fire.

To minimize the danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed, and to comply with the requirements of nVent, agency certifications, and national electrical codes, ground-fault equipment protection must be used on each heating cable branch circuit. Arcing may not be stopped by conventional circuit protection. Many nVent RAYCHEM control and monitoring systems meet the ground-fault protection requirement.

Pay special attention to the following:
• Instructions marked Important
• Safety warnings identified as WARNING

1.3 APPROVALS

The IceStop heating cables are UL Listed and CSA Certified only when used with the appropriate agency-approved nVent connection kits and accessories. For approvals information, refer to the IceStop heating cable data sheet H56428.

1.4 WARRANTY

nVent’s standard limited warranty applies to nVent RAYCHEM Roof and Gutter De-icing Systems.

An extension of the limited warranty period to twenty (20) years from the date of installation is available, except for the control and distribution systems, if a properly completed online warranty form is submitted within thirty (30) days from the date of installation. You can access the complete warranty on our web site at nVent.com. A copy of the warranty can be found at nVentthermal.com/support/warranty
2. RIM2 SYSTEM INSTALLATION INSTRUCTIONS

Important: Reading and following these instructions is critical for a properly functioning nVent RAYCHEM Roof Ice Melt (RIM2) system.

2.1 TOOLS & MATERIALS REQUIRED:

- Metal Cutting Equipment (Skill Saw, Chop Saw, Band Saw, etc.) for aluminum bases & cover panels
- Deburring File
- Power Drill / Screwdriver
- Tape Measure (100 ft preferred)
- Razor Blade Knife
- Wire Stripper, Wire Cutter, & Crimper
- Heat Shrink Gun, or Propane Torch with Flame Spreader
- Caulking Gun
- Putty Knife with 3/4 or 1 inch blade
- Megohmmeter with 2500v settings
- 1-1/2 inch Attachment Screws (or as required)
- Cleaning Solvent, denatured alcohol or equal, for cleaning any metal areas prior to applying adhesive or sealant
- Roofing Adhesive, DuraLink by Chemlink, or equal
- Roofing Sealant, DuraSil by Chemlink, or equal

WARNING: The RIM2 heating system MUST be protected with a ground fault protection device per local codes and the NEC National Electric Code.

2.2 PANELS, CABLES & COMPONENTS

PANEL SYSTEMS

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIM2-E</td>
<td>F6237-<strong>-</strong>-**</td>
<td>- RIM2 Eave System is designed to mount on the roof eave, to minimize the formation of ice dams and icicles. RIM2-Eave panels embed 2 runs of self-regulating heating cable for a more energy efficient solution. Available in Aluminum and Copper cover panels Weight: 2,035.75 lb/1000 ft</td>
</tr>
<tr>
<td>RIM2-LPE</td>
<td>F6258-<strong>-</strong>-**</td>
<td>- RIM2 Eave System, Low Pitch is specifically designed for integration with metal roof systems and for applications involving roof pitch equal to or less than 3:12. RIM2-LPE uses two runs of self-regulating heating cable. Available in Aluminum and Copper cover panels Weight: 1,696.75 lb/1000 ft</td>
</tr>
<tr>
<td>RIM2-V</td>
<td>F6287-<strong>-</strong>-**</td>
<td>- RIM2 Valley System is designed to mount in the roof valleys to minimize the formation of ice dams and icicles in roof valleys. RIM2-V panels embed 2 runs of self-regulating heating cable. Available in Aluminum and Copper cover panels Weight: 677.50 lb/1000 ft</td>
</tr>
<tr>
<td>RIM2-C</td>
<td>F6222-<strong>-</strong>-**</td>
<td>- RIM2 Channel System is designed to mount on the roof and provide a heated channel for the snow melt to flow from one section of the roof to the other, usually a drain or eave. RIM2-C panels embed 2 runs of self-regulating heating cable. Available in Aluminum and Copper cover panels Weight: 728.75 lb/1000 ft</td>
</tr>
</tbody>
</table>
### HEATING CABLES

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFP-612</td>
<td>P000000222</td>
<td>WFP self-regulating heating cable, 120 V</td>
</tr>
<tr>
<td>WFP-622</td>
<td>P000000223</td>
<td>WFP self-regulating heating cable, 240 V</td>
</tr>
</tbody>
</table>

### CONNECTION KITS & ACCESSORIES

<table>
<thead>
<tr>
<th>Catalog number</th>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIM2-EPSC</td>
<td>R6209-<strong>V</strong></td>
<td>RIM2 Eave Panel Splice Cover is designed to cover the joints between RIM2-E panels on the roof. Available in Aluminum and Copper cover panels.</td>
</tr>
<tr>
<td>RIM2-EPEB</td>
<td>R6016-23</td>
<td>RIM2 Eave Panel End Bracket, Black is designed to cover the ends of RIM2-E panels on the roof.</td>
</tr>
<tr>
<td>WPCK-R</td>
<td>F1012</td>
<td>WPCK-R is a CSA Certified and UL Listed power connection kit for RIM system. Materials for one power connection kit and end seal are provided.</td>
</tr>
<tr>
<td>WHES</td>
<td>F1009</td>
<td>WHES is a CSA Certified and UL Listed end seal kit for RIM system. Materials for one end seal are provided.</td>
</tr>
<tr>
<td>WSTK</td>
<td>P000000229</td>
<td>WSTK is a CSA Certified and UL Listed splice/tee/end seal kit for RIM system. Materials for one splice or tee and end seal are provided.</td>
</tr>
<tr>
<td>JB-55</td>
<td>F0300</td>
<td>JB-55 is a CSA Certified and UL Listed junction box that can be used for a power connection kit for RIM system in conjunction with WPCK-R. Junction box dimensions 5&quot;x5&quot;</td>
</tr>
<tr>
<td>Catalog number</td>
<td>Part number</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
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<td>-------------</td>
</tr>
<tr>
<td>JB-75</td>
<td>F0303</td>
<td>JB-75 is a CSA Certified and UL Listed junction box that can be used for a power connection kit for RIM system in conjunction with WPCK-R. JB-75 allows powering up to 3 cables (powered tee). Junction box dimensions 7&quot;x5&quot;</td>
</tr>
<tr>
<td>DSH</td>
<td>B0402</td>
<td>Downspout hanger (DSH) is used to protect the heating cable from sharp edges at the corner of gutter and downspout.</td>
</tr>
<tr>
<td>HFF DSH</td>
<td>F0110</td>
<td>Heater Feedthrough Fitting (HFF) is used as a gland kit when the heating cable penetrates the gutter or downspout.</td>
</tr>
<tr>
<td>CCB</td>
<td>R6201.**</td>
<td>Cable Cover Bracket is designed to mount on roofs or gutters and embeds one or two runs of self-regulating heating cable. It enhances the heat transfer from the heating cable to the snow, creating larger drain paths. Available in Aluminum and Copper cover panels Weight: 17 lb/1000 ft</td>
</tr>
<tr>
<td>RIM Adhesive/Sealant</td>
<td>B1626</td>
<td>RIM Adhesive/Sealant is a silicone sealant used to attach selected RIM systems to the underlying surface. Please refer to appropriate installation instructions included with the system. 10.3 oz. Tube</td>
</tr>
</tbody>
</table>
2.3 GENERAL PROCEDURES

1. Upon receipt of shipment
   - Immediately inspect packaging upon delivery. If there are any damaged packages, note on shipper's bill of lading and contact nVent (toll-free 1.800.545.6258)
   - Identify and visually inspect all materials and compare with the packing list included with the shipment. Contact nVent if there are any discrepancies.
   - Review RIM2 System Layout Drawings with RIM2 panels identified, junction box locations for each section, and RTD temperature sensor locations. See sample layout if not supplied.

2. Setup access equipment (ladders, scaffolding, safety ropes, etc.)

3. Determine based on the RIM System Layout Drawings where the RIM panels are to be installed and the roof eave end conditions for those locations.

Important: Illustrations in this manual show general procedures. Your roof type may be different and may need custom procedures. Please contact nVent with questions.

Important: RIM System panels should be deburred at all edges to prevent damage to the cable.

2.4 PANEL BASE INSTALLATION

Eave Base (RIM2-E) Installation

1. Install RIM2-E bases according to the roof eave end conditions. Notch RIM2-E base as needed to route heating cable.
   A. Roof eave ends at angle
   B. Roof eave ends at straight corner
   C. Roof eaves meet at outside ridge corner
   D. Roof eaves meet at a valley intersection
**New Installation:** Install the base panel on the edge of the eave as illustrated.

**Retrofit Installation:** Cut roof material even with the roof eave and install the base panel on the edge of the eave as illustrated. Use caution to prevent any damage to the roof material.
A. **Eave Ends At Angle** - Cut the RIM2-E base at the roof end’s angle and position 2 inches from one end of the eave.

![Diagram of eave ends at angle](image)

**Leave 2 inch space from eave end**

(B. **Roof eave ends at angle**)

B. **Eave Ends At Straight Corner** - Position the Eave Panel End Brackets (EPEB2) flush on either side of the eave against the end of the eave, and screw into place. Position the first RIM2-E base directly against the EPEB2, 2 inches from one end of the eave.

![Diagram of eave ends at straight corner](image)

**Eave Panel End Bracket (EPEB2) hides cable at roof edge**

**Lip of the base bottom**

(B. **Roof eave ends at straight corner**)

C. **Eaves Meet At Outside Ridge Corner** - Cut the RIM2-E bases at the ridge’s angle and position 2 inches from either side of the corner.

![Diagram of eaves meet at outside ridge corner](image)

**Watertight roof underlayment**

**Leave 2 inch space from eave end**

(C. **Roof eaves meet at outside ridge corner**)

D. Eaves Meet At Valley Intersection - Position the RIM2-E bases 2 inches from either side of the corner.

2. Align the lip of the RIM2-E base bottom with the eave edge, continue positioning the RIM2-E bases, allowing 1 inch spacing between the bases. Cut the last RIM2-E base to fit 2 inches from the eave edge, trim and deburr the RIM2-E base as required by the eave end conditions.

3. Using self-tapping, non-rusting, outdoor screws of appropriate length, screw the RIM2-E base down. Locate screws within 3 inches of the eave ends and on 2 foot centers. Apply caulking over screwheads to create a water-tight seal.
Valley Base (RIM2-V) Installation

1. Install RIM2-V bases according to valley conditions and locations.
   - A. Roof valley ends at heated inside eave corner
   - B. Roof valley ends at unheated eave
   - C. Roof valley ends at heated eave
   - D. Roof valley transition
   - E. Roof valley below eave

In areas of the valley flashing where RIM2-V bases will be installed with adhesive, clear away all debris and carefully clean with a solvent such as denatured alcohol.

⚠️ WARNING: Failure to position RIM2-V bases per instructions could cause melted snow to re-freeze at unheated areas, forming icicles and ice dams.

A. Valley Ends At Heated Inside Eave Corner: Starting at the lower edge of the valley flashing at the roof eave, position the RIM2-V base 3 inches up the valley from the drip edge, continuing with additional RIM2-V bases.
B. **Valley Ends At Unheated Eave** - Starting at the lower edge of the valley flashing at the roof eave, position the RIM2-V base 1 inch up the valley from the drip edge, continuing with additional RIM2-V bases.

![Diagram of RIM2-V base on valley flashing](diagram)

C. **Valley Ends At Heated Eave** - Position RIM2-V base starting 3 inches from the RIM2-E base. If valley flashing is present with only one adjacent RIM2-E base, position the RIM2-V base on the opposite side of the flashing.

![Diagram of RIM2-V base on valley flashing](diagram)

D. **Roof / Valley Transition** - Allow 1-2 inches between RIM2-V bases and at transition points for cable routing. At locations where a valley transitions at an angle, locate the RIM2-V base on the far side of the valley flashing (as shown) to allow cable routing.

![Diagram of RIM2-V base on valley flashing](diagram)
E. Valley Below Eave - If RIM2-E bases are to be located above the RIM2-V base path, align the RIM2-V bases vertically below the RIM2-E base drip edge.

(E. Roof valley below eave)

2. Apply a bead of adhesive along the entire length of each side of the bottom of the RIM2-V base and place it on the cleaned valley flashing. Starting at the lower end of the valley, position the RIM2-V base 1/8 inch from the flashing’s center V-crimp to allow for later installation of RIM2-V cover panel. Allow 1-2 inch space between base sections. Use tape or other method to fasten RIM2-V base pieces in place until the adhesive sets (cure time will vary with temperature). Position and adhere the additional RIM2-V bases, cut to fit as needed.

Low Pitch Eave Base (RIM2-LPE) Installation

1. Determine from the RIM2 System Layout Drawings where the RIM2-LPE Low Pitch Eave bottom with base attached is to be installed.

On the roof eave, place the RIM2-LPE bottom directly at the end of the eave. Make sure there is a 1 inch gap from the end of the RIM2-LPE bottom and the start of the RIM2-LPE base for cable routing. Position the bottom piece with a 1/4 inch space between the eave fascia and the drip edge of the RIM2-LPE bottom. Position the next RIM2-LPE bottom directly against the previous RIM2-LPE bottom leaving no space in-between. Continue with the final RIM2-LPE bottom flush with the other end of the roof eave with a 1 inch gap from the end of the RIM2-LPE base to the end of the RIM2-LPE bottom.
Important: Verify RTD location before attaching LPE base, so as to allow ample room for installation if necessary.

2. Using self-tapping, non-rusting, outdoor screws of appropriate length, screw down the RIM2-LPE bottom. Locate screws 2-1/2 inches in from the edge of the RIM2-LPE bottom, within 3 inches from the eave end, and on 2 foot centers. Apply caulk over screwheads to create a watertight seal.

At eave end:
2.5 HEATING CABLE INSTALLATION & INSULATION RESISTANCE TEST

1. Determine the total amount of heating cable needed for the heating system. Refer to Table 1. Add heating cable for leads, gutters, downspouts, etc. Typical lead allowance is 3 ft per power connection.

2. Determine the total power needed for the heating system by multiplying the total amount of heating cable by the design load (Amp/ft). See Table 2.

3. Determine the maximum circuit lengths, based on the circuit breaker size, start-up temperature of 0°F, cable type, and voltage (see Table 2). Based on the maximum circuit length, lay out the heating cable into circuits.

<table>
<thead>
<tr>
<th>Panel Type</th>
<th>Heating Cable per ft of Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIM-E</td>
<td>3 ft</td>
</tr>
<tr>
<td>RIM2-E</td>
<td>2 ft</td>
</tr>
<tr>
<td>RIM/ RIM2-V</td>
<td>2 ft</td>
</tr>
<tr>
<td>RIM/ RIM2-LPE</td>
<td>2 ft</td>
</tr>
<tr>
<td>RIM-C</td>
<td>2 ft</td>
</tr>
<tr>
<td>RIM-R</td>
<td>2 ft</td>
</tr>
<tr>
<td>RIM-S</td>
<td>2 ft</td>
</tr>
<tr>
<td>RIM-SC</td>
<td>2 ft</td>
</tr>
</tbody>
</table>

Table 1
Heating Cable per Panel

<table>
<thead>
<tr>
<th>Cable Type (8 W/ft)</th>
<th>Cable Voltage (V)</th>
<th>Design Load (Amp/ft)</th>
<th>Maximum Circuit Length (ft) @ 0°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>20A C.B.</td>
<td>30A C.B.</td>
<td>40A C.B.</td>
<td></td>
</tr>
<tr>
<td>RIM2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WFP-612</td>
<td>120</td>
<td>0.1230</td>
<td>130</td>
</tr>
<tr>
<td>WFP-622</td>
<td>208-277</td>
<td>0.0592</td>
<td>270</td>
</tr>
</tbody>
</table>

Table 2
Heating Cable Maximum Length / Amp Load

4. Determine the heating cable length supplied on each reel (typically 500 to 900 feet). To minimize heating cable line splices, record the length of heating cable used and determine the amount of heating cable still available. Meter marks can be found on the heating cable jacket.

<table>
<thead>
<tr>
<th>Reel #</th>
<th>Circuit #</th>
<th>Starting Meter Marker</th>
<th>Ending Meter Marker</th>
<th>Cable Used</th>
<th>Cable Remaining</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
5. From the RIM2 System Layout drawings, if provided, review circuit routing and locate end seals. Install the heating cable end seal per the included end seal kit installation instructions.

6. Beginning at the end seal location, position the GM heating cable into the RIM2 bases (2 runs in RIM2-E base; 2 runs in RIM2-LPE, RIM-S and RIM2-V bases; 1 run for gutters and downspouts) unless otherwise specified in the RIM2 System Layout drawings.

7. Allow enough heating cable to make the connection to the junction box. If cable splices are needed, allow sufficient cable at splice locations and complete using the splice kit installation instructions. Splices are best located in gutters and at eave ends, not at valleys or in cable cover brackets.

**WARNING:** Prior to installing cover panels, the inspector or supervisor must confirm correct heating cable routing, correct end seal installation, and correct power connection installation. Electrical tape is NOT acceptable for sealing heating cable!

8. Route heating cable in the gutters and downspouts according to the RIM2 System Layout drawings. If layout drawings is not provided, see sample in this manual.
To prevent refreezing, provide a heated melt-path all the way to landscape.

Notes:
1. The junction box should be located near the location where the heating cable enters the RIM2 panel. Typically, the junction box is mounted under the roof eave.
2. Plan routing of heating cable to RIM2 panels and gutters/downspouts (if applicable) to minimize the number of power connections needed (although sometimes an extra power connection may eliminate a long duplicate run of heating cable).
3. See other sample wiring diagrams (S-W-001, S-W-002 and/or S-W-003.)
9. Route the heating cable from the RIM2 bases to the electrical junction box.

**WARNING:** Be careful not to permeate the cable jacket with staples or nails, or to route the heating cable over sharp edges that could damage the heating cable jacket over time.

10. To complete the power connection, refer to the power connection kit installation instructions.

11. Verify heating cable is not connected to power source. Prior to installing RIM2 cover panels, test the electrical insulation resistance of the heating cable. Use an appropriate megohmmeter set at 500, 1000, and 2500 Vdc. Record results on Log Sheet.
Insulation Resistance Test (Megohmmeter)

Frequency
Insulation resistance testing is recommended at four stages during the installation process and as part of regularly scheduled maintenance.

• When received
• After the cables have been installed
• Prior to initial start-up (commissioning)
• As part of the regular system inspection
• After any maintenance or repair work

* Under adverse weather conditions, or when the tails or terminal connections have evidence of moisture, lower insulation resistances may be encountered. Wipe tails, face of pot, and all terminal connections with a clean dry rag to eliminate moisture and retest.

Test Criteria
The minimum insulation resistance for a clean, dry, properly installed circuit should reflect the values shown above, regardless of the heating cable length. The insulation resistance test is critical to ensure the safety and reliability of the heating cable system. This test should be performed as part of the installation of the system, and is useful for troubleshooting an installed system.

WARNING: Shock or Fire Hazard. Disconnect power to all circuits prior to testing.

Using a megohmmeter, test insulation resistance at three voltages—500, 1000, and 2500 Vdc. Significant problems may not be detected if the insulation resistance is tested only at 500 or 1000 volts. First, measure the resistance between the heating cable bus wires and the Grounding braid; then, if the heating cable is installed on a metal gutter, downspout, and/or metal roof, measure the insulation resistance between the braid and the metal surface.

Procedure
1. Disconnect all power to the heating cable, thermostat, and contactor.
2. Set test voltage at 0 Vdc.
3. Connect the negative lead (−) to the heating cable metallic braid.
4. Connect the positive lead (+) to both heating cable bus wires.
5. Turn on the megohmmeter and set the voltage to 500 Vdc; apply the voltage for 1 minute. Record the resistance.
6. Repeat step 5 at 1000 Vdc and 2500 Vdc.
7. Turn off the megohmmeter.
8. If the megohmmeter does not self-discharge, discharge phase connection to ground with a suitable grounding rod. Disconnect the megohmmeter.
9. If the heating cable is installed on a metal roof, metal gutter, or metal downspout, repeat these steps with the negative lead (−) connected to the grounding braid and the positive lead (+) connected to the metal roof, gutter, and/or downspout.
10. Reconnect the thermostat or contactor and reenergize the circuit.

Insulation Resistance Criteria
A clean, dry, properly installed circuit should measure thousands of megohms, regardless of the heating cable length or measuring voltage (0–2500 Vdc). The following criteria are provided to assist in determining the acceptability of an installation where optimum conditions may not apply:

• All three insulation resistance values should be greater than 100 megohms.
• Insulation resistance values for any particular circuit should not vary more than 25 percent as a function of measuring voltage.
• Reading must be steady at measuring voltage.
• If any of the above conditions are not met, consult the “Troubleshooting” instructions.
2.6 COVER PANEL INSTALLATION

Valley Cover Panel (RIM2-V) Installation

1. Starting closest to the eave, snap the RIM2-V cover panel over the RIM2-V base. Continue snapping additional covers over bases. At the end of the valley, allow an extra 2 inches of RIM2-V cover panel to extend beyond the RIM2-V base. Trim and fold the RIM-V cover panel as needed.

A. **Valley At Unheated Roof Eave** - Position the RIM2-V cover panel extending at least 1 inch past the facia, forming a drip edge.

B. **Valley At Heated Roof Eave** - Position RIM2-V cover panel directly against RIM2-E base.

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Dimensions shown for reference only.
C. Other Valley Transitions - Trim and fold cover panels as needed to route and cover exposed heating cables.

1. Slip the RIM2-E cover panel at least 1 inch up under the roof material and hold it against the base drip edge. Using self-tapping, non-rusting, outdoor screws of appropriate length, screw the RIM2-E cover panel in place. Locate screws within 3 inches of the eave ends and on 2 foot centers. After securing the RIM2 panels, recheck the cover panel to verify that it is locked securely into place at the drip edge.
A. Where the roof eaves meet at a valley intersection, allow extra RIM2-E cover panel at corners for miter cuts. Trim the RIM2-E cover panel as needed around the RIM2-V cover panel.

B. Notch RIM2-E cover as needed to route heating cable.

2. Continue installing RIM2-E cover panels allowing 1 inch spacing between covers. At the end locations, trim and fold RIM2-E cover panels as needed.
3. Apply a bead of adhesive along each side of the RIM2-E cover panel. Position the RIM2-E splice cover centered over the joint and slide it under the counter-flashing, locking it securely at the drip edge. Screw the RIM2-E splice cover in place with two self-tapping, non-rusting, outdoor screws of appropriate length. Seal all joints with sealant. Refer to “Temperature Sensor Installation” to install RTD temperature splice covers.
Low Pitch Cover Panel (RIM2-LPE) Installation

1. Slip the RIM2-LPE cover panel at least 1 inch up under the roof material and hold it against the base drip edge. Using self-tapping, non-rusting, outdoor screws of appropriate length, screw the RIM2-LPE cover panel in place. Locate screws within 3 inches of the eave ends and on 2 foot centers. After securing the RIM2 panels, recheck the cover panel to verify that it is locked securely into place at the drip edge. Seal all joints with sealant.
Cable Cover Bracket (CCB) Installation

1. Determine from the RIM System Layout Drawings where the CCB panels are to be installed. Install CCB in any areas where cable is exposed, if possible. Determine based on the direction of the cable’s flat side whether to position CCB vertically or horizontally. Leave 1-2 inch gap on each end for cable routing, as needed.

   A. If fastened vertically on wall, position open side of CCB facing downward.

   B. To fasten with adhesive, clear away debris and carefully clean with a solvent such as denatured alcohol in areas where CCB IS to be installed. Place heating cable inside the CCB. Apply adhesive to the bottom of CCB, zig-zag edge to edge, and position CCB in place. Use tape or other method to fasten CCB in place until the adhesive sets (cure time depends on temperature.) Remove tape and verify CCB is well attached.

   C. To fasten with screws, place heating cable inside CCB, screw self-tapping, non-rusting, outdoor screws within 3 inches of ends and on 2 foot centers, at the CCB bend to avoid damaging cable inside. Seal with watertight seal.

   D. If cable twists, leave extra cable tucked into a loop at cable’s turn point at the gap on either end.

2. Seal all joints with sealant.

   **Single Cable Run**

   **Option 1:**

   ![Single Cable Run Option 1 Diagram]

   **Option 2:**

   ![Single Cable Run Option 2 Diagram]

   **Double Cable Run**

   **Option 1:**

   ![Double Cable Run Option 1 Diagram]

   **Option 2:**

   ![Double Cable Run Option 2 Diagram]
2.7 FINAL INSULATION RESISTANCE TEST

1. Verify heating cable is not connected to power source. After installing RIM2 cover panels, test the electrical insulation resistance of the heating cable. Use an appropriate megohmmeter meter set at 2500 volts minimum.

2. Install the control system following the controller installation procedures. Install power wiring and perform an electrical insulation resistance test of the power wiring, prior to connecting to power source.

   A. Install power wiring between heating cable and power source. Connect wires to the heating cable but not to the power source.

   B. Perform electrical insulation resistance test on the ends of the power wires not yet connected to the power source, using an appropriate megohmmeter set at 2500 volts minimum. Record all results on the Installation Log Sheet. Record installation and inspection information.
2.8 TEMPERATURE SENSOR INSTALLATION

1. Refer to RIM2 System layout drawings for ambient RTD temperature sensor locations, if provided. Place Ambient RTD Sensor in shaded area (typically on North side of building under the soffit) away from any heat source (such as solar gain or heated vents) that would create a false (and higher) reading. Place Loop Strap around RTD, between pieces of shrink tube. Secure with a mounting screw (by others) Route the RTD lead wire to junction box. Route copper extension wire (note gauge vs length) to the proper terminal blocks in the control panel, as specified in the Control Panel drawing.

**Important:** Do not exceed maximum extension wire length versus wire gauge.
- 16 gauge up to 60 ft max
- 14 gauge up to 120 ft max
- 12 gauge up to 240 ft max
- 10 gauge up to 480 ft max

**Note:** The NEC (National Electrical Code) allows the routing of control wiring in the same conduit and junction box as the power wiring. The electrical insulation rating on the control wiring must be equal or greater than the power wiring rating. For example, if the power wiring is 300Vac, then the control wiring leads must be 300Vac rated or greater.

RTD lead/extension wire field connections (route wires to provide physical protection & aesthetics). Note: When joining the small gauge RTD lead wires to heavier gauge extension wires, strip back the insulation far enough to double over the RTD wires.
2. Install the RIM2-E or RIM2-LPE splice cover with RTD temperature sensor at the specified locations. Refer to the Control System Setup and Operation Manual for installation instructions. With RIM2-E base and End Bracket in place, position the RIM2-E cover 5" from the end of eave. Place the RIM2-E splice cover with RTD in position, overlapping the RIM2-E cover by 1". Route copper extension wire (note gauge vs. length) to the proper terminal blocks in the control panel, as specified in the control panel drawing.

**Important:** Do not exceed maximum extension wire length vs. wire gauge.
3. OPERATION PROCEDURES

3.1 GENERAL DESCRIPTION

The RIM2 is designed to prevent ice dams at eaves and in valleys and to prevent icicle formation at the eaves. The system accomplishes this by providing heated eave panels that keep melted snow from refreezing as it drains off the eave, and by providing heated valley panels that ensure a continuous water drain path down the valley.

3.2 FALL TESTING

Some time prior to the winter season, test each circuit by turning on each circuit breaker, one at a time, and leaving them on for 10-15 minutes. Should any of the circuit breakers trip, reset the circuit breaker for a second test. If the circuit breaker trips again, refer to the "RIM System Troubleshooting" section of this manual.

If the heaters are controlled with an nVent RAYCHEM AS-Digital or Manual/Auto Control System (MACS) it is not necessary to wait until the ambient temperature is below freezing. Set the Heater-On set point several degrees above the currently sensed ambient temperature to energize any control zone that is set to Auto via its 3-position switch. Or, use the 3-position switch to set the control zone to Hand (On). Once testing is complete, reset the Heater-On set point back to its original value or the switch to its original position.

If the heaters are controlled with a High-Efficiency Control System (HECS) it is not necessary to wait until the ambient temperature is below freezing. Set the controller's Heater-On set point several degrees above the currently sensed ambient temperature so that the Control Zone temperature controllers will be energized. Once the Control Zone temperature controllers are energized the RIM panel maintain temperature (lower number on the controller) can be raised above the current RIM panel temperature (upper number on the controller) in order to energize the heaters (see High-Efficiency Control System Setup and Operation). Once testing is complete reset the panel maintain temperature back to its original value (factory default setting is 42°F).

3.3 WINTER STARTUP

At the onset of snow accumulation on the roof surface, energize the RIM panels by turning on the circuit breakers (typically in November/December). RIM systems controlled with an AS-Digital or Manual/Auto Control System (MACS) will be energized when the ambient temperature falls below the Heater-On set point on the ambient sensing controller AND the 3-position switch is set to Auto, or when the 3-position switch is set to Hand (On). RIM systems controlled with a High-Efficiency Control System (HECS) will be energized when the ambient temperature falls below the Heater-On set point AND the RIM panel temperature (upper number on the Control Zone temperature controllers) is below the specified RIM panel maintain temperature (lower number on the Control Zone temperature controllers).

3.4 UNUSUAL WINTER CONDITIONS

Most winters start up with gradual snow accumulation on the roof in November/December and the snow accumulation remains until March/April. Sometimes, however, the snow either melts or slides off roof sections and those sections remain without snow until the next snowstorm. The owner, at his option, may choose to de-energize those sections.

For RIM systems controlled with an AS-Digital Controller or Manual/Auto Control System (MACS), set the controller's 3-position control zone switch to Off only for those sections without snow (the owner must remember to set the ambient controller's Run/Stop Mode...
back to RUN or to turn the 3-position control zone switches back to Hand (On) or Auto when the next snowfall occurs).

For RIM systems controlled with a High-Efficiency Control System (HECS), set the 3-position control zone switch to Off only for those sections without snow (the owner must remember to set the ambient controller’s Run/Stop Mode back to RUN, or to turn the 3-position control zone switches back to Hand (On) or Auto when the next snowfall occurs).

3.5 SPRING SHUTDOWN

In the spring when the snow has melted off the roof surface, the owner should de-energize (turn circuit breakers off) the RIM System for the summer. As mentioned above, some roof sections (primarily south facing) can be de-energized before the balance of the roof sections (north facing and shaded areas).
### RIM2 SYSTEM TROUBLESHOOTING

#### General Wiring Layout

The System must be installed and tested in accordance with Bylin’s installation and testing instructions.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Remedy</th>
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<tr>
<td>1 The System will not heat.</td>
<td>a. Circuit breaker and / or ground fault protection device turned off or tripped.</td>
<td>a. Turn on / reset.</td>
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<td>b. Interconnect wiring has open circuit.</td>
<td>b. Check continuity of wiring and all connections. Check all splices in junction boxes.</td>
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<td></td>
<td>c. Control system (by others) off or Heater-On set point too low.</td>
<td>c. Turn system on, adjust Heater-On set point. If problem persists, check with manufacturer.</td>
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<tr>
<td>2 Circuit breaker or ground fault protection device continues tripping.</td>
<td>a. Short circuit in heating cable or wiring has occurred.</td>
<td>a. Disconnect the power wires from circuit breaker and perform insulation resistance test of the power wiring at the circuit breaker If insulation test fails at the power wiring, perform test on heating cable at local junction box by disconnecting power wires from heating cable (for multiple heater cable runs on the same circuit, test each run separately). If insulation test passes for each heating cable run, test power wiring. If insulation test fails for power wiring, fix or replace wiring until wiring passes test. If insulation test fails for a run of heating cable, check for moisture in junction box, damage to the heating cable, or improper power connection, splice or end seal installation. Repair or replace heating cable and components using approved materials. Retest.</td>
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<td>b. Ground fault protection device rating is too low (e.g., 5mA).</td>
<td>b. Replace with 30mA EPD (Equipment Protection Device) ground fault protection device.</td>
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<td>c. Defective ground fault protection device.</td>
<td>c. Replace ground fault protection device as required.</td>
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## INSTALLATION LOG SHEET RIM/RIM2 SYSTEMS

### Application
- nVent RAYCHEM RIM System
- nVent RAYCHEM RIM2 System

### Project #

### Test Check List
- Test #1 - Prior to RIM Cover at J. Box
- Test #2 - After RIM Cover at J. Box
- Test #3 - Control Panel Terminal Blocks

### Reference

### End User Information

### Customer Information

### Visual Inspection

- Test #1 - Prior to RIM Cover at J. Box
- Test #2 - After RIM Cover at J. Box
- Test #3 - Control Panel Terminal Blocks

### Heater Cable Model

### For heater cable insulation resistance test, refer to p.19 of H59380 for RIM or p. 19 of H59375 for RIM2

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**Note:** All circuits must be ground fault protected per the NEC.

### Visual inspection and insulation test performed by:

- Name
- Company
- Date

**Important Notice:** To validate the heater cable 2-year warranty, the above tests must be completed on the installed heater cable, and the test results recorded & mailed, emailed, or faxed to nVent.