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Snow Melting Sensors & Controls

PRO Resource: Technical Field Guide for Electric Snow Melting Controls, Aerial & In-Slab Sensors, Hold-On Timers, and Pre-Season Commissioning

PRO Resource: Snow Melting Sensors & Controls

Physics of Activation, Sensor Placement, Hold-On Timers & Pre-Season Commissioning

Section 1: The Physics of Activation (Temperature + Moisture = Heat)

PRO Takeaway: Teach your clients the "AND" rule early: cold alone will not trigger the system, and rain above 38°F will not waste electricity. Automatic snow melting requires both conditions simultaneously.

The Universal Truth: Automatic snow melting systems do not trigger on temperature alone. Energy-efficient activation demands dual-state verification before energizing high-amperage heating cables.

The Two Required Conditions

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Precipitation Sensor The heated moisture sensing grid must detect moisture, ice, or falling snow bridging the sensing tracks.	**Temperature Sensor** Ambient or pavement temperature must read at or below the setpoint threshold (factory standard: ≤ 38°F / 3.3°C).

Temperature Thresholds & Sensor Placement

Why 38°F (3.3°C) Instead of 32°F (0°C)?

- Snowflakes frequently fall when surface air temperatures sit between 34°F and 37°F. A 32°F threshold would miss early snowfall.
- Pre-warming the slab: Triggering at 38°F allows embedded heating cables to build thermal mass in the slab before heavy snow accumulation can insulate cold ground.

What the System Does NOT Do

- **Dry, Sub-Freezing Days:** It does not turn on during a dry, sunny 10°F freeze (no moisture present).
- **Cold Rain:** It does not turn on during a rainy 45°F spring downpour (temperature above 38°F threshold).

Section 2A: Aerial Sensor Placement — 7 Field Best Practices

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

1. 360° Open Air Exposure

Mount with an unobstructed line of sight to the sky. Keep at least 1–2 ft above the highest anticipated snow drift line to avoid the "igloo effect" where snow banks bury the sensor.

2. Stay Clear of Drip Edges

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

3. Account for Prevailing & Storm Winds

Place sensors where local wind vortexes and building airflow naturally deposit snow rather than sweeping it past the sensing grid.

Aerial Sensor Placement (continued)

4. Avoid Heated Exhaust & Microclimates

Keep well clear of dryer vents, HVAC exhaust units, chimneys, and warm mechanical louvers that prevent falling snow from accumulating on the grid.

5. Field Tip (10°–15° Mast Tilt)

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.

6. Use Multiple Sensors for Variable Storms

On controllers supporting multiple inputs, place sensors on opposing building exposures to catch storms arriving from atypical wind directions.

7. Ensure Service Access

Mount on a rigid, secure conduit mast that remains accessible for seasonal cleaning and debris inspection without risking ladder falls.

Section 2B: In-Slab Sensor Placement & Rough-In Geometry

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

1. Center Between Heating Cables

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

2. 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.

In-Slab Sensor Placement (continued)

3. Choose Representative Drainage & Exposure

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

4. 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.

5. Rough-In with Protective Tube & Plug

Always install the rough-in mounting housing, securing conduit and pulling the actual sensor only after curing.

6. Seal Housing & Pack Duct Seal

Pack the interior of the housing with pliable duct sealant around the conduit entry to displace void space, preventing groundwater intrusion and freeze-thaw expansion damage.

Section 3: Dialing in the Afterrun / Hold-On Timer

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

What is Afterrun?

Afterrun (hold-on time) is the calibrated duration heating cables remain fully energized after precipitation stops and the sensor moisture grid dries out.

Evaporates Slush to Prevent Dangerous Refreeze: When snowfall stops, the sensor detects that precipitation has ended. The hold-on timer keeps the heaters running just long enough to fully melt remaining accumulation and dry the pavement surface before standing meltwater turns into hazardous black ice.

User-Adjustable for Seasonal Fine-Tuning: Control dials (ranging 0–8 or 0–10 hours depending on the controller model) allow homeowners or facility managers to easily calibrate runtime on the fly based on observed winter performance and changing weather patterns.

Visual Calibration Rules of Thumb

Observation	Action	Benefit
Slab completely dry within 2 hours after snow stops	Dial back to ~2 hours	Eliminates unnecessary electric runtime & saves energy
Slush or standing wet spots persist after 3 hours	Dial up to 4+ hours	Ensures cables stay energized until slab is 100% bone-dry

Section 4: Pre-Season Commissioning: Testing AIR-SS-2 in 75°F Weather

PRO Takeaway: Walk away from every install with documented proof of contactor engagement and an amp draw test recorded on your commissioning sheet. Never wait for the first snowstorm to test.

Homeowners expect the snow melting system to fire up seamlessly on Day 1 of winter. Field commissioning should always happen during early autumn (September or October)—long before freezing weather arrives.

5-Step Winter Bench Simulation Procedure

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Step 1: Locate the Internal Thermistor

Find the raised indexing tab along the sensor rim. The internal temperature sensor is located at the base on the exact opposite side of this tab.

Step 2: Simulate Sub-Freezing Air

Step 2: Simulate Sub-Freezing Air (< 38°F / 3.3°C) — Invert a can of electronic freeze mist and apply a controlled burst directly against the base area opposite the indexing tab.

FIELD WARNING: Never submerge the sensor in ice water—it is weather-resistant, not submersible.

Step 3: Simulate Falling Snow

Step 3: Simulate Falling Snow — While the base remains chilled below 38°F, place an ice cube or wet sponge across the top moisture sensing grid tracks.

Step 4: Verify Full System Engagement

Step 4: Verify Full System Engagement — Confirm that the SNOW and HEAT LEDs illuminate on the controller, DC voltage across Black and White terminals drops from 22–28 VDC down to < 2 VDC, and the main contactor pulls in with a solid mechanical clunk.

Step 5: Quick-Reset the Cycle

Step 5: Quick-Reset the Cycle — Cycle main controller power OFF for 5 to 10 seconds, then back ON. This resets the cycle immediately without waiting through the multi-hour afterrun timer.

State	LED Status	DC Voltage
Standby State (Warm / Dry)	Off / Unlit	22 – 28 VDC
Active Snow State (Cold	—	De-energized (Open)

Active Snow State & System Status

State	LED Status	Contactor
Active Snow State (Cold + Wet)	Illuminated (Solid)	Energized (Closed clunk)
DC Voltage	< 2.0 VDC	—

Ready to Commission Your Snow Melting System?

Use this field guide on every install. Document your contactor engagement and amp draw test on your commissioning sheet — and walk away with proof the system is ready for Day 1 of winter.