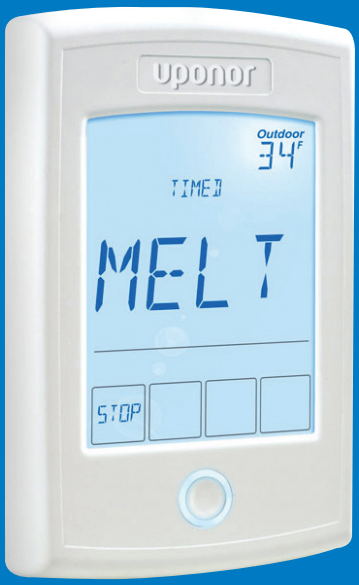

Single-zone snow melt control installation and operation manual

The Uponor Single-zone Snow Melt Control (A3040654) is designed to operate hydronic equipment to melt snow or ice from any surface including driveways, walkways, patios, business entrances, parking ramps, loading docks, hospital entrances, helipads or car wash bays.

The surface temperature for snow melting is controlled automatically to reduce operating energy costs. The control has an automatic start and stop function when used with the Pavement Snow and Ice Sensor (A3040090).

Automatic start with a timed stop is available when used with the Aerial Snow Sensor (A3040095). The control can operate a dedicated hydronic boiler. Isolation relays are required to operate line voltage pumps.

Features

- Automatic snow/ice detection
- Supports both in-slab and retrofit aerial snow sensors
- Mixing with modulating boiler
- Manual start with timer
- Warm weather shut down
- Cold weather cut out
- Idling
- Slab protection
- EconoMelt
- Manual override
- Exercising
- Alert output

Important safety information

Warning

It is your responsibility to ensure that this control is safely installed according to all applicable codes and standards. Uponor is not responsible for damages resulting from improper installation and/or maintenance.

To avoid serious personal injury and damage to the equipment:

- Read manual and all product labels before using the equipment. Do not use unless you know the safe and proper operation of this equipment.
- Keep this manual available for easy access by all users. Replacement manuals are available at uponor-usa.com.
- Disconnect all power before opening the control.
- Safely install this control according to all applicable codes and standards. Improper installation and operation of this control could result in damage to the equipment and possibly even personal injury or death.
- Only place controls that are intended and certified as safety limits into the control circuit. This electronic control is not intended for use as a primary limit control.
- Do not attempt to service the control. There are no user serviceable parts inside the control. Attempting to do so voids the warranty.

Radio frequency interference

The installer must ensure this control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise. Conversely, this Class B digital apparatus complies with Part 15 of the FCC Rules and meets all requirements of the Canadian Interference-Causing Equipment Regulations. However, if this control causes harmful interference to radio or television reception, (determined by turning the control off and on) try to correct the interference by re-orientating or relocating the receiving antenna, relocating the receiver with respect to this control, and/or connecting the control to a different circuit connected to the receiver.

Single-zone snow melt control installation and operation manual is published by

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Uponor has used reasonable efforts in collecting, preparing and providing quality information and material in this manual. However, system enhancements may result in modification of features or specifications without notice. Uponor is not liable for installation practices that deviate from this manual or are not acceptable practices within the mechanical trades.

Table of contents

Getting started

Congratulations on the purchase of your new Uponor Single-zone Snow Melt Control. This manual covers installation, programming, sequence of operation, instruction on testing, commissioning and troubleshooting.

Installation

Preparation

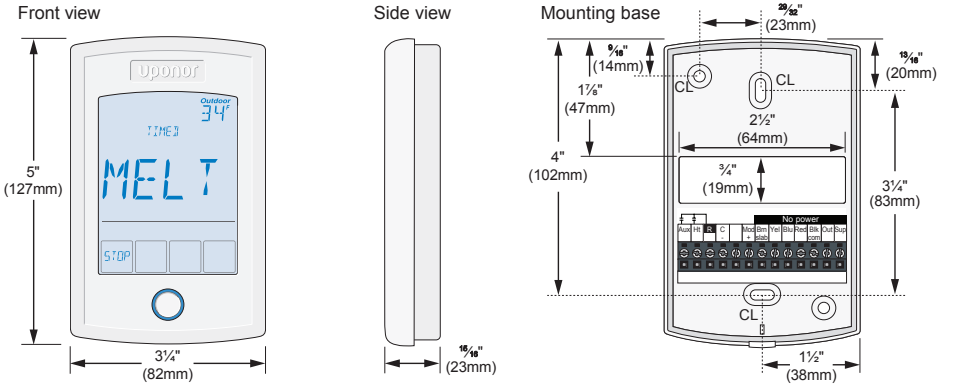
Tools required

- Jeweller screwdriver
- Phillips head screwdriver
- Needle-nose pliers
- Wire stripper

Materials required

- 18 AWG LVT solid wire (low-voltage connections)
- 24 VAC transformer

Physical dimensions



Installation location

When choosing the location for the control, consider the following:

- Interior wall
- Keep dry; avoid potential leakage onto the control
- Relative humidity less than 90%; non-condensing environment
- No exposure to temperatures below -4ºF (-20ºC) or above 122ºF (50ºC)
- No draft, direct sun or other cause for inaccurate temperature readings
- Away from equipment, appliances or other sources of electrical interference
- Easy access for wiring, viewing and adjusting the display screen
- Maximum wire length of 500 feet (150m)
- Approximately 5 feet (1.5m) off the finished floor
- Strip wire to ⅜" (10mm) for all terminal connections
- Use standard 8-conductor, 18 AWG wire

Rough-in wiring

Low-voltage wiring

Pull each cable from the equipment to the control's plastic enclosure. All low-voltage wiring connections enter the enclosure through the square knockout on the rear. Uponor recommends labeling each cable for easy identification. Strip all low-voltage wires to a length of ⅜" (10mm) to ensure proper connection to the control.

Pull 4-conductor, 18 AWG LVT cable up to 500 feet (150m) for the Aerial Snow Sensor (A3040095).

Pull 5-conductor, 18 AWG LVT cable up to 500 feet (150m) for the Pavement Snow and Ice Sensor (A3040090).

Pull 2-conductor, 18 AWG LVT cable up to 500 feet (150m) for the following equipment:

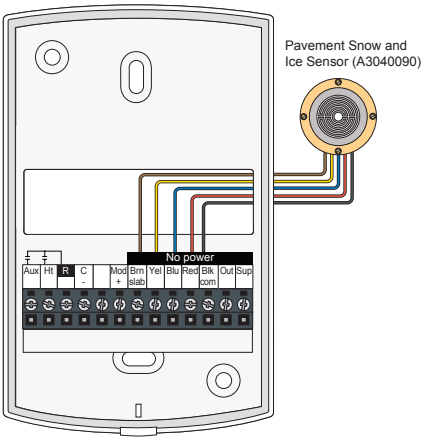
- 24 VAC power from transformer
- Outdoor temperature sensor
- Supply sensor (if applicable)
- On/off boiler (if applicable)
- Modulating boiler 0-10 VDC or 4-20 mA (if applicable)
- Alert output (if applicable)

Sizing the transformer

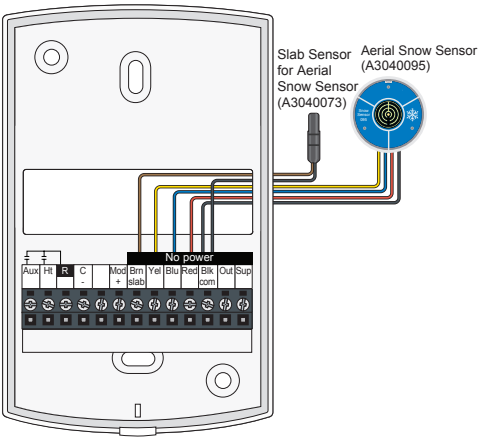
The control requires an external transformer. The total power capacity of the power supply should be larger than the total load of all the devices connected to the control. This total load must not exceed 100 VA.

Control wiring

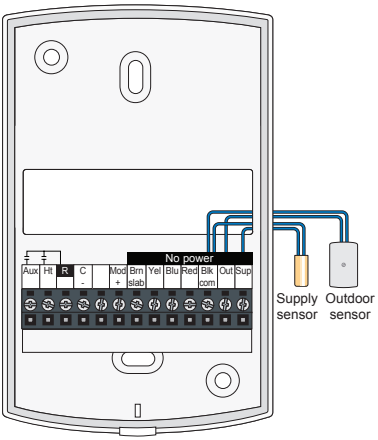
Pavement Snow and Ice Sensor (A3040090)



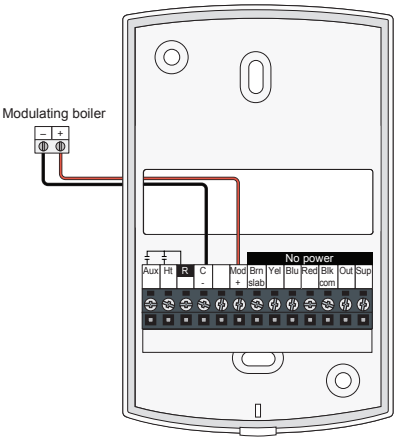
Aerial Snow Sensor (A3040095) and Slab Sensor for Aerial Snow Sensor (A3040073)



Outdoor and supply sensors

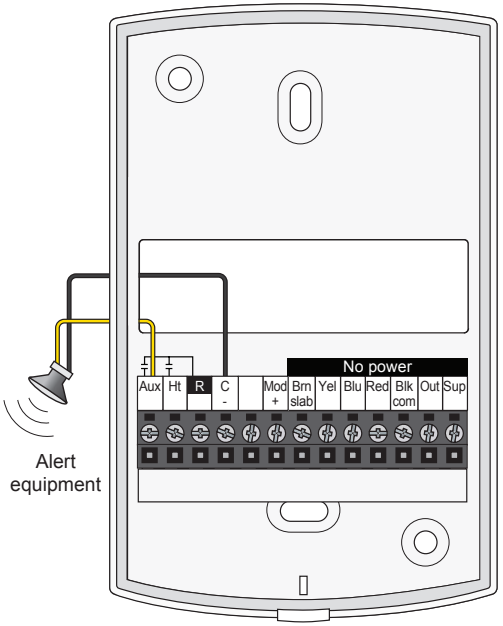


Modulating boiler output

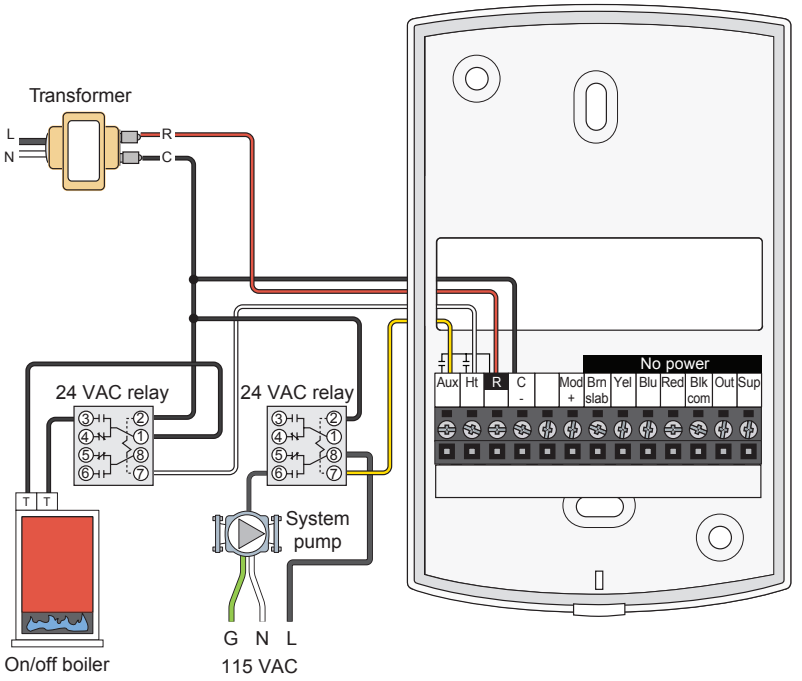


Control wiring

Alert relay output



Transformer and relays



Sensor wiring

Mounting the outdoor sensor

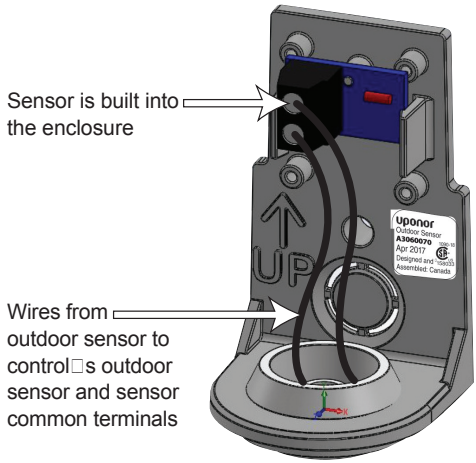
Note: The temperature sensor (thermistor) is built into the sensor enclosure.

- Remove the screw and pull the front cover off the sensor enclosure.
- Mount the outdoor sensor directly onto a wall or a 2" x 4" electrical box. When wall mounting the outdoor sensor, the wiring should enter through the back or bottom of the enclosure. Do not mount the outdoor sensor with the conduit knockout facing upward as rain could enter the enclosure and damage the sensor.
- To prevent heat through the wall from affecting the sensor reading, it may be necessary to install an insulating barrier behind the enclosure.
- Mount the outdoor sensor on a wall which best represents the heat load on the building (a northern wall for most buildings and a southern-facing wall for buildings with large south-facing glass areas). Do not expose the outdoor sensor to heat sources such as ventilation or window openings.
- Install the outdoor sensor at an elevation above the ground that will prevent accidental damage or tampering.

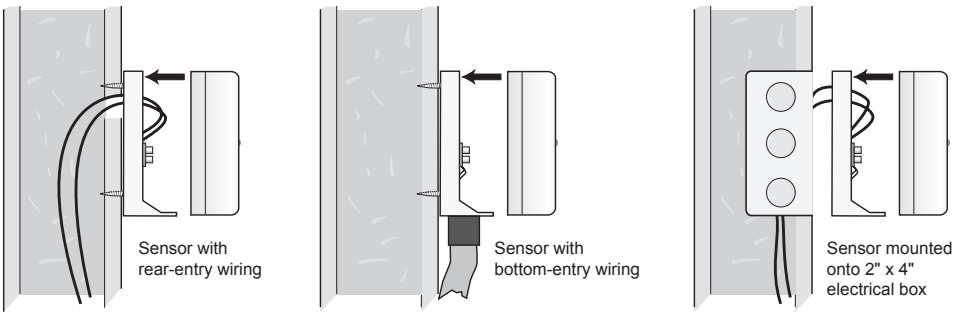
Wiring the outdoor sensor

- Connect 18 AWG or similar wire to the two terminals provided in the enclosure and run the wires from the outdoor sensor to the control. Do not run the wires parallel to telephone or power cables. If the sensor wires are located in an area with strong sources of electromagnetic interference (EMI), use shielded cable or twisted pair or run the wires in a grounded metal conduit. If using shielded cable, connect the shield wire to the Com or Com Sen terminal on the control and not to earth ground.
- Follow the sensor testing instructions in this manual and connect the wires to the control.
- Replace the front cover of the sensor enclosure.

Wiring the outdoor sensor



Mounting the outdoor sensor



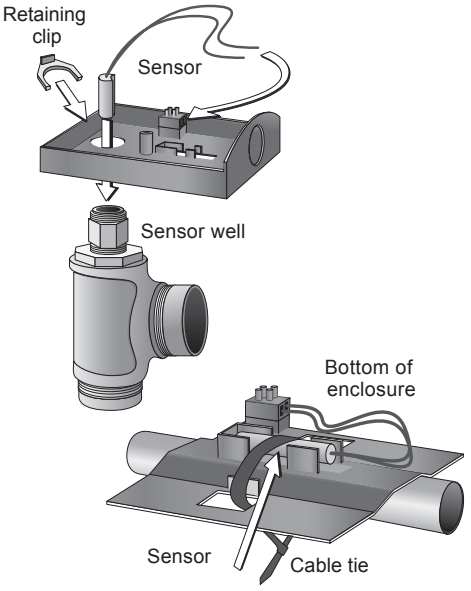
Mounting the slab sensor

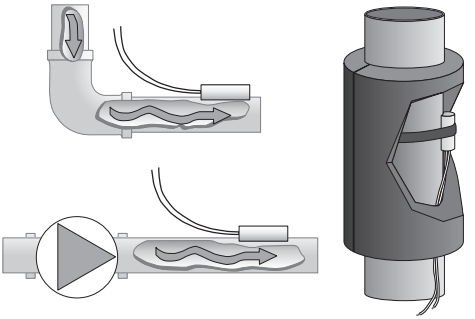
Note: The Slab Sensor for Aerial Snow Sensor (A3040073) can mount on a pipe or in a temperature immersion well.

Place the sensor downstream of a pump or after an elbow or similar fitting. This is especially important if the system uses large-diameter pipes, as the thermal stratification within the pipes can result in erroneous sensor readings. Proper sensor location requires the fluid is thoroughly mixed within the pipe before it reaches the sensor.

Strapping to pipe

Strap the sensor directly to the pipe using the cable tie provided. Place insulation around the sensor to reduce the effect of air currents on the sensor measurement.





Mounting the sensor

Immersion well

If mounting a sensor onto 1" (25mm) diameter, Type L copper pipe, there is approximately an 8-second delay between a sudden change in water temperature and the time the sensor measures the temperature change. This delay increases considerably when using mild steel (black iron) pipe. Uponor recommends using a temperature well for steel pipe of diameter greater than 1¼" (32mm). Uponor also recommends temperature wells when using large-diameter pipes and fluid stratification is present.

Conduit connection

The slab sensor and slab sensor enclosure (sold separately) are specifically designed to mount onto a ⅜" (10mm) I.D. temperature well that is supplied with an end groove. To install the well, plumb a 'T' into the pipe and fix the well into the 'T'. Remove the ⅞" (22mm) back knockout to place the enclosure over the temperature well. Then insert the universal sensor into the well and snap the retaining clip supplied with the enclosure onto the well end groove. If the well has a threaded end, add a standard threaded conduit retaining ring. The two wires from the sensor are connected to the terminal block provided in the enclosure. The other side of the terminal block is used to connect wires from the control.

Testing the sensor wiring

A good-quality test meter capable of measuring up to 5,000 kΩ (1 kΩ = 1000 Ω) is required to measure the sensor resistance. In addition to this, the actual temperature must be measured with either a good quality digital thermometer, or if a thermometer is not available, a second sensor can be placed alongside the one to be tested and the readings compared.

First measure the temperature using the thermometer and then measure the resistance of the sensor at the control. The wires from the sensor must not be connected to the control while the test is performed. Using the chart below, estimate the temperature measured by the sensor. The sensor and thermometer readings should be close. If the test meter reads a very high resistance, there may be a broken wire, a poor wiring connection or a defective sensor. If the resistance is very low, the wiring may be shorted, there may be moisture in the sensor or the sensor may be defective. To test for a defective sensor, measure the resistance directly at the sensor location.

Do not apply voltage to a sensor at any time as damage to the sensor may result.

Testing the control wiring

Testing the power

1. Remove the front cover from the control.
2. Use an electrical test meter to measure AC voltage between the R and C terminals. The reading should be 24 VAC +/– 10%.
3. Install the front cover.

Temp.		Resistance	Temp.		Resistance	Temp.		Resistance	Temp.		Resistance
°F	°C	Ω	°F	°C	Ω	°F	°C	Ω	°F	°C	Ω
-50	-46	490,813	20	-7	46,218	90	32	7,334	160	71	1,689
-45	-43	405,710	25	-4	39,913	95	35	6,532	165	74	1,538
-40	-40	336,606	30	-1	34,558	100	38	5,828	170	77	1,403
-35	-37	280,279	35	2	29,996	105	41	5,210	175	79	1,281
-30	-34	234,196	40	4	26,099	110	43	4,665	180	82	1,172
-25	-32	196,358	45	7	22,763	115	46	4,184	185	85	1,073
-20	-29	165,180	50	10	19,900	120	49	3,760	190	88	983
-15	-26	139,403	55	13	17,436	125	52	3,383	195	91	903
-10	-23	118,018	60	16	15,311	130	54	3,050	200	93	829
-5	-21	100,221	65	18	13,474	135	57	2,754	205	96	763
0	-18	85,362	70	21	11,883	140	60	2,490	210	99	703
5	-15	72,918	75	24	10,501	145	63	2,255	215	102	648
10	-12	62,465	80	27	9,299	150	66	2,045	220	104	598
15	-9	53,658	85	29	8,250	155	68	1,857	225	107	553

Testing the relay outputs

The control includes an Override menu to check if the control's relays are operating and that the control is wired correctly to the snow melting equipment.

1. Press and hold the Home button for 3 seconds.
2. Press NEXT to navigate to the Override menu.
3. Press ENTER to enter the Override menu.
4. Select Manual Override to Hand.
5. For hydronic systems, set System Pump to On. The system pump should now be operating.
6. Set Heat Relay to On. The boiler or electric heating cables should start heating.
7. For modulating boilers, change the Boiler Percent from 0 to 100%. The boiler should be firing.
8. Select the Override Time after which the control resumes normal operation.
9. Exit the Manual Override by selecting Auto.

Manual override — maximum heat

In hydronic application modes, the control includes a Maximum Heat operation where the control operates the snow melting system to maintain the maximum allowed heating setpoints. This allows testing of the snow melting system during warm weather.

1. Press and hold the Home button for 3 seconds.
2. Press NEXT to navigate to the Override menu.
3. Press ENTER to enter the Override menu.
4. Select Manual Override to Max.
5. Select the Maximum Heat Time after which the control resumes normal operation.
6. Exit the Manual Override by selecting Auto.

Manual override — test

When operating an electric snow melting system, the control includes a Test operation where the electrical heating cables can be energized for 10 minutes after which the control resumes normal operation. This allows testing of the electric snow melting system during warm weather.

1. Press and hold the Home button for 3 seconds.
2. Press NEXT to navigate to the Override menu.
3. Press ENTER to enter the Override menu.
4. Select Manual Override to Test.
5. Exit the Manual Override by selecting Auto.

Manual override — purge

When operating a hydronic snow melting system, it is necessary to purge and bleed all air out of the system. The control includes a Purge operation where the System Pump is turned on to assist in purging air from the system.

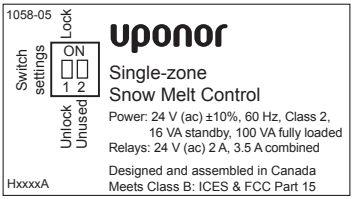
1. Press and hold the Home button for 3 seconds.
2. Press NEXT to navigate to the Override menu.
3. Press ENTER to enter the Override menu.
4. Select Manual Override to Purge.
5. Select the Maximum Purge Time after which the control resumes normal operation.
6. Exit the Manual Override by selecting Auto.

Manual override — off

The snow melting system can be manually turned off and the control remains off until manually changed back to Auto. This allows the installer or end user to permanently disable the snow melting system without removing power from the control.

1. Press and hold the Home button for 3 seconds.
2. Press NEXT to navigate to the Override menu.
3. Press ENTER to enter the Override menu.
4. Select Manual Override to Off.
5. Exit the Manual Override by selecting Auto.

Switch settings

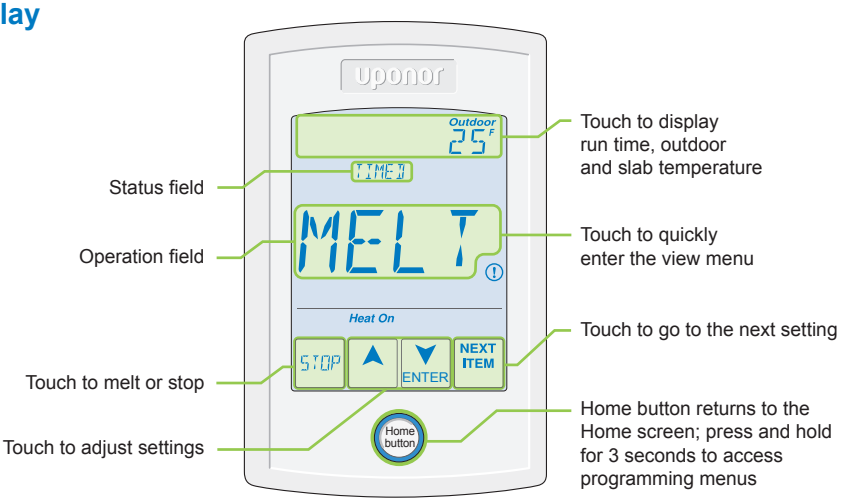


Back of control

Switch	Position	Action
1	ON	**Lock access level** – The control is locally locked and the access level cannot be changed. Set to Lock when installation has been completed.
	OFF	**Unlock access level** – The control is unlocked and the access level may be changed. Go to the Toolbox menu to change the access level. Set to Unlock during the installation process.
2	ON	Not used
	OFF	Not used

User interface

Display



Operational field	Action
MELT	System is melting snow or ice.
IDLE	System is idling.
OFF	System is off.

Symbols	Definition
Heat On	**HEAT ON** Heat is turned up.
ⓘ	**WARNING SYMBOL** An error is present.
▲▼	**ARROWS** Adjusts the displayed setting.

Status field	Action
WWSD	Warm weather shut down. The slab is naturally warm enough to melt snow or ice.
CWCO	Cold weather cut out. Too cold to melt.
TIMED	Timed melting operation. System operates until time has elapsed.
WARM	Slab is warming up to the melting temperature.
PEND	Pending. The system has detected water but it is too cold to operate or the schedule is in idle or off.

Programmable settings

Programming menus

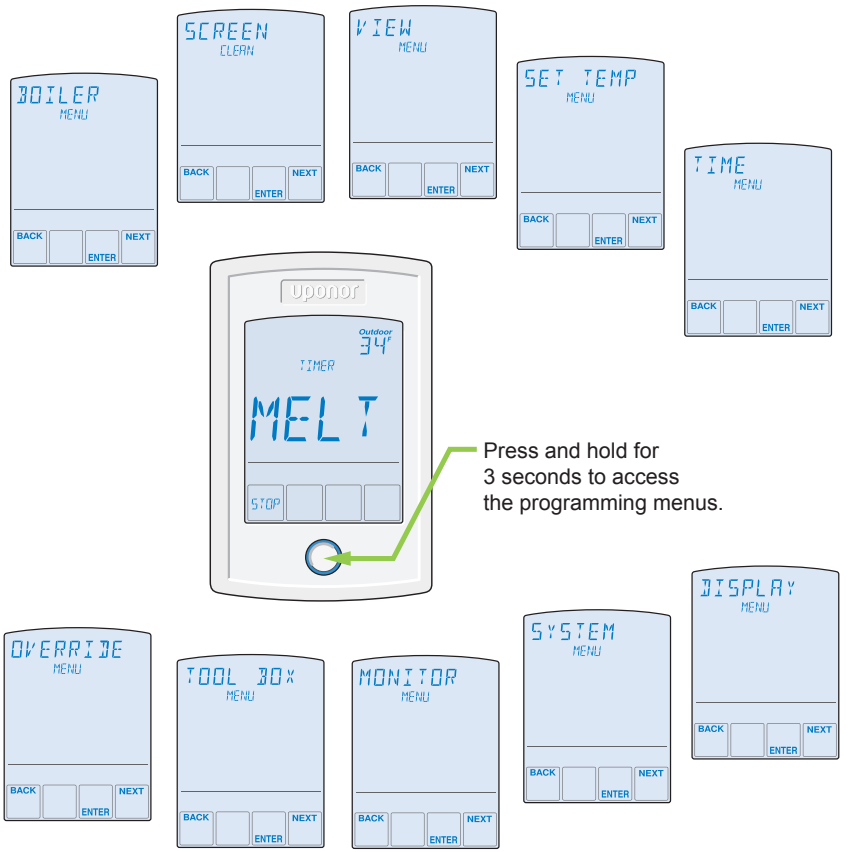
Press and hold the Home button for 3 seconds to enter the programming menus. The control returns to the last programming menu previously used.

Select a programming menu

- Touch NEXT to advance (clockwise in below illustration) to the next menu.
- Touch BACK to go backwards (counterclockwise in below illustration) through the menus.
- Touch ENTER to enter a menu.

Setting items

- Touch ▲ or ▼ arrows to adjust the setting if required.
- Touch NEXT ITEM to advance to the next item within the menu.
- Touch BACK ITEM to go backwards to the previous item within the menu.
- To return to the parent menu after changing a setting, press and release the Home button.
- To return to the Home screen, press and release the Home button twice or wait 30 seconds to automatically return to the Home screen.



Access levels and access level lock

The control is shipped pre-programmed with common settings. The control has an Installer access level that allows full access to all settings and a user access level that restricts the number of settings available.

The control defaults to the User access level after 12 hours of operation.

To change to the Installer access level:

- In the Toolbox menu, locate Access.
- Adjust the access level to Installer by pressing the up or down button. This will permit setting changes to the control.

View menu (1 of 2)

The View menu displays the current operating temperatures and status information of the system.

Field	Range	Access	Description	Set to
OUTDOOR	– – –, -76 to 149ºF (-60 to 65ºC)	User Installer	**OUTDOOR** — Current outdoor air temperature as measured by the local outdoor sensor. **Conditions:** Application Mode is set to PWM, Boil or Elec.	
SLAB TARG	– – –, -76 to 149ºF (-60 to 65ºC)	Installer	**SLAB TARGET** — This field displays the calculated slab target of the snow melting system. Three dashes (– – –) display when the snow melt control is off. **Conditions:** Application Mode is set to PWM, Boil or Elec and a snow/ice sensor or slab sensor is installed.	
SLAB	-76 to 149ºF (-60 to 65ºC)	User Installer	**SLAB** — Current slab temperature as measured by the control. **Conditions:** Application Mode is set to PWM, Boil or Elec and a snow/ice sensor or slab sensor is installed.	
SENSOR WATER	DRY or WET	User Installer	**WATER SENSOR** — Current status of the water detection sensor. **Conditions:** A snow/ice sensor or snow sensor is installed.	
BoilTARGET	– – –, 70 to 200ºF (21.0 to 93.5ºC)	Installer	**BOILER TARGET** — This field displays the calculated boiler target of the snow melt system. Three dashes (– – –) display when the snow melt control is not operating the boiler. **Conditions:** Application Mode is set to Boil.	
SUPPLY	-58 to 212ºF (50.0 to 100.5ºC)	Installer	**SUPPLY** — Shows the current system supply temperature as measured by the control. **Conditions:** Application Mode is set to PWM or Boil.	

View menu (2 of 2)

The View menu displays the current operating temperatures and status information of the system.

Field	Range	Access	Description	Set to
Boil RATE	0 to 100%	Installer	**BOILER RATE** — Shows the current firing rate of the modulating boiler. **Conditions:** Application Mode is set to Boil and Boiler Type is set to Mod (modulating boiler).	
HEAT RELAY	OFF or ON	User Installer	**HEAT RELAY** — Shows the current status of the heat relay. The boiler or pump is on when ON is displayed. The boiler or pump is off when OFF is displayed. **Conditions:** Application Mode is set to PWM, Boil or Elec.	
PWM RATE	0 to 100%	Installer	**PWM RATE** — Shows the current duty cycle rate of the zone or boiler for each 20 minute cycle. **Conditions:** Application Mode is set to PWM or Elec. Not visible when Manual Override is not Auto.	
SYS PUMP RELAY	OFF or ON	User Installer	**SYSTEM PUMP RELAY** — Shows the current status of the system pump relay. **Conditions:** Application Mode is set to PWM or Boil and Auxiliary Relay is set to SYS (system pump).	
ALERT RELAY	OFF or ON	User Installer	**ALERT RELAY** — Shows the current status of the alert relay. **Conditions:** Application Mode is set to PWM or Boil and Auxiliary Relay is set to ALRT (alert) or Application Mode is set to Elec.	
MAN MELT HOURS	00:00 to 24:00 hours	User Installer	**MANUAL MELT TIME** — When manually started, the display shows the remaining run time before shutting off. **Conditions:** Application Mode is set to PWM, Boil or Elec.	
ADD MELT HOURS	00:00 to 6:00 hours	User Installer	**ADDITIONAL MELT TIME** — When automatically started by the Pavement Snow and Ice Sensor, the display shows the remaining run time before shutting off. **Conditions:** Application Mode is set to PWM, Boil or Elec and the Pavement Snow and Ice Sensor (A3040090) is installed.	

Set Temp menu

The Set Temp menu selects the operating temperatures of the snow melt system.

Field	Range	Access	Description	Set to
MELTING	32 to 95ºF (0.0 to 35.0ºC) Default = 36ºF (2.0ºC)	User Installer	**MELTING** — Selects the desired surface temperature of the snow melt surface when melting. **Conditions:** Application Mode is set to PWM, Boil or Elec.	
IDLING	OFF, 20 to 95ºF (-6.5 to 35.0ºC) Default = OFF	Installer	**IDLING** — Selects the desired surface temperature of the snow melt surface when idling. Idling pre-heats the slab when the slab is dry but cold and allows faster reaction time to reach the melting temperature. (Recommended for commercial use only.) **Conditions:** Application Mode is set to PWM, Boil or Elec.	
MAN MELT HOURS	0:30 to 24:00 hours Default = 4:00 hours	User Installer	**MANUAL MELT RUN TIME** — Selects the amount of running time when manually starting the system. **Conditions:** Application Mode is set to PWM, Boil or Elec.	
ADD MELT HOURS	0:00 to 6:00 hours Default = 0:00 hours	Installer	**ADDITIONAL MELT TIME** — Selects the amount of additional melting time after the Pavement Snow and Ice Sensor is dry. This allows low spots on the slab to fully dry before the snow melting system is shut off. **Conditions:** Application Mode is set to PWM, Boil or Elec and a Snow/Ice Sensor is set to 090.	
SENSITIVITY WATER	AUTO, MIN, -2, -1, MID, +1, +2, MAX Default = AUTO	Installer	**WATER SENSITIVITY** — Selects how sensitive the Pavement Snow and Ice Sensor or the Aerial Snow Sensor is to water detection. **Conditions:** Snow/Ice Sensor is set to the Pavement Snow and Ice Sensor or Aerial Snow Sensor.	
WWSD	AUTO, 32 to 95ºF (0.0 to 35.0ºC) Default = AUTO	Installer	**WARM WEATHER SHUT DOWN** — Selects the temperature at which to shut down the snow melting system during warm weather. This allows the snow or ice to melt off the slab naturally. **Conditions:** Application Mode is set to PWM, Boil or Elec.	
CWCO	OFF, -30 to 50ºF (-34.5 to 10.0ºC) Default = 10ºF (-12.0ºC)	Installer	**COLD WEATHER CUT OUT** — Selects the temperature at which to shut down the snow melting system during extremely cold weather. Below this temperature, the heat loss of the slab exceeds the capacity of the boiler or heating appliance.	

Monitor menu

The Monitor menu provides information about the system's operation and performance. The Monitor menu is not available when the Application Mode is set to the Pavement Snow and Ice Sensor.

Field	Range	Access	Description	Set to
HEAT HOURS	0 to 9999 hours	User Installer	**HEAT HOURS** — Records the number of running hours since the item was last reset. Touch the number and then the ENTER key to reset to zero.	
CYCLES HEAT	0 to 9999 hours	Installer	**HEAT CYCLES** — Records the numbers of cycles of the heat relay since the item was last reset. Touch the number and then the ENTER key to reset to zero.	
SYS PUMP HOURS	0 to 9999 hours	User Installer	**SYSTEM PUMP HOURS** — Records the system pump running hours since the item was last reset. Touch the number and then the ENTER key to reset to zero. **Conditions:** Auxiliary Relay is set to SYS (system pump).	
SLAB HIGH	-58 to 167ºF (-50.0 to 75.0ºC)	Installer	**SLAB HIGH** — Records the highest slab temperature since the item was last reset. Touch the number and then the ENTER key to reset. **Conditions:** Sensor is set to the Pavement Snow and Ice Sensor or Slab Sensor is set to On.	
SLAB LOW	-58 to 167ºF (-50.0 to 75.0ºC)	Installer	**SLAB LOW** — Records the lowest slab temperature since the item was last reset. Touch the number and then the ENTER key to reset. **Conditions:** Snow/Ice Sensor is set to the Pavement Snow and Ice Sensor or Slab Sensor is set to On.	
OUTDOOR HIGH	-58 to 212ºF (-50.0 to 100.0ºC)	Installer	**OUTDOOR HIGH** — Records the highest outdoor temperature since the item was last reset. Touch the number and then the ENTER key to reset.	
OUTDOOR LOW	-58 to 212ºF (-50.0 to 100.0ºC)	Installer	**OUTDOOR LOW** — Records the lowest outdoor temperature since the item was last reset. Touch the number and then the ENTER key to reset.	
SUPPLY HIGH	-58 to 212ºF (-50.0 to 100.0ºC)	Installer	**SUPPLY HIGH** —Records the highest supply temperature since the item was last reset. Touch the number and then the ENTER key to reset. **Conditions:** Application Mode is set to PWM or Boil.	
SUPPLY LOW	-58 to 212ºF (-50.0 to 100.0ºC)	Installer	**SUPPLY LOW** — Records the lowest supply temperature since the item was last reset. Touch the number and then the ENTER key to reset. **Conditions:** Application Mode is set to PWM or Boil.	

Display menu

The Display menu selects the temperature units and backlight options.

Field	Range	Access	Description	Set to
UNITS IN	or °C Default = °F	User Installer	**UNITS** — Selects Fahrenheit or Celsius as the temperature units.	
BACKLIGHT	ON, ON MELT, OFF Default = ON MELT	User Installer	**BACKLIGHT** — Selects how the display backlight operates. ON = Always on ON MELT = On when melting, off when not melting This provides a visual indicator to occupants that the snow melting system is currently melting. OFF = Always off	

Toolbox menu

The Toolbox menu is a location for system information and Test functions. If any errors are present on the system, they will be located at the beginning of this menu.

Field	Range	Access	Description	Set to
ACCESS LEVEL	Installer (INST) User (USER Default = INST	User Installer	**ACCESS LEVEL** — Selects the access level of the control, which determines which menus and items are available. **Conditions:** Adjustable only when control switch setting is set to UNLOCK.	
SW J1236A TYPE	Software J1236A Type 1058	User Installer	**SOFTWARE VERSION AND TYPE NUMBER** — Selects the access level of the control, which determines which menus and items are available.	
DEFAULTS LOAD?	Not applicable	Installer	**FACTORY DEFAULTS** — Loads the factory default settings. Press ENTER to load defaults.	
HISTORY-1	See Troubleshooting Guide on p. 30	Installer	**HISTORY - 1 THROUGH 5** — Displays a history of any past errors that have occurred on the system. Will clear after 30 days, or press Up and Down buttons for one second to manually clear. The last five history items will display if present.	

Override menu

The Override menu allows an operator to manually test each relay and manually start the system.

Field	Range	Access	Description	Set to
OVERRIDE MANUAL	Hydronic AUTO, HAND, MAX, PRGE, OFF Electric AUTO, AND, TEST, OFF Default = AUTO	Installer	**MANUAL OVERRIDE** — Manually overrides the normal automatic operation of the control to test the equipment or operate the system at the maximum temperature limits. AUTO = Normal operation HAND = Manual override of each relay output MAX = Operate hydronic system at maximum heat TEST = Operate electric system for 10 minutes PRGE = Hydronic system purge operates pumps to help bleed air from the system	
SYS PUMP RELAY	OFF or ON Default = OFF	Installer	**SYSTEM PUMP RELAY** — Manually turns on the system pump during the HAND Manual Override.	
HEAT RELAY	OFF or ON Default = OFF	Installer	**HEAT RELAY** — Manually turns on the heat during the HAND Manual Override.	
PERCENT BOIL	0 to 100% Default = 0%	Installer	**BOILER PERCENT** — Manually sets the modulating boiler firing rate during the HAND Manual Override. **Conditions:** Application Mode is set to Boil.	
ALERT RELAY	OFF or ON Default = OFF	Installer	**ALERT RELAY** — Manually turns on the alert relay during the HAND Manual Override. **Conditions:** Application Mode is set to PWM or Boil and Alert Relay is set to ALRT (alert) or the Application Mode is set to Elec.	
OVERRIDE HOURS	0:10 to 72:00 hours Default = 0:10 hours	Installer	**OVERRIDE TIME** — Selects the amount of time that the HAND Manual Override is in effect before returning to Automatic operation.	
MAX PURGE HOURS	0:10 to 72:00 hours Default = 24:00 hours	Installer	**MAXIMUM PURGE TIME** — Selects the amount of time that the PURGE Manual Override is in effect before returning to Automatic operation. **Conditions:** Application Mode is set to PWM or Boil.	
MAX HEAT HOURS	0:10 to 72:00 hours Default = 24:00 hours	Installer	**MAXIMUM HEAT TIME** — Selects the amount of time that the MAX HEAT Manual Override is in effect before returning to Automatic operation. **Conditions:** Application Mode is set to PWM or Boil.	

System menu

The System menu provides settings on how to configure and operate the mechanical equipment.

Field	Range	Access	Description	Set to
APP MODE	PWM, BOIL, ELEC, Default = PWM	Installer	**APPLICATION MODE** — Select the control application mode. PWM = Hydronic pulse width modulation BOIL = Hydronic boiler heats snow melting system ELEC = Electric snow melt	
SNOW/ICE SENSOR	NONE, 090, 095 Default = 090	Installer	**SNOW/ICE SENSOR** — Selects if a Pavement Snow and Ice Sensor or Aerial Snow Sensor is installed.	
SLAB SENSOR	OFF or ON Default = ON	Installer	**SLAB SENSOR** — Selects if a Slab Sensor for Aerial Snow Sensor is installed to measure the slab temperature. **Conditions:** Application Mode is set to PWM, Boil or Elec and Snow/Ice Sensor is set to None or 095.	
PROTECT SLAB	OFF or ON Default = ON	Installer	**SLAB PROTECTION** — Select if the slab should be protected from large temperature differentials to avoid cracking the concrete due to high tensile stress. **Conditions:** Application Mode is set to Boil and Snow/Ice Sensor is set to 090 or Slab Sensor is set to On.	
ECONOMELT	OFF or ON Default = OFF	Installer	**ECONOMELT** — EconoMelt allows the user to mechanically remove snow then manually start the system to melt the thin snow layer or ice. **Conditions:** Application Mode is set to PWM, Boil or Elec.	
AUXILIARY RELAY	SYS (System Pump) or ALRT (Alert) Default = SYS	Installer	**AUXILIARY RELAY** — Select if the auxiliary relay should function as system pump or as an alert. **Conditions:** Application Mode is set to PWM or Boil.	
MAX MELT DAYS	0.5 to 7.0 days, OFF Default = 3.0 days	Installer	**MAXIMUM MELT TIME** — Select to limit the amount of melting run time after snow is automatically detected by the Pavement Snow and Ice Sensor or Aerial Snow Sensor. **Conditions:** Application Mode is set to PWM, Boil or Elec.	

Boiler menu

The Boiler menu provides settings on how to configure and operate the boiler.

Field	Range	Access	Description	Set to
Boil TYPE	App mode = Boil MOD, 1STG, EMS1, EMS2 Default = MOD	Installer	**BOILER TYPE** — Shows the type of boiler connected to the control. MOD = Modulating boiler 1STG = Single one-stage on-off boiler EMS1 = Boiler staging controls EMS2 = Viessmann modulating boilers with 0-10 V OpenTherm Module	
MOD TYPE	0-10 or 4-20 Default = 0-10	Installer	**BOILER MODULATION TYPE** — Selects if the modulating boiler accepts a 0-10 VDC or 4-20 mA input signal to control the boiler firing rate. **Conditions:** Boiler Type is set to MOD (modulating boiler).	
MIN MOD	0 to 50% Default = 0%	Installer	**BOILER MINIMUM MODULATION** — Shows the minimum-percent modulation of the boiler burner. **Conditions:** Boiler Type is set to MOD (modulating boiler).	
MOD DELAY SEC	OFF, 10 to 180 seconds Default = OFF	Installer	**BOILER MODULATION DELAY** — Shows the delay time between the burner firing and the boiler releasing to modulation. **Conditions:** Boiler Type is set to MOD (modulating boiler).	
MOTOR SPD SEC	30 to 230 seconds Default = 30 seconds	Installer	**BOILER MOTOR SPEED** — Shows the time required for the modulating actuating motor to fully open the gas valve or ramp the burner fan from off to full speed on a modulating boiler. Set to 30 seconds unless otherwise recommended by the boiler manufacturer. **Conditions:** Boiler Type is set to MOD (modulating boiler).	
Boil DIFF	AUTO, 2 to 42ºF (1.0 to 23.5ºC) Default = AUTO	Installer	**BOILER DIFFERENTIAL** — Shows the temperature differential that the control is to use to cycle the boiler on and off (half above and half below target). **Conditions:** Boiler Type is set to MOD (modulating boiler) or 1STG (one stage).	
Boil MIN	OFF, 50 to 180ºF (10.0 to 82.0ºC) Default = OFF	Installer	**BOILER MINIMUM** — Shows the minimum allowed boiler target temperature. Check the boiler manufacturer's manual for recommended supply water temperatures. **Conditions:** Application Mode is set to Boil.	

Sequence of operation

Snow melting overview

A snow melting system can offer a safe, convenient and cost-effective way to remove snow and ice from surfaces. Activating the snow melting system as soon as the snow falls rather than waiting for mechanical snow removal after snow has accumulated is a safer alternative. This eliminates slip hazards and reduces the risk of injury by mechanized snow melting equipment, thereby reducing potential liability costs. Eliminating snow plow equipment and corrosive salts also reduces damage to the slab surface and to the environment. Additionally, snow melting systems, when controlled correctly, can be cost competitive compared to mechanical snow removal.

The snow melting control can operate in one of three different ways:

- **Melt:** Heats the slab to melt snow or ice
- **Idle:** Pre-heats the slab just below freezing to shorten the time required to melt snow
- **Off:** Snow melting system is off

The control display shows the control operation in the home screen.

Slab temperature control

Controlling the slab temperature is critical to minimizing the cost of snow melting. This requires installation of the Pavement Snow and Ice Sensor (A3040090) or Slab Sensor for Aerial Snow Sensor (A3040073).

The sensor contains a built-in slab temperature sensor. While the control will continue to operate without a slab sensor installed, operating costs will be much higher.

The slab is operated using slab outdoor reset. As the outdoor temperature gets colder, the heat loss of the slab increases.

In order to keep the slab surface at a constant temperature while operating, the inner core of the slab must be heated above the melt or idle temperature setting.

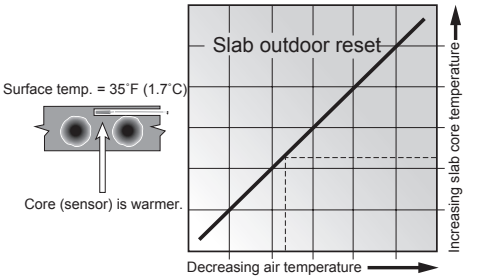
The amount that the slab inner core temperature is above the melt or idle setting is proportional to the outdoor temperature. Since the slab sensor is installed below the surface of the slab, it is not measuring the true slab surface temperature, but rather the inner core temperature.

The control automatically compensates for this temperature difference. However, the slab item in the View menu displays the actual measured temperature, so it is normal to view slab temperatures that exceed the melt or idle temperature settings.

Melt operation

The snow melting system operates the heating equipment to heat the slab from a cold start or from the idle temperature to reach the melt temperature setting to melt snow or ice.

Melt operation can be triggered automatically using the Pavement Snow and Ice Sensor, the Aerial Snow Sensor or manually by pressing a button. The melt temperature setting affects calculated targets such as the slab target and boiler target.

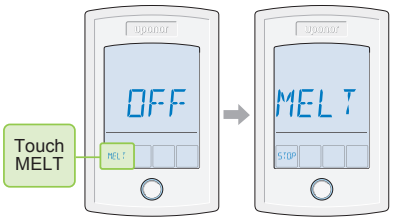


Slab surface temperature is constant.

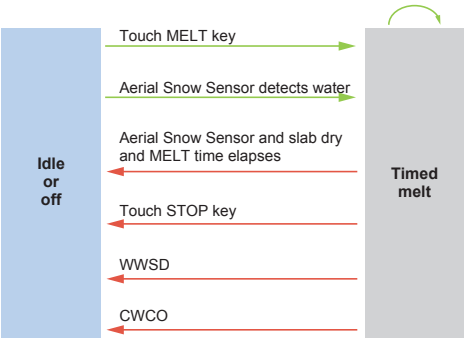
Manual start and timed stop

The snow melting system can be started manually by touching the Melt key on the control display.

Once manually started, the snow melting system continues to operate until the time set by the Manual Melt Run Time setting in the Set Temp menu elapses.



If a manual start has been provided and a sensor detects water, the control changes from manual melt to automatic operation. The snow melting system will continue to operate until the sensor is dry and the Additional Melt Time elapses.



Automatic start and stop

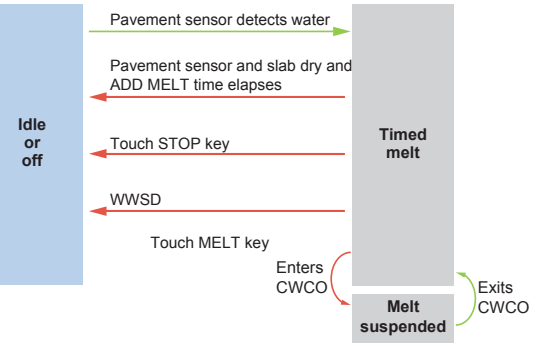
Pavement Snow and Ice Sensor (A3040090)

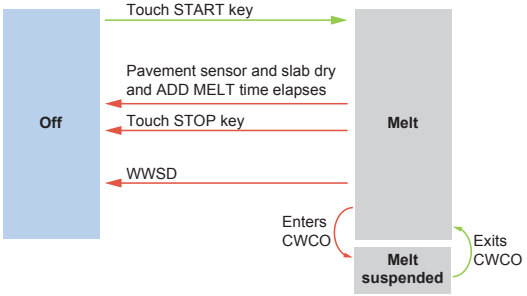
Automatic start and stop operation requires the installation of a Pavement Snow and Ice Sensor (A3040090). The control continually monitors the sensor for the presence of moisture and slab temperature conditions in which snow or ice may be present. When moisture is detected, the control will show Sensor Water Wet in the View menu. When the sensor is dry the control will show Sensor Water Dry. The control includes a Sensitivity setting in the Set Temp menu that allows the installer to adjust the amount of moisture required to start and stop the melting operation. In areas with low amounts of dust and/or air pollution, the sensitivity may need to be increased.

The Sensitivity setting default is Auto, and the control will automatically determine the best suitable sensitivity setting for the installation.

When moisture is detected and the slab and outdoor temperatures are at or below freezing, the control will automatically start the snow melting system. As the snow or ice melts and the slab dries off, the sensor also dries off at the same time. When the sensor is dry, the snow melt system automatically shuts off. If there are low spots on the slab surface that dry off slower than the sensor, additional melting run time can be included by adjusting the Additional Melt Time setting in the Set Temp menu.

If the snow melting system is manually stopped, the sensor must fully dry before it is able to detect a new snow fall and automatically start the snow melting system.





EconoMelt

When a Pavement Snow and Ice Sensor is installed, the installer can choose to select to either automatically or manually start the snow melting system. Selecting EconoMelt to On provides the option to remove the snow using a snow plow or shovel and then use the snow melting system to melt the remaining thin layer of snow or ice that mechanical snow removal methods are unable to remove. The snow melting system stops when the sensor is dry. The factory default for EconoMelt is Off.

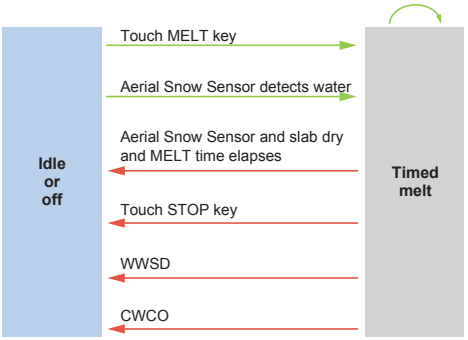
Automatic start and timed stop

Automatic start with a timed stop operation requires the installation of an Aerial Snow Sensor (A3040095). It is also highly recommended to install a Slab Sensor for Aerial Snow Sensor (A3040073) to regulate the slab temperature and operate the snow melting system at the highest possible efficiency.

The control continually monitors the sensor for the presence of moisture and slab temperature conditions in which snow or ice may be present. When moisture is detected, the control will show Sensor Water Wet in the View menu. When the sensor is dry the control will show Sensor Water Dry. The control includes a Sensitivity setting in the Set Temp menu that allows the installer to adjust the amount of moisture required to start and stop the melting operation. In areas with low amounts of dust and/or air pollution, the sensitivity may need to be increased. The factory default is for the Sensitivity setting is Auto. The control automatically determines the best suitable sensitivity setting for the installation.

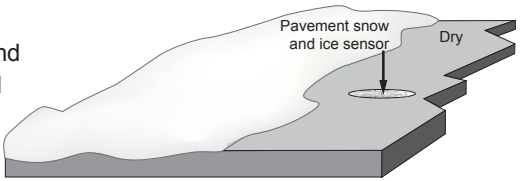
Aerial Snow Sensor (A3040095)

When moisture is detected and both the slab and outdoor temperatures are below the Melting setting, the control automatically starts the snow melting system. The snow melting system operates to heat the slab to the slab target temperature and continues to operate until the time set by the Manual Melt Run Time in the Set Temp menu elapses.



Additional melting time

A Pavement Snow and Ice Sensor (A3040090) automatically shuts off the snow melting system when the water sensor is dry. Due to the construction of the slab and the layout of the heating pipe or electrical cable, there may be areas that do not melt completely. The Additional Melt Time setting in the Set Temp menu allows the installer to set additional melting time after the sensor is dry.



Idle operation

When the snow melting system starts from a cold temperature, there may be a long time delay before the slab is warm enough to melt snow. This time delay allows snow to accumulate on the slab which is not acceptable in some commercial and institutional applications. To decrease the start-up time, the slab can be pre-heated to maintain a minimum temperature.

This is known as the Idle temperature. Idling requires large energy consumption and is generally recommended for institutional and/or commercial installations where safety concerns are paramount. Idle is shown on the display when the control is in idle operation.

When designing a snow melting system, an engineer may specify the amount of allowed snow accumulation as the Snow-free Area Ratio. There are three different levels. A Snow-free Area Ratio of 1 is defined as a system that melts all snow as it falls with no allowed accumulation. This requires that the Idle temperature be set just below freezing. Examples of these types of applications include:

- Hospital emergency areas
- Helicopter landing pads
- Parking garage ramps

A Snow-free Area Ratio of 0.5 is defined as a system with partial snow accumulation on the slab but not in all areas.

These types of systems may also use idling but usually set at a temperature several degrees below freezing to reduce energy consumption. Applications may include:

- Steep residential driveways
- Commercial sidewalks
- Loading docks

A Snow-free Area Ratio of 0 is defined as a system that allows snow accumulation. These systems operate the snow melting system from a cold start resulting in the lowest energy consumption costs and the longest times to start melting snow.

In this case, set the Idle to off. This is recommended for most residential applications:

- Flat residential driveways
- Patios
- Residential sidewalks

Some systems are designed for keeping a slab surface free of ice rather than free of snow. The most common applications include:

- Car wash bays and aprons
- Aircraft hanger aprons
- Turf conditioning on golf course greens

These systems require the use of idling at or near freezing throughout the winter and may result in high energy consumption.

Warm weather shut down

During warm weather, the slab is warm enough to naturally melt snow or ice. The control has a Warm Weather Shut Down (WWSD) setting in the Set Temp menu that prevents the control from entering Melt or Idle operation in order to conserve energy. The control shows WWSD on the display when WWSD is in effect.

Automatic (Auto)

The control enters WWSD when both the slab temperature of the zone and the outdoor temperature exceed the Melt temperature setting by more than 2ºF (1ºC).

Manual WWSD

The control enters WWSD when the outdoor air temperature exceeds the WWSD setting by 1ºF (0.5ºC) and when the slab temperature exceeds 34ºF (1ºC). The control exits WWSD when the outdoor air temperature falls 1ºF (0.5ºC) below the WWSD setting or if the slab temperature falls below 34ºF (1ºC). This allows the Melt temperature setting to be set higher than the WWSD. This is useful when high slab temperatures are required to melt the snow or ice. An example of this are installations using paving bricks on top of sand and concrete layers.

Cold weather cut out

Maintaining the melting or idling temperature during extremely cold temperatures is not only expensive but may be impossible if the heat loss of the slab exceeds the input capacity of the heating plant or electric cable. The control turns the snow melting system off when the outdoor air temperature drops below the Cold Weather Cut Out (CWCO) temperature and the slab is below freezing. This is a safety and energy-saving measure. The control shows CWCO on the display when CWCO is in effect. When the temperature reaches the CWCO setting in an actively melting system with a Pavement Snow and Ice Sensor, melting is suspended until the outdoor temperature rises above the CWCO setting. If a Pavement Snow and Ice Sensor is not installed, melting is permanently stopped when CWCO is in effect. Melting does not resume when the temperature rises above the CWCO setting.

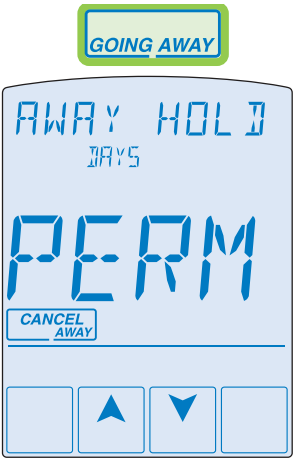
Away key

Disable the snow melting system with the Away Key. To turn on the Away Key, go to the Display menu.

- Select AWAY KEY.
- Select ON.

To activate the Away Override (once the Away Key has been activated).

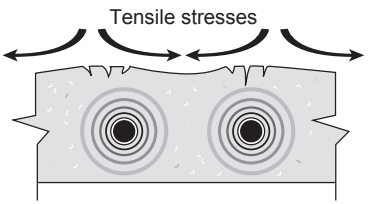
- Touch “Going Away” on the screen.
- Select PERM (permanent) or a number of days using the ▲ or ▼ arrow. Range is 1 to 180 days.
- Press the home button to accept the setting or leave the screen untouched for several seconds.
- “Away” is displayed on the home screen until the number of days expires.
- Touch “Cancel Away” to cancel at any time



Slab protection

In a hydronic snow melting system, the boiler or heating plant capacity may be much larger than the load of the snow melting zones. This can result in large temperature differentials between the supply water temperature and the slab, creating large tensile stresses on the slab.

Concrete is weak to tensile forces and when repeatedly exposed to tensile loads the concrete may crack. This may be prevented by selecting the Protect Slab setting in the System menu to On. The control measures and limits the temperature differential between the supply water and the slab.



Application modes

The snow melting control can operate either an electric or a hydronic snow melting system. A hydronic system can be further categorized as either boiler or pulse width modulation (PWM) zone operation as well as whether the boiler plant is dedicated or non-dedicated for the snow melting system.

A dedicated boiler only provides heat from the snow melting system. A non-dedicated boiler provides heat for the snow melting system in addition to the space heating and/or domestic hot water system. The control requires that one of the following Application Modes is selected in the System menu:

- PWM: Pulse width modulation
- BOIL: Boiler operation
- ELEC: Electrical operation

Electric operation

The control operates the heat relay on a 20-minute PWM cycle. The heat relay, in turn, activates a line voltage electrical contactor to energize the electrical cable heater installed in the slab. The heat relay on time is determined by the calculated slab target and by the measured slab temperature reading.

As the slab temperature reaches the slab target, the on time per cycle of the heat relay is reduced to prevent the slab temperature from overshooting. If no slab sensor is installed, the heat relay remains on 100% of the time until the Melt operation has completed. Idle operation is not available when a slab sensor is not installed. The electric operation requires the installation of an outdoor sensor. A slab sensor is highly recommended to reduce operating costs.

Pulse width modulation operation

The Application Mode should be set to Pulse Width Modulation (PWM) when the boiler or heat source is non-dedicated to the snow melting system and there is no mixing system. The snow melting system is considered to be a zone together with space heating and the domestic hot water system. The control operates the heat relay on a 20-minute PWM cycle. The heat relay, in turn, activates the hydronic heating system zone pump or zone valve. The heat relay on time is determined by the calculated slab target and by the measured slab temperature reading. As the slab temperature reaches the slab target, the on time per cycle of the heat relay is reduced to prevent the slab temperature from overshooting. If no slab sensor is installed the heat relay remains on 100% of the time until the Melt operation has completed. Idle operation is not available when a slab sensor is not installed.

The hydronic PWM operation requires the installation of an outdoor sensor and a supply sensor. The supply sensor is installed on the glycol antifreeze system supply pipe and allows the control to provide slab protection and as well as supply zone priority. A slab sensor is highly recommended to reduce operating costs.

Boiler operation

The Application Mode should be set to Boil when the snow melting system has a dedicated boiler or heat source. The boiler is piped primary-secondary to the snow melting loop, allowing the boiler to fire on and off while allowing continuous flow through the snow melting system loop.

The control calculates a Boiler Target based upon the Slab Target which, in turn, is based upon the measured outdoor temperature and the Melt or Idle temperature setting. The control can operate a boiler in one of four different methods: single stage, modulating boiler, EMS1 or EMS2. The Boiler Target is shown in the View menu. Settings for the boiler operation are located in the Boiler menu.

Note: The boiler operator, or aquastat, remains in the burner circuit and acts as a secondary upper limit on the boiler temperature. The boiler aquastat temperature setting must be adjusted above 200ºF (93.5ºC) in order to prevent short cycling of the burner.

Single stage on/off boiler (1STG)

The control turns the heat relay on or off to fire the boiler in order to maintain the Boiler Target temperature. The boiler supply temperature operates on a differential that is half above and half below the boiler target. The status of the boiler is shown by the Boil Relay item in the View menu.

Modulating boiler (MOD)

The control can operate a single hot-water modulating boiler using the Mod output and the Heat contact. The control operates the boiler by first switching the heat contact to allow the modulating boiler to go through the ignition sequence (the heat contact may not be required on all modulating boilers).

A 0-10 VDC or 4-20 mA analog signal is then used to modulate the boiler firing rate starting at 50% (5 VDC or 12 mA signal) for 30 seconds. After the 30-second delay has elapsed, the control will then allow the boiler to modulate down to the Minimum Modulation setting and hold it there for the Modulation Delay time setting.

After the modulation delay has elapsed, the control uses PID logic to change the boiler firing rate signal in order to satisfy the boiler target temperature. When the firing rate signal is reduced down to the minimum modulating setting and the boiler supply temperature exceeds the boiler target by half the differential, the control will shut off the boiler burner. The modulating signal output is shown by the Boil Rate in the View menu.

The Modulation Delay setting is determined by the boiler manufacturer. It is the amount of time that the burner must operate before the internal boiler control allows an external signal to operate the burner.

The Motor Speed sets the rate at which the modulating electrical signal can change. For most modulating boilers with an ECM fan, the motor speed can be set to 30 seconds.

For commercial boilers with a mod motor, set the motor speed according to the time required by the mod motor to travel from the closed to the open position.

EMS1

The EMS1 signal is a method for the snow melting control to send the boiler target temperature to a compatible boiler control (if used). The control provides a 0-10 VDC signal proportional to the boiler target and turns on the heat relay to operate the boiler to maintain the Boiler Target temperature.

EMS1 conversion table

0-10 VDC	Boiler target
0	– – – (Off)
1	50ºF (10ºC)
2	68ºF (20ºC)
3	86ºF (30ºC)
4	103ºF (39ºC)
5	121ºF (49ºC)
6	139ºF (59ºC)
7	157ºF (69ºC)
8	174ºF (79ºC)
9	192ºF (89ºC)
10	210ºF (99ºC)

EMS2

The EMS2 signal is a method for the snow melting control to send the boiler target to a Viessmann boiler that supports the OpenTherm temperature targeting. Typical boilers include the Viessmann Vitodens 100-W and 200-W. The boiler may require an OpenTherm Input Module 0-10V. Contact Viessmann for details.

The control provides a 0-10 VDC signal proportional to the boiler target and turns on the heat relay to operate the boiler to maintain the Boiler Target temperature.

Exercising

In a hydronic snow melting system, the control operates the system pump every three days to prevent pump seizure.

Alert relay

The control includes an auxiliary relay that can be configured to be either a system pump or an alert output. When the Auxiliary Relay setting in the System menu is set to Alert, the relay closes whenever there is a local error code. The Alert Relay is connected to the input power R and provides a 24 VAC powered signal when closed. An isolation relay may be installed if a dry contact switch is required on the third-party equipment.

Pump post purge

After a zone has finished heating, the boiler or heat source is shut off and the zone continues to operate for 20 seconds to post purge heat from the boiler to the zone.

Troubleshooting

It is recommended to complete all wiring to ensure trouble free operation. Should an error occur, simply follow these steps:

1. Find: If the control flashes ⓘ on the screen, it is indicating a problem on the system.
2. Identify: Hold the Home button for 3 seconds, touch the NEXT key to locate the Toolbox Menu, then touch the ENTER key. The error code should appear as the first item.
3. Solve: Use the chart below to match the error code to the one on the control. Use the description to solve the problem

Error messages

Field	Description
	**SET TEMP MENU SAVE ERROR** — The control failed to read the Set Temp menu settings from memory and has reloaded the factory default settings. The control stops operation until all settings in the Set Temp menu are checked. To clear the error, set the access level to Installer and check all settings in the Set Temp menu.
	**SYSTEM MENU SAVE ERROR** — The control failed to read the System menu settings from memory and has reloaded the factory default settings. The control stops operation until all settings in the System menu are checked. To clear the error, set the access level to Installer and check all settings in the System menu.
	**BOILER MENU SAVE ERROR** — The control failed to read the Boiler menu settings from memory and has reloaded the factory default settings. The control stops operation until all settings in the Boiler menu are checked. To clear the error, set the access level to Installer and check all settings in the Boiler menu.

Error messages

Field	Description
	**MAXIMUM MELT TIME ERROR** — The control has operated in melting for the time set by Maximum Melt Days setting located in the System menu. This error is usually created when there is a mechanical system failure resulting in the snow melt slab not heating correctly. Clear the error message by touching the Cancel key while viewing the error message. Use the Manual Override menu to manually check that each component of the mechanical system is operating correctly. If necessary, change the Maximum Melt Days setting to a longer time period or to Off.
	**OUTDOOR SENSOR SHORT CIRCUIT ERROR** — Due to a short circuit, the control is unable to read the outdoor sensor. The control continues to operate and assumes an outdoor temperature of 32ºF (0ºC). Energy saving features such as Warm Weather Shut Down (WWSD) and Cold Weather Cut Out (CWCO) are disabled. Check the outdoor sensor wire for short circuits according to the sensor installation manual. It may be necessary to replace the outdoor sensor. Once the error has been corrected, the error message automatically clears.
	**OUTDOOR SENSOR OPEN CIRCUIT ERROR** — Due to an open circuit, the control is unable to read the outdoor sensor. The control continues to operate and assumes an outdoor temperature of 32ºF (0ºC). Energy saving features such as Warm Weather Shut Down (WWSD) and Cold Weather Cut Out (CWCO) are disabled. Check the outdoor sensor wire for open circuits according to the sensor installation manual. It may be necessary to replace the outdoor sensor. Once the error has been corrected, the error message automatically clears.
	**SUPPLY SENSOR SHORT CIRCUIT ERROR** — Due to a short circuit, the control is unable to read the supply sensor. When set to App Mode Boiler, the control stops operation and does not provide any heat. When set to App Mode PWM the control continues melting or idling. Check the supply sensor wire for short circuits according to the sensor installation manual. It may be necessary to replace the supply sensor. Once the error has been corrected, the error message automatically clears.
	**SUPPLY SENSOR OPEN CIRCUIT ERROR** — Due to an open circuit, the control is unable to read the supply sensor. When set to App Mode Boiler, the control stops operation and does not provide any heat. When set to App Mode PWM the control continues melting or idling. Check the supply sensor wire for open circuits according to the sensor installation manual. It may be necessary to replace the supply sensor. Once the error has been corrected, the error message automatically clears.
	**SLAB SENSOR SHORT CIRCUIT ERROR** — Due to a short circuit, the control is unable to read the Slab Sensor for Aerial Snow Sensor (A3040073). Idling is disabled and energy saving features such as Warm Weather Shut Down (WWSD) and Cold Weather Cut Out (CWCO) are operated using the outdoor temperature only. Check the slab sensor wire for short circuits according to the sensor installation manual. It may be necessary to replace the slab sensor. Once the error has been corrected, the error message automatically clears.

Symptoms and solutions

Symptom	Look for…	Corrective action
LCD display is off	Power to control	Use electrical meter to measure 24 VAC voltage on input power R and C terminals.
System pump always on	Display shows idle	Idle operation requires that the system pump operate continuously while below the melting temperature setting.
Blue short	Dirt or salt on sensor	The sensor requires regular cleaning. Avoid using road salt on the snow melting slab.
Slab is above melt temperature	Slab target	The slab is heated to the slab target.
	Heat on not shown	Check wiring of the system pump. The system pump operates continuously during melt and idle operation. The heat source must be wired to operate together with the heat relay.
System running with no snow	Idle	Idling heats the slab when the temperature falls below the Idle temperature.
	Melt	During Cold Weather Cut Out (CWCO), the system is shut off. If shut off during a melt cycle, the system resumes melting once the outdoor temperature is above CWCO.
	Timed melt	System manually started.
Snow on slab but system did not start	Off	System has been manually stopped and the Pavement Snow and Ice Sensor or the Aerial Snow Sensor never dried, thereby preventing the system to automatically start.

Job record

Set Temp menu settings

Item	Setting
Melting	
Idling	
Manual melt run time	
Additional melt time	
Water sensitivity	
WWSD	
CWCO	

System menu settings

Item	Setting
Application mode	
Snow/ice sensor	
Slab sensor	
Slab protection	
EconoMelt	
Auxiliary relay	
Maximum melt time	

Boiler menu settings

Item	Setting
Boiler type	
Boiler modulation type	
Boiler minimum modulation	
Boiler modulation delay	
Boiler motor speed	
Boiler differential	
Boiler minimum	

Display menu settings

Item	Setting
Units	
Backlight	

Warning: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, visit http://oehha.ca.gov/prop65.html.

Technical data

Control	Microprocessor control; not a safety (limit) control
Packaged weight	1.3 lb. (590 g)
Dimensions	5" H x 3¼" W x 15⁄16" D (127mm x 82mm x 23mm)
Enclosure	White PVC plastic, NEMA type 1
Ambient conditions	-4 to 122ºF (-20 to 50ºC), < 90% RH non-condensing, outdoor use permitted when installed inside a NEMA 3 enclosure
Power supply	24 VAC ±10%, 60 Hz, Class 2, 16 VA standby, 100 VA fully loaded
Relay capacity	24 VAC 2 A, 3.6 A combined
Modulating output	0-10 VDC, 500 Ω minimum load impedance, 4-20 mA 1 kΩ maximum load impedance
Sensors	NTC thermistor, 10k @ 77ºF (25ºC ± 0.2ºC) ß=3892
Included	Outdoor sensor and slab sensor
Optional	Pavement Snow and Ice Sensor (A3040090), Aerial Snow Sensor (A3040095) and Slab Sensor for Aerial Snow Sensor (A3040073)

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