



October 2026 Webinar

Snow Melt Controls & Sensors Getting Activation Right



Snow Melt Controls & Sensors: Getting Activation Right



Mastering Selection, Sensor Placement, Wiring Schematics, and Pre-Season Commissioning

WarmlyYours Radiant Heating Technical Team

Welcome & webinar overview

The hidden vulnerability of
radiant snow melting systems

Why control strategy dictates
operating cost and client
satisfaction

PRO Takeaway: Even a flawless \$15,000 in-ground cable layout is useless if the \$600 control package is installed or configured improperly.

The #1 Reason Snow Melt “Fails” Isn’t the Cable



The Contractor’s Nightmare: First major storm hits in December → phone rings: *“My driveway is buried in 4 inches of snow and the system is stone cold!”*

What Actually Happened?

- In 8 out of 10 tech support cases, the heating cables pass continuity and megohmmeter tests perfectly.
- The system failed because the control never pulled in the contactors, or activated hours too late after snow pack insulated the ground.

Common Culprits:

- In-slab sensor mounted under an eave or buried under plowed snow.
- Aerial sensor mounted in a wind shadow or under tree branches.
- Hold-on afterrun timer set too short, leaving partially melted snow and ice.

PRO Takeaway: Diagnosing the control system is your quickest path to resolving or preventing winter service calls.

The Physics of Activation: Temperature + Moisture = Heat



The Universal Truth

Automatic snow melting **does not** trigger on temperature alone.

The Two Conditions (Both Required)

1. **Precipitation Sensor:** Heated moisture grid must detect water, ice or snow.
2. **Temperature Sensor:** Must read at or below the setpoint threshold (factory standard: $\leq 38^{\circ}\text{F}$ / 3.3°C).

Why 38°F instead of 32°F?

- Snowflakes frequently fall when surface air is 34°F – 37°F .
- Starting at 38°F allows the embedded cables to pre-warm the slab before heavy accumulation insulates the cold ground.

PRO Takeaway: Teach your clients the “AND” rule early: cold alone won’t trigger the system, and rain above 38°F won’t waste their electricity.

Control Strategies: Manual vs. Automatic vs. Multi-Zone

Select controls based on operator involvement, sensor automation, and layout complexity:

1. Manual Controls (SCM / SCW)

User-initiated operation for budget-focused applications, spot heating, or attended sites:

2. Automatic Controls (SCV / SCA / SCP / SCE)

Hands-off, sensor-driven activation based on falling precipitation and freezing temperatures:

3. Multi-Zone Controls (SCMZ)

Independent management of multiple heating areas with different thermal demands or exposure:

PRO Takeaway: *Manual options (timer or WiFi) offer simple, budget-conscious control when someone can trigger the system; automatic and multi-zone controllers eliminate human delay and ensure surfaces stay clear before snow packs down.*

1. Manual Controls (SCM / SCW)

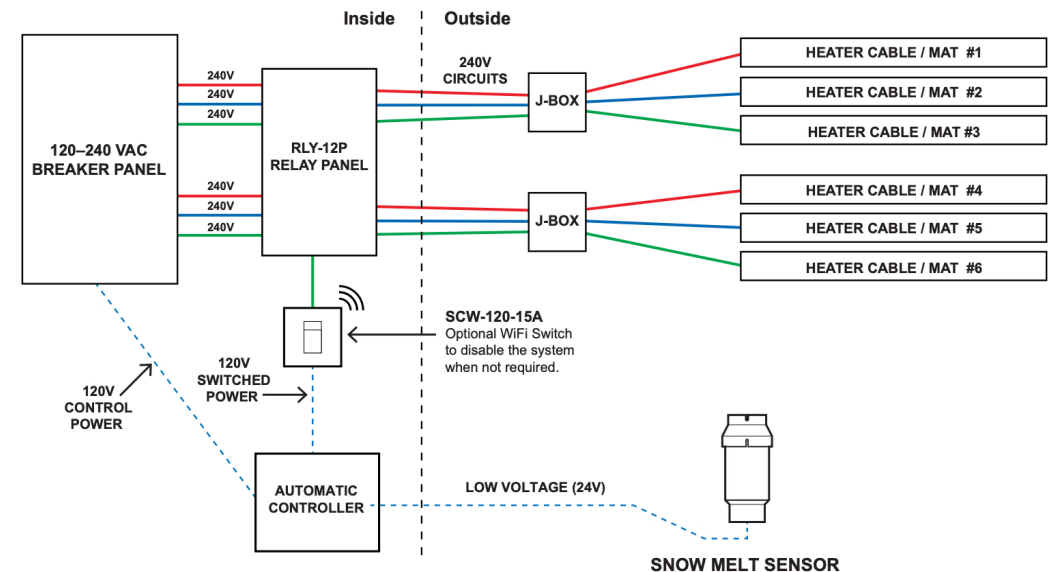
User-initiated operation for budget-focused applications, spot heating, or attended sites:

- **SCM-DUAL (Timer):** Countdown dial timer (up to 12 hours of run time). Ideal for small landings, steps, or walkways where an operator starts the system manually.
- **SCW-120 (WiFi Control):** Remote app-enabled manual control. Allows users to switch zones on/off and set schedules directly from a smartphone or smart device without weather sensors. The SCW-120 can be used either as a standalone manual switch to trigger a relay panel from your phone, OR wired inline with an automatic controller to act as a remote vacation/seasonal kill-switch.

SCW-120 (WiFi Control)



Wiring Diagram



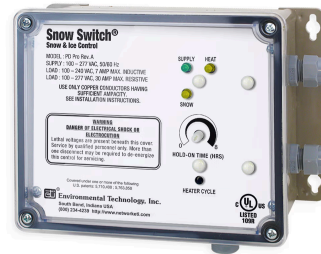
2. Automatic Controls (SCV / SCA / SCP / SCE)

Hands-off, sensor-driven activation based on falling precipitation and freezing temperatures:



SCV-DUAL (Value / Self-Contained)

All-in-one conduit-mounted unit combining temperature sensing, moisture detection, and switching logic in a single head. Best for standard residential driveways.



SCA-DUAL (Advanced Panel)

Wall-mounted control panel paired with external remote sensors (aerial or in-slab). Ideal for custom residences and commercial ramps.



SCP Series (Premium / Contactor Panels)

Wall-mounted controller with built-in high-temperature cutoff, up to 6 remote sensors, and direct 30A switching or contactor panel control.

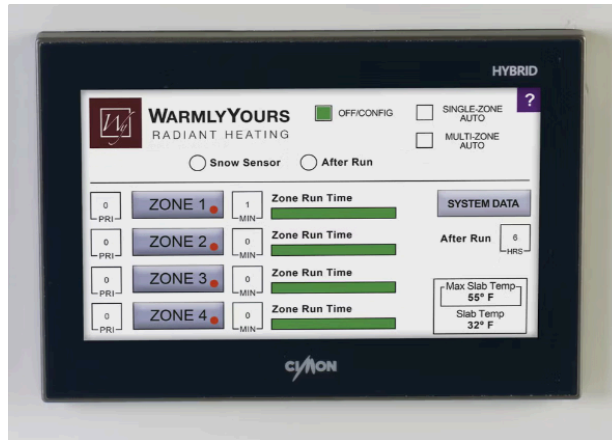


SCE-120 (Economy / Electronic Controller)

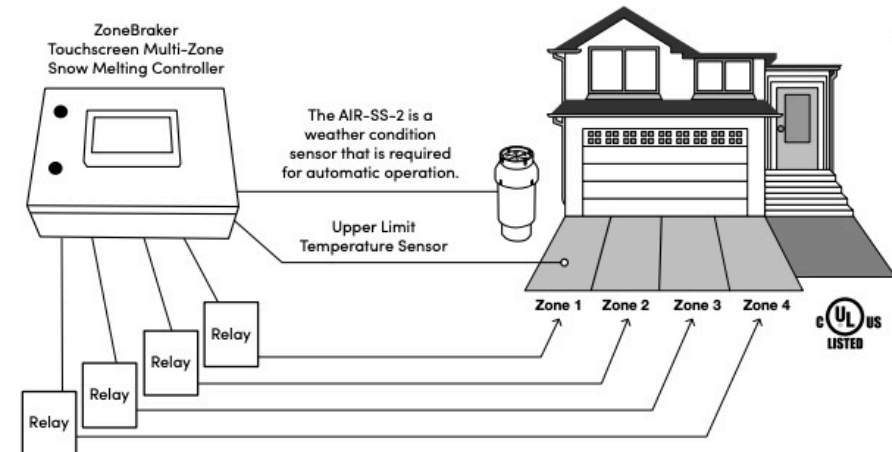
Microprocessor-based DIN-rail controller paired with slab and/or aerial sensors for reliable, automatic snow and ice detection.

3. Multi-Zone Controls (SCMZ)

Independent management of multiple heating areas with different thermal demands or exposure:



SCMZ (Multi-Zone Controller): Controls multiple distinct areas independently (such as Driveway Slab + Roof & Gutter, or North Ramp + South Ramp) to optimize energy use, stagger electrical loads, and prevent unnecessary power draw.



SCV-DUAL: All-in-One Budget Control



01 Lowest-Cost Automatic Option:

Delivers full, automated snow melting at our lowest entry-level price point.

02 All-in-One Integrated Head:

Combines the moisture grid, temperature sensor, and switching logic into a single unit, eliminating separate panel enclosures.

03 Versatile Electrical Rating (100–240V / 16A):

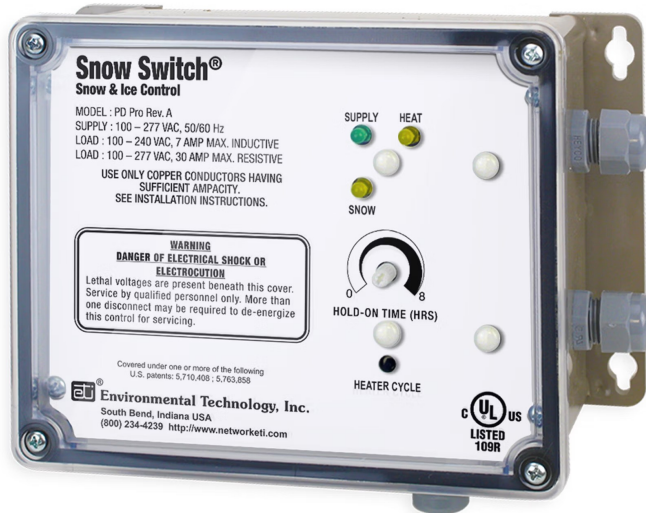
Auto-senses 100V to 240VAC and switches up to 16A directly without requiring an external relay panel for smaller jobs.

04 Simple Conduit Mounting:

Mounts directly to standard $\frac{3}{4}$ " PVC conduit (or 1" with coupler), enabling fast, elevated mast installations using off-the-shelf fittings.

PRO Takeaway: *Best for straightforward, budget-conscious residential driveways where an all-in-one mast mount eliminates the need for indoor panel space.*

SCA-DUAL: Most Popular Scalable Controller



01 Flexible Sensor Support:

Works with one or up to two external sensors—compatible with aerial precipitation sensors (AIR-SS-2) and/or in-slab pavement sensors (SIT-6E) for versatile placement.

02 High Direct Switching Capacity (30A):

Handles resistive heating loads up to 30 amps (100V to 277VAC) directly, allowing it to power medium-sized jobs without a separate relay panel.

03 Adjustable After-Run Timer:

Features an on-board dial to adjust hold-on run time (up to 8 hours) after precipitation stops, ensuring complete clearance and preventing meltwater refreeze.

04 On-Control Manual Cycle Button:

Includes an integrated "Heater Cycle" button directly on the faceplate, allowing installers and users to manually trigger or test the system on demand.

SCE-120: Intelligent Dual-Zone Automatic Controller



01 Independent Dual-Zone Control:

Automatically operates two distinct zones at the same time—such as two separate slab areas or a driveway slab paired with a roof and gutter deicing system.

02 Backlit Digital Graphic Display:

Features an intuitive LCD screen with an encoder dial for real-time temperature, moisture, and zone status readouts plus easy menu navigation.

03 Dual In-Slab Sensor Support:

Connects with up to two SLAB-SS pavement sensors (or outdoor air/gutter sensors) to accurately detect both temperature and moisture right at the surface.

04 Energy-Optimized Precision Settings:

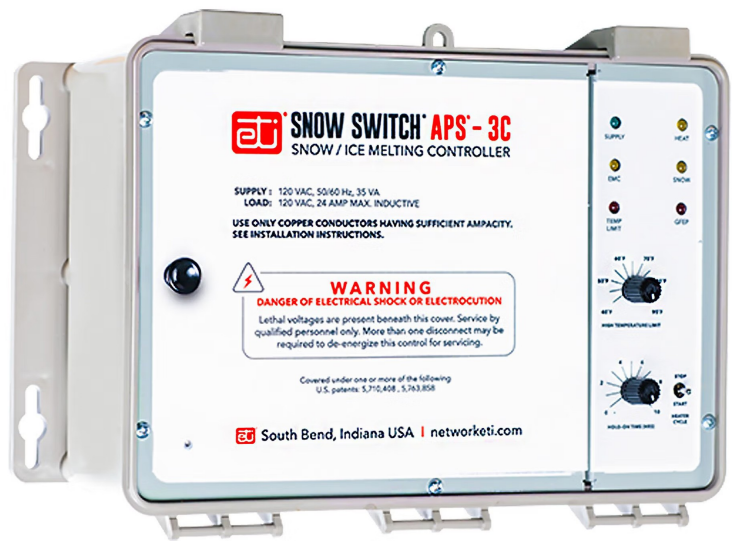
Offers adjustable temperature setpoints, moisture sensitivity levels, and base/idle heating settings to minimize energy consumption.

PRO Takeaway: *The ideal choice when a project requires independent control over two separate exposure areas or a combined slab and roof/gutter system from a single central panel.*

SCP-120: Premium Code-Compliant Automatic Controller

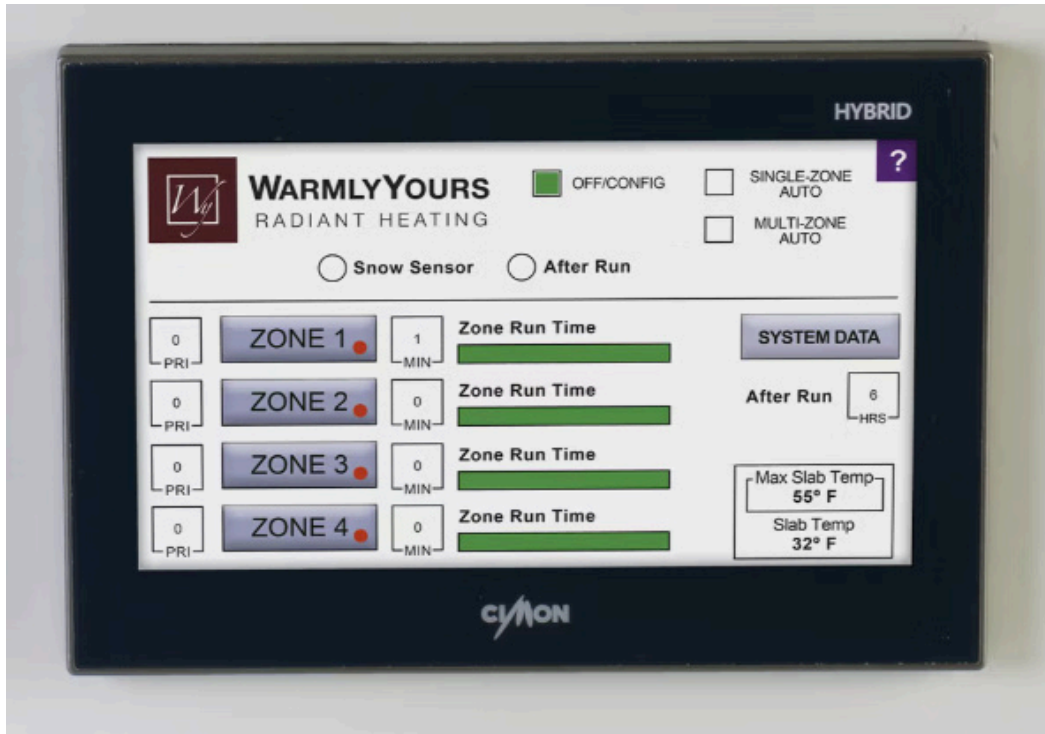


DIGITAL PRECISION CONTROL



- 01 Integrated High-Temp Limit (OT) Sensor:**
Includes a dedicated pavement high-temperature limit sensor to prevent surface overheating, making it required for asphalt embeds and energy code compliance (e.g., in NY, NJ, RI, CO).
- 02 Flexible Multi-Sensor Architecture:**
Connects with up to six remote sensors—supporting aerial precipitation sensors (AIR-SS-2), in-slab sensors (SIT-6E), on the same controller.
- 03 Adjustable Hold-On Timer (0–10 Hours):**
Features an extended on-board after-run timer dial (up to 10 hours) to ensure complete snow and meltwater evaporation and eliminate dangerous refreeze.
- 04 Calibrated High-Temperature Cutoff Dial:**
Features an adjustable on-board temperature limit dial (40°F–90°F) that cuts heating output when the pavement reaches the setpoint to protect sensitive surfaces and conserve power.

Intelligent Load-Sharing Multi-Zone Controller



- 01 Load-Sharing Power Management:** Breaks large heating systems into up to 4 independently controlled zones, cycling them sequentially to dramatically reduce peak electrical amp draw on limited service panels.
- 02 Intuitive Color Touchscreen Interface:** Features a full-color graphical touchscreen display that allows custom runtime programming per zone and provides on-screen access to system diagnostics and FAQs.
- 03 Flexible Automatic Sensing:** Fully compatible with either aerial precipitation sensors (AIR-SS-2) or in-slab pavement sensor kits (SC-SS-PAV-6E-KIT) for automated hands-off snow detection.
- 04 Included High-Temperature Surface Limit Sensor:** Ships with an embedded upper-limit pavement sensor to prevent surface overheating, maximize efficiency, and comply with energy conservation codes.

PRO Takeaway: *The ZoneBraker is the problem-solver for large driveways with limited breaker service: by cycling up to 4 zones sequentially instead of firing all at once, you can melt a 1,000+ sq. ft. area without requiring an expensive utility panel upgrade.*

Aerial vs. In-Slab Sensors: Jobsite Fit

MATCH SENSOR TYPE TO SITE GEOMETRY, WIND EXPOSURE, AND INSTALLATION FEASIBILITY

Feature	Aerial Sensor	In-Slab Sensor
Compatible Models	Aerial (AIR-SS-2 / SCV-DUAL)	In-slab (SC-SS-PAV-6E-KIT / ETOG-56)
Key Advantage	Fast, serviceable; reads air	True surface reading, most efficient
Best For	<ul style="list-style-type: none">• Standard residential driveways and walkways• Retrofits where pavement is already poured	<ul style="list-style-type: none">• Commercial ramps, steep inclines, and hospital entries• New construction prioritizing lowest operating cost• Carwashes and loading docks.

PRO Takeaway: *Use aerial sensors for asphalt and retrofits; use in-slab sensors for pavers, concrete, and high-exposure commercial slabs.*

Aerial Sensor Placement: 5 Field Best Practices



360° Open Air Exposure

- 01 Mount with an unobstructed line of sight to the sky, keeping at least 1–2 ft above the highest anticipated snow drift level to avoid the “igloo effect.”

Stay Clear of Drip Edges

- 02 Never mount directly under roof eaves, valleys, gutters, downspouts, or overhanging trees where melting runoff will falsely trigger or flood the sensor.

Account for Prevailing & Storm Winds

- 03 Place sensors where airflow naturally deposits snow rather than sweeping it past the sensing grid.

Field Tip (10°–15° Mast Tilt)

- 04 Tilt the sensor mast 10° to 15° away from vertical so meltwater drains freely off the head and across the sensing tracks rather than pooling or refreezing on top.

Ensure Service Access

- 05 Mount on a rigid, secure conduit that remains accessible for seasonal cleaning and debris inspection.

PRO Takeaway: *An aerial sensor can only activate what lands directly on its 1” grid—never sacrifice open air exposure and wind clearance for convenient conduit routing.*

In-Slab Sensor Placement: 4 Field Best Practices



Center Between Heating Cables:

Must be installed midway between two cable runs inside the heated grid so it accurately reads average pavement temperature without premature thermal tripping from direct cable contact.

Mount Exactly Flush with the Surface:

The top surface of the brass puck / sensor face must sit exactly flush and level with the finished pavement—never recessed where it pools standing water, nor protruding where snowplows or tires will shear it.

Choose Representative Drainage & Exposure:

Place in an unsheltered spot that receives typical snowfall and normal drainage, avoiding artificial low-point retention puddles or uncharacteristically dry high spots.

Isolate from Wheel Ruts & Animal Traffic:

Keep out of primary tire tracks where tracked-in road salt, deicer slush, or packed ice will distort conductivity readings.

PRO Takeaway: Use the plastic installation plate/casing during the pour or paver setting. Never install the actual brass sensor head until the paving is completed and cured.

Dialing in the Afterrun / Hold-On Timer

What is Afterrun?

The period the heating cables remain fully energized **after** precipitation stops and the sensor dries out.

Evaporates Slush to Prevent Dangerous Refreeze

Keeps heating elements active long enough to dry the pavement thoroughly, eliminating the risk of meltwater turning into black ice in sub-freezing ambient air.

User-Adjustable at Any Time for Seasonal Fine-Tuning:

Control dials (ranging 0–8 or 0–10 hours depending on the unit) allows to easily calibrate run time on the fly based on observed winter performance and changing weather patterns.

Simple Visual Calibration Rule of Thumb:

- *Surface completely dry within 2 hours after snow stops?* Dial it back to ~2+ hours to cut unnecessary electric runtime.
- *Still slush or standing wet spots after 3 hours?* Dial it up to 4+ hours so the heaters stay energized until the slab is 100% bone-dry.

PRO Takeaway: Tell customers the afterrun dial isn't "set-and-forget"—it's designed to be adjusted after the first few winter storms to match their specific slab drainage, shade exposure, and wind patterns.

Relay Panels: Bridging Control Logic to Heavy Power



The Rule of Amps:

- Most controller output relays are rated at 16A to 30A.
- A typical 500 sq ft driveway @ 240V draws ~**100 Amps**
- A Contactor Panel (RLY-Series) is required to safely switch higher amperage systems.

High-Capacity Power Intermediary (120V–277V):

Acts as the central heavy-load bridge between low-voltage/pilot-duty controllers and high-amperage heating cables

Three Sizing Options to Match Any System Footprint:

RLY-4PL (Small):

Powers up to **2** × 208V/240V *or* **4** × 120V/277V circuits.

RLY-8PL (Medium):

Powers up to **4** × 208V/240V *or* **8** × 120V/277V circuits.

RLY-12PL (Large):

Powers up to **6** × 208V/240V *or* **12** × 120V/277V circuits.

Pre-Season Commissioning: Testing AIR-SS-2 in 75°F Weather



Homeowners expect the system to fire up on Day 1 of winter. Commissioning should always happen in September or October—never during the first snowstorm.

How to Simulate Winter on the Bench:

1

Step 1: Simulate Sub-Freezing Air (< 38°F / 3.3°C)

Apply a burst of electronic freeze mist (hold the can upside down) directly against the sensor

2

Step 2: Simulate Falling Snow

While the base is cold, place ice cube or wet sponge across the top moisture sensing grid.

3

Step 3: Verify Full System Engagement

Check that the **SNOW** and **HEAT** LEDs illuminate, the contactors audibly pull in, and verify operating amperage with a clamp meter.

PRO Takeaway: Walk away from every install with documented proof of contactor engagement and an amp draw test recorded on your commissioning sheet.

Common Field Symptoms & Fast Diagnostics

DIAGNOSTIC 01

Controller Issue: Heaters Stay On Continuously (or Shut Down Early)

Fast Diagnostic:

Verify the Timer: Check the on-board Hold-On dial. If slush remains, dial up to 4+ hours; if clear within 2 hours, dial down to prevent wasted power.

DIAGNOSTIC 02

Sensor Issue: Heavy Snowfall, but the System Never Turns On

Fast Diagnostic:

Aerial Sensor (AIR-SS-2): Check if snow has bridged an insulating “igloo” cavity over a buried sensor head, or if wind vortices are deflecting snowflakes away from the sensing grid.

DIAGNOSTIC 03

Error Code / Status Indicator: Blinking Green “SUPPLY” Light (SCP-120)

Fast Diagnostic:

Ohm the Sensor: Disconnect the OT sensor from terminals 10 & 11 and test with a multimeter set to the 200k Ω scale. A functional thermistor reads **95 k Ω to 107 k Ω** at room temperature (~77°F / 25°C).

Fast Diagnostic Bypass: If the sensor wasn't installed or reads open/shorted, temporarily install a **470 k Ω (1/2W, 2%) resistor** instead.

PRO Takeaway: Always clean the sensor grid annually as part of fall maintenance; road salt and dirt bridge contacts and cause false activation.

The Professional Installer's Activation Checklist

01 **Equation Verified:**

Educate client on the Temperature ($\leq 38^{\circ}\text{F}$) + Moisture rule.

02 **Placement Cleared:**

Aerial sensors tilted 10° – 15° , clear of eaves; slab sensors flush and centered between cables.

03 **Wiring Polarity Confirmed:**

Red/Black/White sensor leads landed correctly; contactor coil switched properly.

04 **Afterrun Programmed:**

Set hold-on timer to 2–4 hours to prevent black ice runoff.

05 **Bench-Tested Before Winter:**

Freeze spray + moisture jumper test executed and logged on commissioning sheet.

Technical Support & Project Design Services

PRO Takeaway: Send your site electrical plans to WarmlyYours before bidding—our engineering team will size the contactors and specify the exact control package for you.

WarmlyYours Design & Technical Services

- Free SmartPlanTM electrical layout and quoting service.
- 24/7 Installation Support Line: (800) 875-5285.
- Custom pre-wired contactor panels (RLY-Series) built to order.

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We'd rather help you plan the install than troubleshoot a problem later. Don't hesitate to call.

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