

Heat Link[®]

The Floor Heat System

Melting Control

Stk# 31667

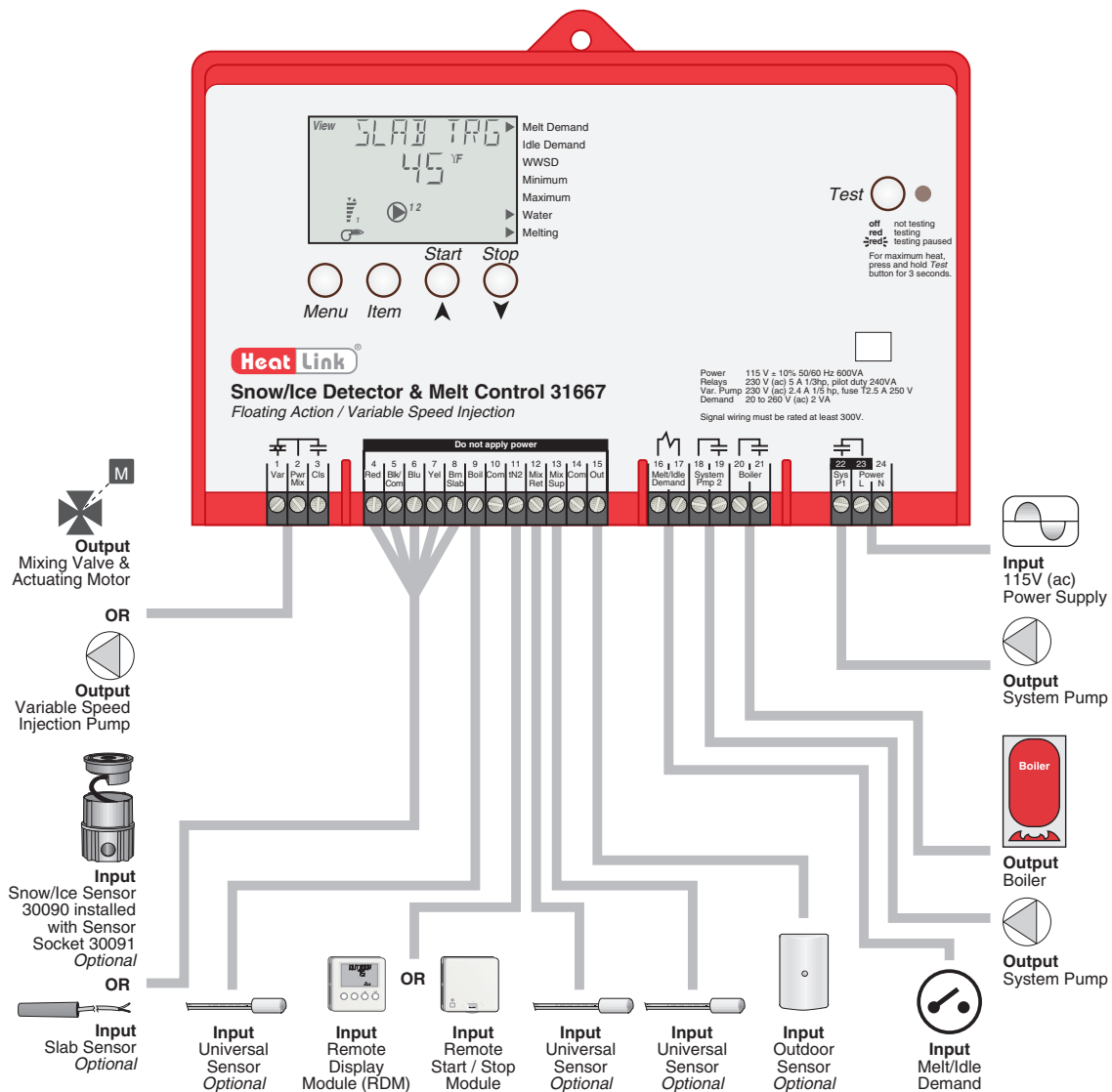


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The Snow Detector & Melting Control 31667 is a microprocessor-based control which operates a snow melting system. The control can operate automatically when a Snow / Ice Sensor 30090, or slab sensor, is installed or the user can manually enable and / or disable the system. The 31667 controls a variable speed injection pump or a floating action mixing valve to provide both boiler and slab protection. When the control is not in the MELTING mode, the system can either be shut down or it can be maintained at an idle temperature for faster response and improved safety. The 31667 control includes a large Liquid Crystal Display (LCD) in order to view system status and operating information.

Additional features include:

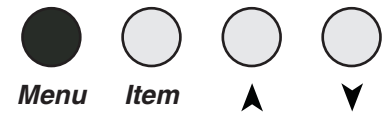
- Slab protection for the snow melting system
- Boiler protection
- Manual Override
- Warm Weather Shut Down (WWSD)
- Cold Weather Cut Out (CWCO)
- Remote display and adjustment capabilities.
- Test sequence to ensure proper component operation.
- Pump exercising.
- Viscosity compensation.
- CSA C US Certified (approved to applicable UL standards)

User Interface

The 31667 uses a Liquid Crystal Display (LCD) as the method of supplying information. You use the LCD in order to setup and monitor the operation of your system. The 31667 has four push buttons (**Menu**, **Item**, **▲**, **▼**) for selecting and adjusting settings. As you program your control, record your settings in the Adjust Menu table which is found in the second half of this brochure.

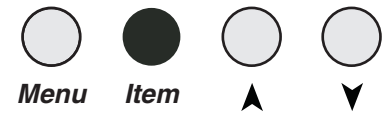
Menu

All of the items displayed by the control are organized into various menus. These menus are listed on the left hand side of the display (Menu Field). To select a menu, use the **Menu** button. By pressing and releasing the **Menu** button, the display will advance to the next available menu. Once a menu is selected, there will be a group of items that can be viewed within that menu.



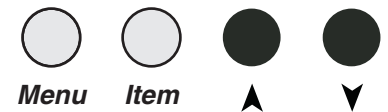
Item

The abbreviated name of the selected item will be displayed in the item field of the display. To view the next available item, press and release the **Item** button. Once you have reached the last available item in a menu, pressing and releasing the **Item** button will return the display to the first item in the selected menu.



Adjust

To make an adjustment to a setting in the control, begin by selecting the Adjust menu using the **Menu** button. Then select the desired item using the **Item** button. Finally, use the **▲** and / or **▼** button to make the adjustment.



Additional information can be gained by observing the Status and Pointers fields of the LCD. The status field will indicate which of the control's outputs are currently active. Most symbols in the status field are only visible when the View Menu is selected.

Item Field

Displays an abbreviated name of the selected item

Number Field

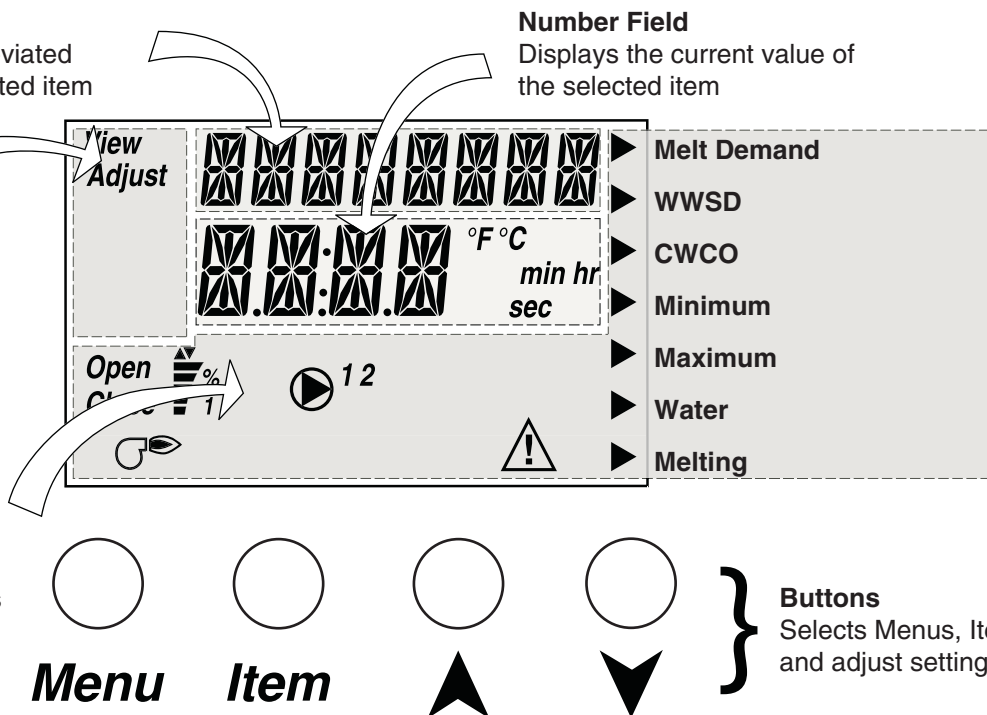
Displays the current value of the selected item

Menu Field






Displays the current menu

Status Field

Displays the current status of the of the control's inputs, outputs and operation



Symbol Description

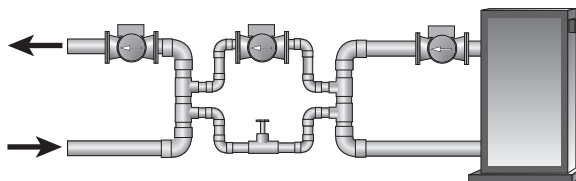
	Mixing Device Output Scale Shows output of injection pump or mixing valve. Arrows show whether the output is increasing or decreasing.		Burner Displays when the boiler relay is turned on.
	Pump Displays when the mixing system pump is in operation.		Pointer Displays the control operation as indicated by the text.
	Warning Displays when an error exists or a specific limit has been reached.	°F °C min hr sec	°F, °C, min, hr, sec Units of measurement.
Open Close	Open / Close Displays when floating actuator is opening or closing.		

A: General Operation**Powering up the Control**

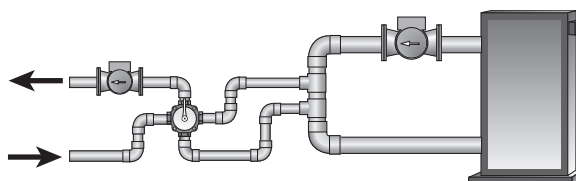
When the Snow Detector & Melting Control 31667 is powered up, the control displays all LCD segments for 2 seconds, then the control type number in the LCD for 2 seconds. Next, the software version is displayed for 2 seconds. Finally, the control enters into the normal operating mode and the LCD defaults to displaying the current outdoor air temperature.

Mixing Device**Variable Speed Injection Pump**

A standard wet rotor circulator is connected to the 31667 on the Opn / Var and Pwr Mix terminals (1 and 2). The 31667 increases or decreases the power output to the circulator based on the system requirements. For correct sizing and piping of the variable speed injection pump, refer to TN13. A visual indication of the current variable speed output is displayed in the LCD in the form of a segmented bar graph.

**Floating Action (FLOT)**

A floating action motor is connected to the 31667 on the Pwr Mix, Opn / Var and Cls terminals (2, 1, and 3). The 31667 pulses the actuator motor to open or close based on the system requirements. The mixing valve that the actuator is connected to can be either a 2-way, 3-way or 4-way valve. A visual indication of the current position of the valve is displayed in the LCD in the form of a segmented bar graph.

**Mix Target**

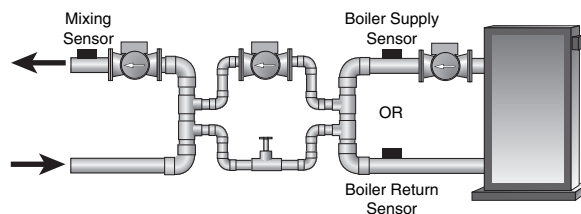
The mix target temperature is the supply fluid temperature calculated by the control. The control will operate the snow melt system so that the mix supply temperature reaches the mixing target except while providing boiler return protection for the boiler.

Mixing Maximum (MIX MAX)

The MIX MAX sets the highest fluid temperature that the control is allowed to calculate as the mixing target temperature. If the control does target the MIX MAX setting, and the MIX SUP temperature is near the MIX MAX, the Maximum pointer is displayed in the LCD while the MIX SUP temperature is being viewed.

Boiler Protection (Boil MIN)

The 31667 is capable of providing boiler protection from cold mixing system return fluid temperatures. If the boiler sensor temperature is cooler than the Boil MIN setting while the boiler is firing, the 31667 reduces the output from the mixing device. This limits the amount of cool return water to the boiler and allows the boiler temperature to recover. This feature can only be used if the Boil SENS item is set to SUP or RET. The 31667 can not provide boiler protection if the Boil SENS item is set to NONE.



Exercising (EXERCISE)

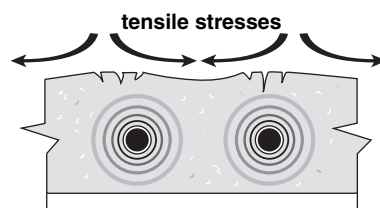
The 31667 has a built-in pump and valve exercising function. The exercising period is adjustable and is factory set at 70 hours. If a pump output has not been operated at least once during every exercising period, the control turns on the output for 10 seconds. This minimizes the possibility of a pump seizing during a long period of inactivity.

Note: The exercising function does not work if power to the control or pumps is disconnected.

B: General Snow Melting

Slab Protection (ΔT MAX)

The control can limit the rate at which heat is applied to the zone through the ΔT MAX setting. The ΔT (Delta T) is the temperature difference between the snow melting supply temperature and the snow melting return temperature. By limiting this temperature difference, the rate at which heat is applied to the zone can be controlled and thermal stresses in the slab can be minimized. When the control is operating at the ΔT MAX, the Maximum pointer can be seen when viewing the ΔT item in the VIEW menu. The control provides slab protection differently based on boiler sensor placement (see section C).



Viscosity Compensation (Exceeding ΔT MAX)

At low temperatures, the glycol solutions used in snow melting systems become very viscous and difficult to pump. In order to overcome this condition during a cold start of a snow melting system, the 31667 is allowed to exceed the ΔT MAX setting for a period of time in order to warm the glycol solution. This allows the control to compensate for the high viscosity of the glycol solution and is used when the mixing return temperature is below 30°F (-1°C). When the control exceeds the ΔT MAX setting, the Maximum pointer will flash when viewing the ΔT item in the VIEW menu.

Soft Start

When the control starts applying heat to the slab, the supply temperature to the snow melting system is ramped up over a period of time until it reaches the target mixed supply temperature. This feature helps reduce thermal stresses in the slab.

Note: This operation only occurs if the Boil SENS item is set to RET or NONE.

Running Time (RUN TIME)

The running time is the length of time that the system operates once it has reached its slab target temperature. During the time that the system is approaching its slab target temperature, the run time does not decrease. Once the system reaches its slab target temperature, the run time begins counting down. When the RUN TIME reaches 0:00 as displayed in the STATUS item in the VIEW menu, the system has finished melting.

Note: The running time is only applicable when a manual melting enable signal starts the snow melting system. Refer to Section D1 for a description of a manual melting enable.

Warm Weather Shut Down (WWSD)

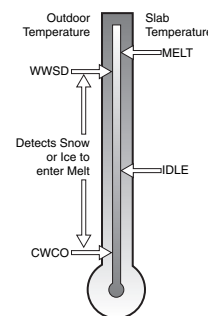
The control has a warm weather shut down that prevents the control from entering the melt or idle modes in order to conserve energy. While in WWSD, the word WWSD is displayed in the STATUS item in the VIEW menu and the WWSD pointer is on the display.

Automatic (AUTO)

When the WWSD is set to AUTO, the WWSD occurs when the slab temperature and the outdoor temperature exceed the MELTING setting by 2°F (1°C). The control exits the WWSD when the slab or outdoor temperature falls to the MELTING setting temperature.

Adjustable WWSD

When the WWSD is set to a temperature, the WWSD occurs when the outdoor air temperature exceeds the WWSD setting by 1°F (0.5°C). The control exits WWSD when the temperature falls 1°F (0.5°C) below the WWSD setting. This allows the MELTING temperature setting to be set higher than the WWSD. This is useful where high slab temperatures are required to melt the snow or ice. A good example of this is installations using paving bricks on top of sand and concrete layers.



Cold Weather Cutout (CWCO)

Maintaining the system at either the melting or idling temperature during extremely cold temperatures can be expensive or impossible. The control turns the snow melting system off when the outdoor air temperature drops below the Cold Weather Cut Out (CWCO) temperature. While the control is in CWCO, the word CWCO is displayed in the STATUS item in the VIEW menu and the CWCO pointer is on in the display. The heater in the sensor is kept on during CWCO until the control detects moisture. If water is detected, the heater is turned off but the control retains the moisture detected information. When the outdoor temperature rises above the CWCO temperature, the control exits CWCO and if the Snow / Ice Sensor 30090 detected moisture during CWCO, the control initiates melting mode. If the control has been started prior to the CWCO, it resumes the melting mode once the outdoor air temperature rises above the CWCO temperature.

Status (STATUS)

While in the VIEW menu there are a number of items available to determine the current status of the system. To view the current status of the system, select the STATUS item in the VIEW menu.

- **STRT** The word STRT is displayed after the snow melting system has been manually enabled. It is displayed until the system reaches its slab target temperature. If the system is at its slab target temperature, STRT is displayed for five seconds after the snow melting system has started operation. This is to verify that the control has entered into the melting mode.
- **STOP** The word STOP is displayed for five seconds after the snow melting system has been manually disabled. The word STOP is also displayed if either a Remote Start / Stop Module 31039 or the Remote Display Module 30040 stops the snow melting system and an external melt demand is still present.
- **IDLE** The word IDLE is displayed as long as the system is operating at its idling temperature.
- **EXT** The word EXT is displayed when the RUN TIME has reached 0:00 and the control still has an external melt demand. In this situation, the system continues melting until the melt demand is removed or the control is stopped.
- **DET** The word DET is displayed after the snow melting system has been automatically enabled by the Snow / Ice sensor 30090 and the system is at its slab target temperature. DET is also displayed once the control is manually enabled after automatic detection by the 30090 and the running time has counted down to 0:00
- **0:00 to 23:59 hr** While the system is up to temperature and melting, the remaining RUN TIME is displayed.
- **INF** If an infinite RUN TIME is selected and the system is melting, INF is displayed.
- **WWSD** When the system is in Warm Weather Shut Down, WWSD is displayed.
- **CWCO** When the control is in Cold Weather Cut Out, CWCO is displayed.

System Pump Operation (Sys P1 and System Pmp 2)

The system pump contacts close and remain closed as long as the system is either in the Melting or Idling mode. The system pump contacts shut off if the control is in CWCO, WWSD, or if there is no call for Melting or Idling.

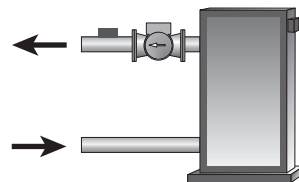
Purge

The system pumps continue to operate for up to 2 minutes after the last demand is removed. This purges the residual heat from the boiler into the snow melting slab. If the boiler temperature drops below the Boil MIN setting after 20 seconds, the purge is aborted and the system pumps are turned off.

C1: Boiler Supply Sensor

Boiler sensor on the Supply (Boil SENS = SUP)

When operating a boiler that is dedicated to a snow melting system, the 31667 is designed to operate the boiler as efficiently as possible. The boiler is cycled based on the mixing supply fluid temperature. This is to provide longer and more efficient boiler cycles. This mode of operation only works if the Boil SENS item is set to SUP.

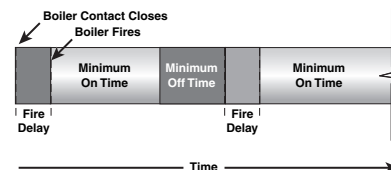


Boiler Minimum (Boil MIN)

The Boil MIN is the lowest water temperature that the control is allowed to use as a boiler target temperature. If the boiler is operating, and the boiler supply temperature is near the Boil MIN setting, the Minimum pointer turns on in the LCD while the Boil SUP temperature is being viewed. If the installed boiler is designed for condensing or low temperature operation, set the Boil MIN adjustment to OFF.

Fire Delay (FIRE DLY)

The FIRE DLY is the delay time that may occur between the time that the 31667 closes the Boiler contact and when the burner fires. This delay is usually the result of burner pre-purge or other forms of time delay built into the burner's safety circuits.



Boiler Mass (Boil MASS)

The Boil MASS setting allows the 31667 to adjust to different types of heat sources depending on their thermal mass.

Light (LITE)

The LITE setting is selected if the boiler that is used has a low thermal mass. This means that the boiler has a very small water content and has very little metal in the heat exchanger. A boiler that has a low thermal mass comes up to temperature quite rapidly when fired. This is typical of many copper fin-tube boilers.

Medium (MED)

The MED setting is selected if the boiler that is used has a medium thermal mass. This means that the boiler either has a large water content and a low metal content or a low water content and a high metal content. This is typical of many modern residential cast iron boilers or steel tube boilers.

Heavy (HEVY)

The HEVY setting is selected if the boiler that is used has a high thermal mass. This means that the boiler has both a large water content and a large metal content. A boiler that has a high thermal mass is relatively slow in coming up to temperature. This is typical of many commercial cast iron and steel tube boilers.

Differential (DIFF)

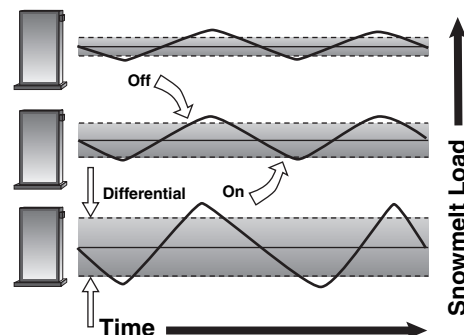
An on / off heat source such as a boiler must be operated with a differential in order to prevent short cycling. With the 31667, either a fixed or an automatic differential may be selected.

Fixed Differential

The differential is centered around the target temperature. If the temperature drops 1/2 the differential below the target temperature, the 31667 closes the Boiler contact to fire the boiler. If the temperature rises 1/2 of the differential above the target temperature, the 31667 opens the Boiler contact to turn off the boiler.

Auto Differential (AUTO)

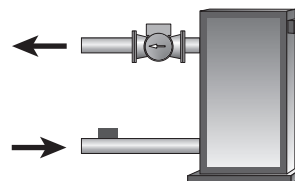
If the AUTO differential is selected, the 31667 automatically adjusts the differential setting under the current load conditions to avoid short cycling.



C2: Boiler Return Sensor

Boiler Sensor on the Return (Boil SENS = RET)

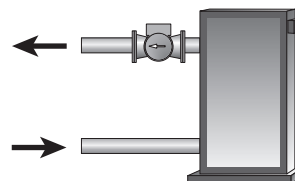
The boiler sensor should be located on the boiler return if the 31667 is one of many controls that can call for boiler operation. When in the return mode, the 31667 provides a boiler enable through the Boiler contact. The 31667 no longer tries to control the boiler supply water temperature directly, but allows the boiler to operate at its operating aquastat setting when required. When the mixing device begins to ramp up, the Boiler contact closes on the 31667. The Boiler contact remains closed until the mixing device no longer requires heat. With the sensor on the boiler return, the 31667 is still capable of providing boiler protection as described in section A.



C3: No Boiler Sensor

No Boiler Sensor (Boil SENS = NONE)

The 31667 is capable of operating without a boiler sensor if desired. Without a boiler sensor, the 31667 is unable to provide boiler protection. In this mode of operation, the Boiler contact is used to provide a boiler enable. When the mixing device begins to ramp up, the Boiler contact on the 31667 closes. The Boiler contact remains closed until the mixing device no longer requires heat. This type of application is typical if the 31667 is drawing heat from a source that already incorporates some form of boiler protection.



D1: Snow Melting Enable

The snow melting system can be enabled manually or automatically. A melting enable signal applied to the control places the system into the melting mode. If a melting enable signal is applied once the system is already in the melting mode, the control responds to the last command received.

Manual Melting Enable

A manual melting enable signal requires the user to manually start the snow melting system and can be provided from the Remote Start / Stop Module 31039, Remote Display Module 30040, or an external melt demand.

Remote Start / Stop Module 31039

The snow melting system is enabled by pressing the button on the front of the 31039. While the system is coming up to temperature, a green indicator light flashes on the front of the 31039. Once the system is up to temperature and the run time is counting down, the green indicator light on the front of the 31039 is on solid.



Start / Stop

Remote Display Module 30040

The snow melting system is enabled by pressing the ▲ button on the 30040 while in the VIEW menu. The 30040 then displays the RUN TIME setting to allow the user to adjust it. Once the snow melting system is enabled, the word STRT is displayed for at least 5 seconds in the STATUS item while in the VIEW menu.

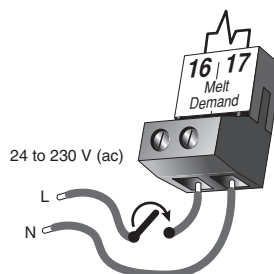


Start

Stop

External Melt Demand

The snow melting system is enabled when a voltage between 24 and 230 V (ac) is applied across the Melt Demand terminals (16 and 17). An external melt demand must be present for at least 4 seconds in order to start the snow melting system. If the RUN TIME reaches 0:00 and the external melt demand is still present, the control continues melting until the external melt demand is removed or the system is otherwise stopped.

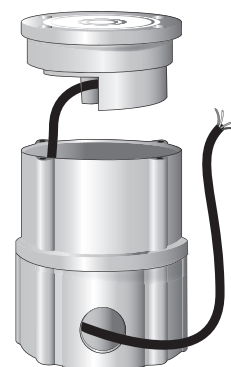


Automatic Melting Enable (Snow / Ice Sensor 30090)

The 31667 can use the Snow / Ice Sensor 30090 to provide an automatic melting enable signal to start the snow melting system. The control continually monitors the 30090 for the presence of moisture. Once moisture is detected, the Water pointer is displayed in the LCD and the snow melting system is enabled.

Water Detection Sensitivity (SENSTVTY)

The 31667 has a sensitivity setting which compensates for varying outdoor conditions which could affect how the moisture detector in the 30090 interprets the presence of moisture. This adjustable setting is available through the SENSTVTY item in the ADJUST menu of the control. As snow becomes contaminated with dirt, and as the sensor itself becomes dirty, the control may incorrectly indicate the presence of water. If this condition occurs, clean the surface of the sensor and / or turn down the SENSTVTY setting. If the snow in your area is very clean, the SENSTVTY setting may need to be increased before snow is detected. If AUTO is selected, the control automatically adjusts the sensitivity level used to detect moisture.



D2: Snow Melting Disable

The snow melting system can be disabled manually or automatically. A melting disable signal applied to the control takes the system out of melting mode. Once the snow melting system is disabled, the system operates in the idling mode. The idling mode allows the system to be operated either at a lower temperature or turned off.

Manual Melting Disable

A manual melting disable signal requires the user to manually stop the snow melting system and can be provided from the Remote Start / Stop Module 31039 or Remote Display Module 30040.

Remote Start / Stop Module 31039

A Remote Start / Stop Module 31039 can be used to stop the snow melting. The snow melting system is disabled by pressing the button on the face of the 31039. When the system is stopped, a solid red indicator light is displayed on the face of the 31039 for five seconds. If the snow melting system is disabled while there is still an external melt demand for snow melting, the 31039 displays a solid red indicator light until the external demand is removed.

Remote Display Module 30040

A Remote Display Module 30040 can be used to stop the snow melting system. The snow melting system is disabled by pressing the DOWN button on the 30040 while in the VIEW menu. Once the snow melting system is disabled, the word STOP is displayed for 5 seconds in the STATUS item while in the VIEW menu.

Automatic Melting Disable (Snow / Ice Sensor 30090)

Once the 30090 is dry, the Water pointer turns off in the LCD. The system slab temperature has to be at least the slab target temperature for a minimum of thirty minutes in order for the system to turn off. If a manual melting disable signal is applied the snow melting system turns off immediately.

E: General Melting Operation

In order for the snow melting system to be started, one of the methods described in section D1 must be used. Once a melting enable signal is applied and the system is not in WWSO or CWCO, the melting mode begins. When the control is in the melting mode, the Melting pointer is visible in the VIEW menu. The MELT setting in the ADJUST menu sets the slab surface temperature. When the system is melting and the slab temperature is warming up to the slab target temperature, STRT is displayed in the STATUS item while in the VIEW menu. The system finishes melting when the slab temperature has been at least the slab target temperature for a period of time. This period of time is based on whether an automatic or manual melting enable signal starts the snow melting system.

If an automatic melting enable signal starts the snow melting system and the slab temperature reaches the slab target temperature, DET is displayed in the STATUS item while in the VIEW menu. The system continues to melt until the 30090 becomes dry and any additional running time has expired. Once the melting mode is complete, the system operates in the idling mode.

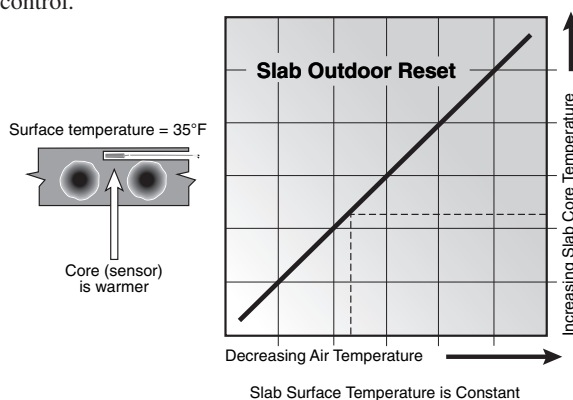
If a manual melting enable signal starts the snow melting system, the running time is displayed in the STATUS item while in the VIEW menu and begins counting down once the slab temperature reaches the slab target temperature. The system continues to melt until the running time counts down to 0:00 and there is no external melt demand. Once the melting mode is complete, the system operates in the idling mode.

Slab Temperature Control

The 31667 uses a snow / ice sensor or slab sensor to provide slab temperature control.

Slab Sensor

If a Slab Sensor is used, the control assumes that the sensor is approximately 1 inch below the surface of the snow melting slab. Since this point is closer to the source of the heat, this point is warmer than the surface of the slab. Therefore, the sensor must be maintained at a higher temperature in order to ensure that the surface of the slab is maintained at the correct temperature. The amount of temperature difference between the surface of the slab and the slab sensor changes with the outdoor temperature. Therefore, the slab core temperature is increased as the outdoor air temperature drops. The temperature displayed as SLAB is the temperature of the slab sensor.



Snow / Ice Sensor 30090

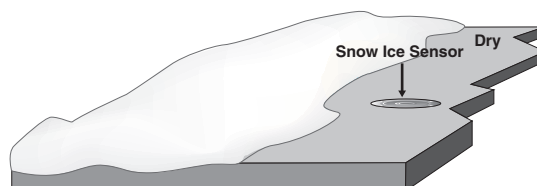
The slab temperature is displayed as SLAB in the VIEW menu. This temperature is calculated from the edge and center sensors built into the 30090.

Slab Target Temperature (SLB TRG)

The SLAB TRG temperature is determined from the MELTING setting, idle setting and the outdoor air temperature. The control displays the temperature that it is currently trying to maintain at the slab sensor. If the control does not presently have a requirement for heat, it displays “—” in the STATUS item while in the VIEW menu.

Additional Melting Time (ADD MELT)

In cases where areas of the snow melting system haven't completely melted after the melting mode has finished and the 30090 is dry, the 31667 has a function in which additional time can be added to melt the zone. This is an adjustable time through the ADD MELT item in the ADJUST menu of the control. The add melt time is calculated into a running time and is displayed in the STATUS item while in the VIEW menu. Once the 30090 becomes dry and the slab temperature is at least the slab target temperature, the running time starts counting down.



F: General Idling Operation

When the snow melting system starts from a cold temperature, the time required for the system to reach the melting temperature may be excessive. To decrease this start up time, the 31667 has an idling feature which can maintain the system at a lower temperature. This feature is also useful for preventing frost and light ice formation. The IDLING setting in the ADJUST menu sets the slab surface temperature while the control is in the idling mode. When in the idling mode, IDLING is displayed in the STATUS item while in the VIEW menu. If idling is not desirable, the IDLING setting may be set to OFF.

CAUTION

IMPROPER INSTALLATION AND OPERATION OF THIS CONTROL COULD RESULT IN DAMAGE TO THE EQUIPMENT AND POSSIBLY EVEN PERSONAL INJURY. IT IS YOUR RESPONSIBILITY TO ENSURE THAT THIS CONTROL IS SAFELY INSTALLED TO ALL APPLICABLE CODES AND STANDARDS. THIS ELECTRONIC CONTROL IS NOT INTENDED FOR USE AS A PRIMARY LIMIT CONTROL. OTHER CONTROLS THAT ARE INTENDED AND CERTIFIED AS SAFETY LIMITS MUST BE PLACED INTO THE CONTROL CIRCUIT. DO NOT OPEN THE CONTROL. REFER TO QUALIFIED PERSONNEL FOR SERVICING. OPENING VOIDS WARRANTY AND CAN RESULT IN DAMAGE TO THE EQUIPMENT AND POSSIBLY EVEN PERSONAL INJURY.

Step One: Getting Ready

Check the contents of this package. If any of the contents listed are missing or damaged, please contact your wholesaler or HeatLink® sales representative for assistance.

Stk# 31667 includes: One Snow Detector & Melting Control 31667, One Outdoor Sensor 30070, Three Universal Sensors 30071; Literature: L631667D, L631667U, L630070, L6631000, TN13.

Note: Carefully read the details of the Sequence of Operation to ensure that you have chosen the proper control for your application.

Step Two: Mounting the Base

Remove the control from its base by pressing down on the release clip in the wiring chamber and sliding the control away from it. The base is then mounted in accordance with the instructions in L631000.

Step Three: Rough-in Wiring

All electrical wiring terminates in the control base wiring chamber. The base has standard 7/8" (22 mm) knockouts which accept common wiring hardware and conduit fittings. Before removing the knockouts, check the wiring diagram and select those sections of the chamber with common voltages. Do not allow the wiring to cross between sections as the wires will interfere with safety dividers which should be installed at a later time.

- Power must not be applied to any of the wires during the rough-in wiring stage.
- All wires are to be stripped to a length of 3/8" (9mm) to ensure proper connection to the control.
- Install the Outdoor Sensor 30070, Boiler Sensor 30071 and Mixing Sensor(s) 30071 according to the installation instructions in the L30070 and run the wiring back to the control.
- If a Snow / Ice Sensor 30090 is used, install the sensor according to the installation instructions in the L630090 and run the wiring back to the control. Refer to L630070 for very important details on sensor location and installation.
- If a Slab Sensor is used, install the slab sensor according to the installation instructions in L630070 and run the wiring back to the control. See "Sensor and Unpowered Input Connections" for very important details on sensor location and installation.
- If a Remote Display Module (RDM) 30040 is used, install the RDM according to the installation instructions included with the RDM and run the wiring back to the control.
- If a Remote Start / Stop Module 31039 is used, install the module according to the installation instructions in L631039 and run the wiring back to the control.
- Run wire from other system components (pumps, boiler, etc.) to the control.
- Run wires from the 115 V (ac) power to the control. Use a clean power source with a minimum 15 A circuit to ensure proper operation. Multi-strand 16 AWG wire is recommended for all 115 V (ac) wiring due to its superior flexibility and ease of installation into the terminals.

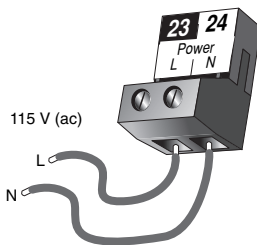
Step Four: Electrical Connections to the Control

The installer should test to confirm that no voltage is present at any of the wires. Push the control into the base and slide it down until it snaps firmly into place.

Powered Input Connections

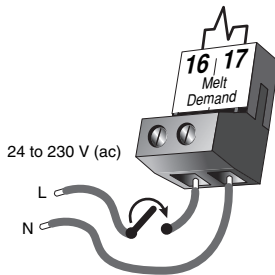
115 V (ac) Power

Connect the 115 V (ac) power supply to the Power L and Power N terminals (23 and 24). This connection provides power to the microprocessor and display of the control. As well, this connection provides power to the Sys P1 terminal (22) from the Power L terminal (23).



Melt Demand

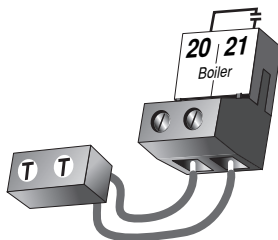
To generate a melt demand, a voltage between 24 V (ac) and 230 V (ac) must be applied across the Melt Demand terminals (16 and 17).



Output Connections

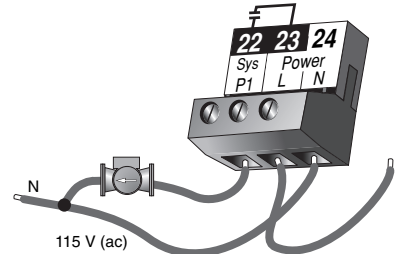
Boiler Contacts

The Boiler terminals (20 and 21) are an isolated output in the 31667. There is no power available on these terminals from the control. These terminals are used as a switch to either make or break the boiler circuit. When the 31667 requires the boiler to fire, it closes the contact between terminals 20 and 21.



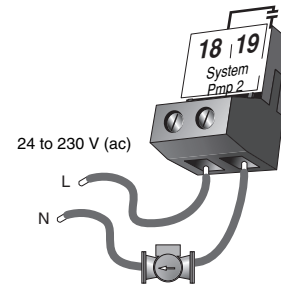
System Pump Contact (Sys P1)

The Sys P1 output terminal (22) on the 31667 is a powered output. When the relay in the 31667 closes, 115 V (ac) is provided to the Sys P1 terminal (22) from the Power L terminal (23). To operate the system pump, connect one side of the system pump circuit to terminal 22 and the second side of the pump circuit to the Neutral (N) side of the 115 V (ac) power supply.



System Pump Contact (System Pmp 2)

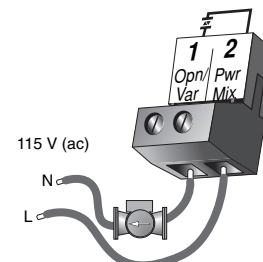
The System Pmp 2 terminals (18 and 19) are an isolated output in the 31667. There is no power available on these terminals from the control. If the System Pmp 2 contact is used, connect the pump circuit to the System Pmp 2 terminals (18 and 19).



Variable Speed Injection Pump

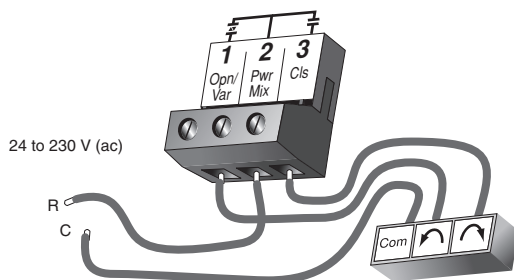
The 31667 can vary the speed of a permanent capacitor, impedance protected or equivalent pump motor that has a locked rotor current of less than 2.4 A. Most small wet rotor circulators are suitable as described in TechNote 13. The 31667 has an internal overload fuse which is rated at 2.5 A 250 V (ac). Contact your HeatLink sales representative for details on the repair procedures if the fuse is blown.

If a variable speed injection pump is used, connect one of the wires from the variable speed injection pump to the Opn / Var terminal (1) on the 31667. Connect the Pwr Mix terminal (2) to the live (L) side of the 115 V (ac) power source. The other wire on the variable speed injection pump must be connected to the neutral (N) side of the 115 V (ac) power supply.



Mixing Valve Actuator

If a mixing valve is used, connect one side of the 24 V (ac) power to the Pwr Mix terminal (2) on the control. The output relay Opn / Var (1) is then connected to the open terminal of the actuating motor and the output relay Cls (3) is connected to the close terminal of the actuating motor. Connect the second side of the 24 V (ac) circuit to the common terminal of the actuating motor.

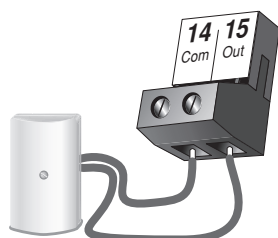


Sensor and Unpowered Input Connections

DO NOT APPLY POWER TO THESE TERMINALS AS THIS WILL DAMAGE THE CONTROL.

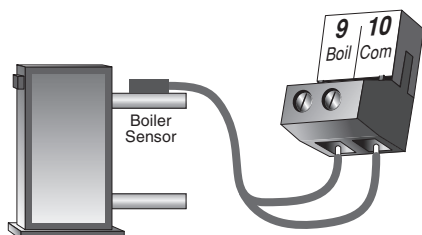
Outdoor Sensor

Connect the two wires from the Outdoor Sensor 30070 to the Com and Out terminals (14 and 15). The outdoor sensor is used by the 31667 to measure the outdoor air temperature.



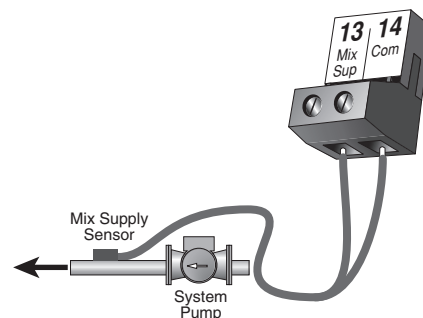
Boiler Sensor

Connect the two wires from the Boiler Sensor 30071 to the Boil and Com terminals (9 and 10). The boiler sensor is used by the 31667 to measure the water temperature of the boiler. The boiler sensor can be located on the supply or the return. See Section C.



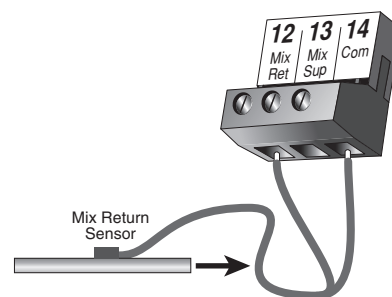
Mixing Supply Sensor

Connect the two wires from the Mix Supply Sensor 30071 to the Mix Sup and Com terminals (13 and 14). The mixing supply sensor is used by the 31667 to measure the fluid supply temperature after the mixing device. Normally the sensor is attached downstream of the mixing pump.



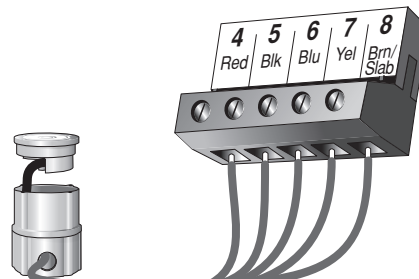
Mixing Return Sensor

Connect the two wires from the Mix Return Sensor 30071 to the Com and Mix Ret terminals (12 and 14). The mixing return sensor is used by the 31667 to measure the fluid return temperature from the snow melting slab.



Either: Snow / Ice Sensor 30090

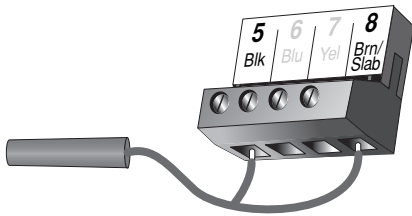
Connect the red wire from the sensor cable to the Red terminal (4), connect the black wire from the sensor cable to the Blk terminal (5), connect the blue wire from the sensor cable to the Blu terminal (6), connect the yellow wire from the sensor cable to the Yel terminal (7) and connect the brown wire from the sensor cable to the Brn / Slab terminal (8). The snow / ice sensor is used by the 31667 to measure the slab surface temperature and to detect the presence of moisture. This sensor must be installed flush with the slab surface and 1/2 way between the heating pipes. See L630090 for installation instructions regarding the Snow / Ice Sensor 30090 and Sensor Socket 30091.



OR: Slab Sensor

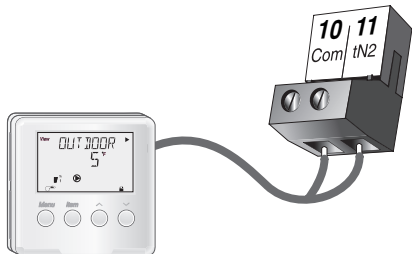
If a Snow / Ice Sensor 30090 is not used, a slab sensor can be used. If a slab sensor is used, connect the two wires from the slab sensor to the Blk and Brn / Slab terminals (5 and 8). The slab sensor is used by the 31667 to measure the slab temperature.

Note: Proper sensor placement is critical for correct operation, of the 31667 control. The slab sensor must be installed 1/2 way between the heating pipes and 1 in (25 mm) below the surface of the slab. Although the sensor can be installed directly into the slab, we recommend that the sensor be installed in tubing or conduit in such a manner that the sensor can be removed and replaced in case of failure.



tN2 Device

A Remote Display Module (RDM) 30040 or Remote Start / Stop Module 31039 can be connected to the tN2 input. Connect the Com terminal from the appropriate tN2 device to the Com terminal (10) on the 31667. Connect the tN2 terminal from the appropriate tN2 device to the tN2 terminal (11) on the 31667. Note: The wires from the RDM and Remote Start / Stop Module are polarity sensitive. The tN2 device does not operate correctly if the wires are reversed.



Step Five: Testing the Wiring

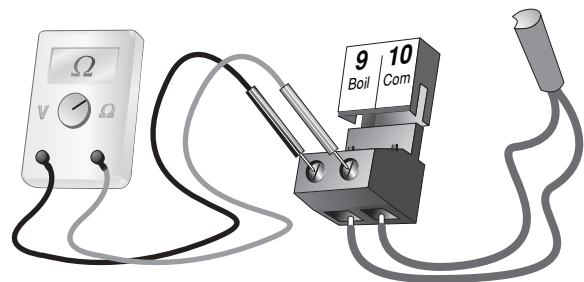
Each terminal block must be unplugged from its header on the control before power is applied for testing. To remove the terminal block, pull straight down from the control.

The following tests are to be performed using standard testing practices and procedures and should only be carried out by properly trained and experienced persons.

A good quality electrical test meter, capable of reading from at least 0 – 300 V (ac) and at least 0 – 2,000,000 Ω , is essential to properly test the wiring and sensors.

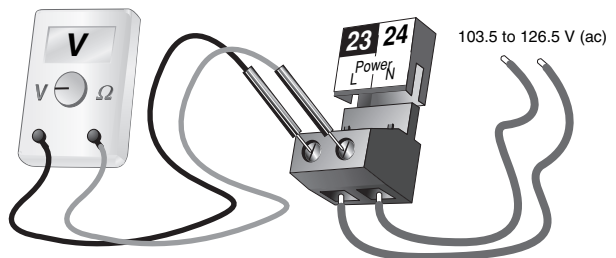
Test The Sensors

In order to test the sensors, the actual temperature at each sensor location must be measured. A good quality digital thermometer with a surface temperature probe is recommended for ease of use and accuracy. Where a digital thermometer is not available, a spare sensor can be strapped alongside the one to be tested and the readings compared. Test the sensors according to the instructions in L630070 or L630090.



Test The Power Supply

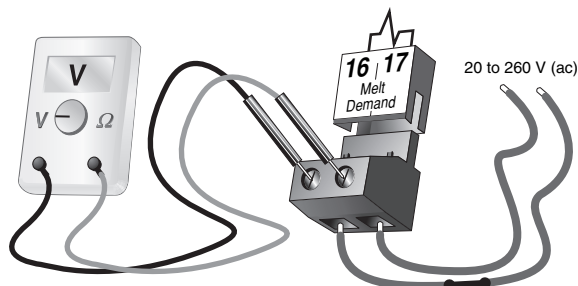
Make sure exposed wires and bare terminals are not in contact with other wires or grounded surfaces. Turn on the power and measure the voltage between the Power L and Power N terminals (23 and 24) using an AC voltmeter, the reading should be between 103.5 and 126.5 V (ac).



Test The Powered Inputs

Melt Demand

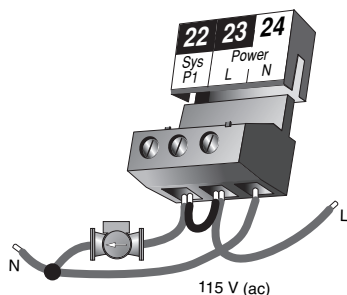
If a Melt demand is used, measure the voltage between the Melt Demand terminals (16 and 17). When the melting or idling device calls for heat, you should measure between 20 and 260 V (ac) at the terminals. When the melting or idling device is off, you should measure less than 5 V (ac).



Test The Outputs

System Pump (Sys P1)

If a system pump is connected to the Sys P1 terminal (22), make sure that power to the terminal block is off and install a jumper between the Sys P1 and Power L terminals (22 and 23). When power is applied to the Power L and Power N terminals (23 and 24), the system pump should start. If the pump does not turn on, check the wiring between the terminal block and pump and refer to any installation or troubleshooting information supplied with the pump. If the pump operates properly, disconnect the power and remove the jumper.



System Pump (System Pmp 2)

If a pump is connected to the System Pmp 2 terminals (18 and 19), make sure power to the pump circuit is off and install a jumper between the System Pmp 2 terminals (18 and 19). When the circuit is powered up, the pump should turn on. If no response occurs, check the wiring between the terminal and the pump and refer to any installation or troubleshooting information supplied with the pump. If the pump operates properly, disconnect the power and remove the jumper.

Boiler

If the boiler circuit is connected to the Boiler terminals (20 and 21), make sure power to the boiler circuit is off, and install a jumper between the terminals. When the boiler circuit is powered up, the boiler should fire. If the boiler does not turn on, refer to any installation or troubleshooting information supplied with the boiler. (The boiler may have a flow switch that prevents firing until the boiler pump is running). If the boiler operates properly, disconnect the power and remove the jumper.

Variable Speed Injection Pump

If a variable speed injection pump circuit is connected to the Opn / Var and Pwr Mix terminals (1 and 2), make sure the power to the terminal block is off and install a jumper between the Opn / Var and Pwr Mix terminals (1 and 2). When the variable speed pump circuit is powered up, the variable speed pump should operate at full speed. If the pump does not operate, check the wiring between the terminal block and the pump and refer to any installation or troubleshooting information supplied with the pump. If the pump operates properly, disconnect the power and remove the jumper.

Mixing Valve Actuator

If a floating action actuating motor circuit is connected to the Pwr Mix (2), Opn / Var and Cls terminals (1 and 3), make sure power to the motor circuit is off and install a jumper between the Pwr Mix and Opn / Var terminals (2 and 1). When the circuit is powered up, the actuator should move in the opening direction. If it does not, check the wiring between the terminals and the actuating motor. Refer to any installation or troubleshooting information supplied with the motor. If the motor closes instead of opening, the wiring of the actuating motor must be reversed. If the valve opens correctly, turn off the power to the circuit and remove the jumper. Install a jumper between the Pwr Mix and Cls terminals (2 and 3). When the circuit is powered up, the actuator should move in the closing direction. If it does not, check the wiring between the terminals and the actuating motor. Refer to any installation or troubleshooting information supplied with the motor. If the motor closes correctly, turn off the power to the circuit and remove the jumper.

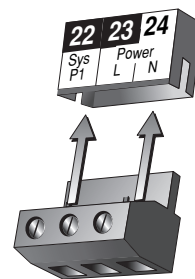
Connecting The Control

Make sure all power to the devices and terminal blocks is off, and remove any remaining jumpers from the terminals.

Reconnect the terminal blocks to the control by carefully aligning them with their respective headers on the control, and then pushing the terminal blocks into the headers. The terminal blocks should snap firmly into place.

Install the supplied safety dividers between the unpowered sensor inputs and the powered wiring chambers.

Apply power to the control. The operation of the control on power up is described in the Sequence of Operation section of this brochure.



Cleaning

The control's exterior can be cleaned using a damp cloth. Moisten cloth with water and wring out prior to wiping control. Do not use solvents or cleaning solutions.

31667 View Menu

Item Field	Section	Description	Range
OUT DOOR		Outdoor: Current outdoor air temperature as measured by the outdoor sensor.	-67 to 149°F (-55 to 65°C)
SLAB TRG	E1	Slab Target: Slab sensor target temperature.	---, -58 to 167°F (---, 50 to 75°C)
SLAB	E1	Slab: Current slab sensor temperature.	-58 to 167°F (-50 to 75°C)
STATUS	B1	Status: Operating status.	STRT, STOP, IDLE, EXT, 0:00 to 23:59 hr, ---, INF, WWSD, CWCO, DET
MIX TRG	A	Mix Target: The current mix target temperature as calculated by the control.	---, -25 to 248°F (---, -32 to 120°C)
MIX SUP	B1	Mix Supply: Current mixed supply water temperature as measured by the mixing supply sensor.	-31 to 266°F (-35 to 130°C)
MIX RET	B1	Mix Return: Current mixed return water temperature as measured by the mixing return sensor. Mix Ret Sensor present	-58 to 167°F (-50 to 75°C)
ΔT	B1	ΔT: Current mixed ΔT difference between the mixed supply sensor and the mixed return sensor. ΔT MAX ≠ OFF	-85 to 170°F (-65 to 75°C)
Boil SUP	C1	Boil Supply: Current boiler supply water temperature as measured by the boiler sensor. Boil SENS = SUP	-31 to 266°F (-35 to 130°C)
Boil RET	C2	Boil Return: Current boiler return water temperature as measured by the boiler sensor. Boil SENS = RET	-31 to 266°F (-35 to 130°C)

31667 Adjust Menu

Item Field	Section	Description	Range	Actual Setting
RUN TIME	B1	Run Time: The time for which the zone is operated once it has reached its melting temperature. This item cannot be viewed if a Remote Start / Stop Module 31039 has been connected.	0:30 to 17:00 hr, INF (Infinity) Default = 4:00 hr	
ADD MELT	E1	Add Melt: The additional time for which the zone is operated once the Snow / Ice Sensor 30090 becomes dry. Sensor 30090 present	0:00 to 6:00 hr, Default = 0:30 hr	
SENSITVITY	D1	Sensitivity: Sensitivity of water detection of the Snow / Ice Sensor 30090. Sensor 30090 present	AUTO, 20 to 80% Default = AUTO	
MELTING	E1	Melting: The desired slab surface temperature while in the Melting Mode.	32 to 95°F (0 to 35°C) Default = 36°F (2°C)	
IDLING	F1	Idling: The desired slab surface temperature while in the Idling Mode.	OFF, 20 to 95°F (OFF, -7 to 35°C) Default = OFF	
WWSD		WWSD: Warm Weather Shut Down.	AUTO, 32 to 95°F (AUTO, 0 to 35°C) Default = AUTO	
CWCO	B1	Cold Weather Cut Out: The Cold Weather Cut Out temperature for the snow melting system.	-30 to 50°F (-34 to 10°C) Default = 10°F (-12°C)	
MIX MAX	A	Mix Max: The maximum supply water temperature for the mixing system.	80 to 210°F, OFF (27 to 99°C, OFF) Default = 150°F (66°C)	
MIXING		Mixing: The type of mixing device that is to be used.	FLOT (Floating) VAR (Variable Speed), Default = VAR	
MOTR SPD		Motor Speed: The time the actuating motor requires to operate from fully closed to fully open. MIXING = FLOT	30 to 230 seconds Default = 150 seconds	
Boil SENS	C	Boil Sensor: The location of the boiler sensor. This affects operation of the Boiler contact.	SUP, RET, NONE Default = SUP	
ΔT MAX	B1	ΔT Maximum: The maximum ΔT for the snow melting system.	10 to 70°F, OFF (6 to 39°C, OFF) Default = OFF	
DIFF	C1	Differential: The differential for the snow melting system. Boil SENS = SUP	AUTO, 2 to 42°F (AUTO, 1 to 23°C) Default = AUTO	
Boil MIN	A C1	Boil Minimum: The minimum temperature allowed for the boiler target temperature. Boil SENS ≠ NONE	OFF, 80 to 180°F (OFF, 27 to 82°C) Default = 140° (60°C)	
FIRE DLY	C1	Fire Delay: The time delay the control can expect between the time the Boiler contact closes and the boiler fires. Boil SENS = SUP	0:00 to 3:00 minutes Default = 0:10 min	
Boil MASS	C1	Boil Mass: The thermal mass characteristics of the boiler that is being used. Boil SENS = SUP	LITE, MED, HEVY Default = MED	
EXERCISE	A	Exercise: The frequency with which the control exercises the pumps and valves that are operated by the control.	30 to 240 hours, (in 10 hour steps) Default = 70 hr	
UNITS		Units: The units of measure that all of the temperatures are to be displayed in by the control.	°F, °C Default = °F	

Testing the Control

The Snow Detector & Melting Control 31667 has a built-in test routine which is used to test the main control functions. The 31667 continually monitors the sensors and displays an error message whenever a fault is found. See the following pages for a list of the 31667's error messages and possible causes. When the Test button is pressed, the test light is turned on. The individual outputs and relays are tested in the following test sequence.

Test Sequence

Each step in the test sequence lasts 10 seconds.

During the test routine, the test sequence is paused by pressing the Test button. While paused, the control displays the testing step as well as the word PAUS. If the Test button is not pressed again for 5 minutes while the test sequence is paused, the control exits the entire test routine. If the test sequence is paused, the Test button can be pressed again to advance to the next step. This can also be used to rapidly advance through the test sequence. To reach the desired step, repeatedly press and release the Test button until the appropriate device and segment in the display turn on.

Step 1 - If FLOT is selected in the Mixing item, the mixing valve is run fully open in the time set by the Motr Spd item. If Var is selected in the Mixing item, the injection pump is ramped up over 10 seconds.

Step 2 - If FLOT is selected in the Mixing item, the mixing valve is run fully closed in the time set by the Motr Spd item. If Var is selected in the Mixing item, the injection pump is ramped down over 10 seconds.

Step 3 - The System Pmp 2 contact is turned on for 10 seconds. After 10 seconds, the System Pmp 2 contact is turned off.



Step 4 - The System Pump contact (Sys P1) is turned on for 10 seconds.

Step 5 - The Boiler contact is turned on for 10 seconds. After 10 seconds, the Boiler contact and Sys P1 contacts are shut off.

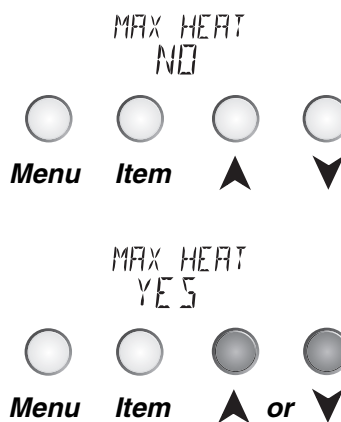
Max Heat

The Snow Detector & Melting Control 31667 has a function called MAX HEAT. In this mode, the 31667 turns on and operates the system up to the maximum set temperatures, and the mixing device at the set percentage. The control continues to operate in this mode for up to 24 hours or until either the Item, Menu or Test button is pressed. This mode may be used for running all circulators during system start-up in order to purge air from the piping. To enable the MAX HEAT feature, use the following procedure.

- 1) Press and hold the Test button for more than 3 seconds. At this point, the control displays the words MAX HEAT and the word NO.
- 2) Using the ▲ or ▼ buttons, select the word YES. After 3 seconds, the control flashes the word MANUAL and the number 100. This number represents the desired output from the mixing device.
- 3) Set the desired output of the mixing device by using the ▲ and / or ▼ buttons on the control.
- 4) To cancel the MAX HEAT mode, press either the Item, Menu, or Test button.
- 5) Once the MAX HEAT mode has either ended or is cancelled, the control resumes normal operation.

Test  

off not testing
red testing
red testing paused



31667 Error Messages (1 of 2)

Error Displayed	Description or Error
CTRL ERR EE W	The control was unable to store a piece of information into its EEPROM. This error can be caused by a noisy power source. The control will display the error message and will continue to operate as normal. Pressing either the Menu or Item button will clear this error.
CTRL ERR ADJUS	The control was unable to read a piece of information stored in the ADJUST menu. Because of this, the control was required to load the factory settings into all of the items in the ADJUST menu. The control will stop operation until all of the items available in the ADJUST menu of the control have been checked by the user or installer. <i>Note: Access level must be ADV in order to clear the error.</i>
tN2 TYPE	An incorrect device has been connected to the tN2 input terminal. Once the problem has been corrected, press either the Menu or Item button to clear the error message from the control.
tN2 SHRT	A short circuit has been read between the tN2 terminal and a Com terminal on the control. Either the wires leading to the tN2 device are shorted or the polarity of the wires is reversed. Determine the cause and remove the short. To clear this error, press either the Menu or Item button.
OUT DOOR SHRT	The control is no longer able to read the outdoor sensor due to a short circuit. In this case the control assumes an outdoor temperature of 32°F and continues operation. Locate and repair the problem as described in L630070. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
OUT DOOR OPEN	The control is no longer able to read the outdoor sensor due to an open circuit. In this case the control assumes an outdoor temperature of 32°F and continues operation. Locate and repair the problem as described in L630070. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
MIX SUP SHRT	The control is no longer able to read the mixing supply sensor due to a short circuit. In this case, the control does not operate the snow melting system. Locate and repair the problem as described in L630070. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
MIX SUP OPEN	The control is no longer able to read the mixing supply sensor due to an open circuit. In this case, the control does not operate the snow melting system. Locate and repair the problem as described in L630070. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
MIX RET SHRT	The control is no longer able to read the mixing return sensor due to a short circuit. If the ΔT MAX item is set to OFF, the control will continue to operate as if the mixing return sensor was not connected to the control. If the ΔT MAX item is not set to OFF, the control does not operate the snow melting system. Locate and repair the problem as described in L630070. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
MIX RET OPEN	The control is no longer able to read the mixing return sensor due to an open circuit. If the ΔT MAX item is set to OFF, the control will continue to operate as if the mixing return sensor was not connected to the control. If the ΔT MAX item is not set to OFF, the control does not operate the snow melting system. Locate and repair the problem as described in L630070. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.

31667 Error Messages (2 of 2)

Error Displayed	Description or Error
Boil SENS SHRT	The control is no longer able to read the boiler sensor due to a short circuit. If the Boil MIN item is set to OFF, the control operates the Boiler contact when the mixing device starts to operate. If the Boil MIN is not set to OFF, the control does not operate the snow melting system. Locate and repair the problem as described in L630070. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
Boil SENS OPEN	The control is no longer able to read the boiler sensor due to an open circuit. If the Boil MIN item is set to OFF, the control operates the Boiler contact when the mixing device starts to operate. If the Boil MIN is not set to OFF, the control does not operate the snow melting system. Locate and repair the problem as described in L630070. If the boiler sensor was deliberately not installed, set the Boil SENS item to NONE. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
SLAB SHRT	The control is no longer able to read the slab sensor due to a short circuit. In this case, if the control is currently in the MELTING mode, the control will target a fixed mixing water temperature until the melting cycle is finished. Locate and repair the problem as described in L630070 or L630090. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
SLAB OPEN	The control is no longer able to read the slab sensor due to an open circuit. In this case, if the control is currently in the MELTING mode, the control will target a fixed mixing water temperature until the MELTING cycle is finished. Locate and repair the problem as described in L630070 or L630090. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
YELLOW SHRT	The control is no longer able to read the yellow sensor due to a short circuit. In this case, the control will turn off the heater in the Snow / Ice Sensor 30090. Check the 30090 yellow temperature sensor (black and yellow wires, terminals 4 & 6), and the wiring from the terminal plug to the sensor. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
YELLOW OPEN	The control is no longer able to read the yellow sensor due to an open circuit. In this case, the control will turn off the heater in the Snow / Ice Sensor 30090. Check the 30090 yellow temperature sensor (black and yellow wires, terminals 4 & 6), and the wiring from the terminal plug to the sensor. To clear the error message from the control after the sensor has been repaired, press either the Menu or Item button.
BLUE SHRT	The control is no longer able to read the water detection circuit due to a short circuit. In this case, if the control is currently in the MELTING mode, the control will finish the snow melting cycle. The snow melting system can only be operated using an external melt demand, Remote Display Module 30040 or the Remote Start / Stop Module 31039. Otherwise, the control will operate as if the Snow / Ice Sensor 30090 is dry. Check the 30090 water detection circuit (black and blue wires, terminals 4 & 5) according to L630070. To clear the error message from the control after the error has been repaired, press either the Menu or Item button.
BLUE OPEN	The control is no longer able to read the water detection circuit due to an open circuit. In this case, if the control is currently in the MELTING mode, the control will finish the snow melting cycle. The snow melting system can only be operated using an external melt demand, Remote Display Module 30040 or the Remote Start / Stop Module 31039. Otherwise, the control will operate as if the Snow / Ice Sensor 30090 is dry. Check the 30090 water detection circuit (black and blue wires, terminals 4 & 5) according to L630090. To clear the error message from the control after the error has been repaired, press either the Menu or Item button.
RED ERR	The control is reading a heater malfunction. In this case, unless the yellow sensor becomes too hot, the heater continues to try to operate. The snow melting system can only be operated using an external melt demand, Remote Display Module 30040 or the Remote Start / Stop Module 31039. Check the 30090 heater circuit (red and black wires, terminals 3 & 4) according to L630090. Make sure the yellow and brown wires are not reversed. To clear the error message from the control after the error has been repaired, press either the Menu or Item button.
CTRL ERR HOT	The control's internal sensor is too hot. (Above 160°F (71°C)) In this case, the control will turn off the heater in the Snow / Ice Sensor 30090 until the control cools off. To clear the error message from the control after the error has been repaired, press either the Menu or Item button.

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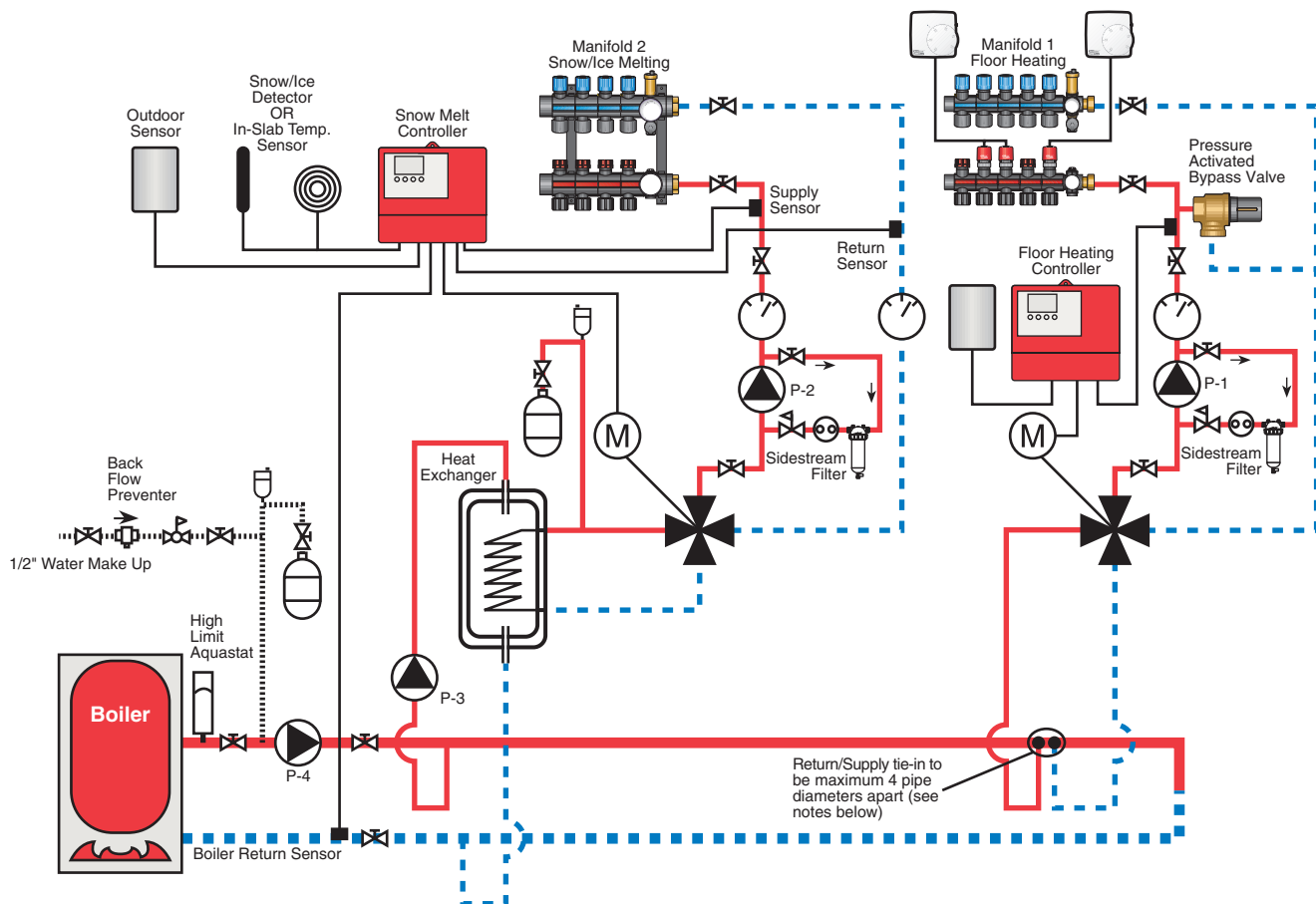
3 Circuit (Fully Auto. Mod. Snowmelt & Fl. Heat. c/w Heat Exchanger)

Application:

Cast iron high mass boiler c/w 3 circuits

(two low temp. circuit - fully automatic modulating water temp for floor heating & snow melting.)

(one high temp. circuit off boiler primary loop for snow melt heat exchanger.)



Note: • To maintain proper flow through boiler, piping MUST be completed as shown, ie. IFHWH supply & return connections to be tied in BEFORE the mixing valve!
• Thermal traps must be used to prevent uncontrolled heat-up from hot water migration. (drop piping a minimum of 16")

Note:

- Air vents, expansion tanks, pressure relief valves etc. For boiler as per local codes.
- Drawings are for HeatLink® suggested system layout only. User must determine if system layout will work for their particular application!
- Use isolation ball valves for all circuits and components.
- Expansion tank sizing for the snow melting circuit to take into account the ratio of glycol freeze protection in the system.

Control sequence:

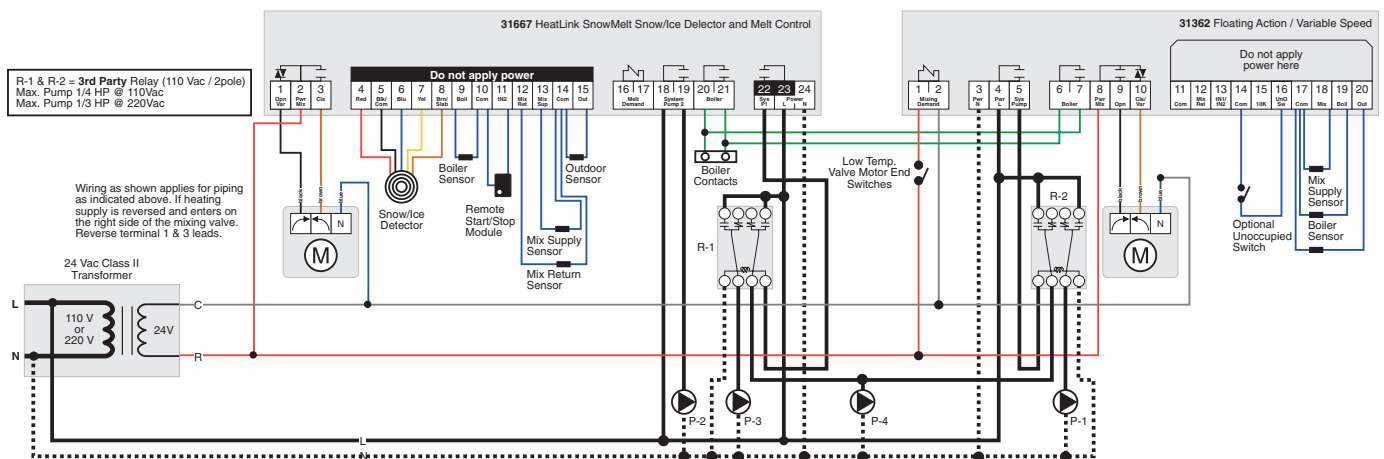
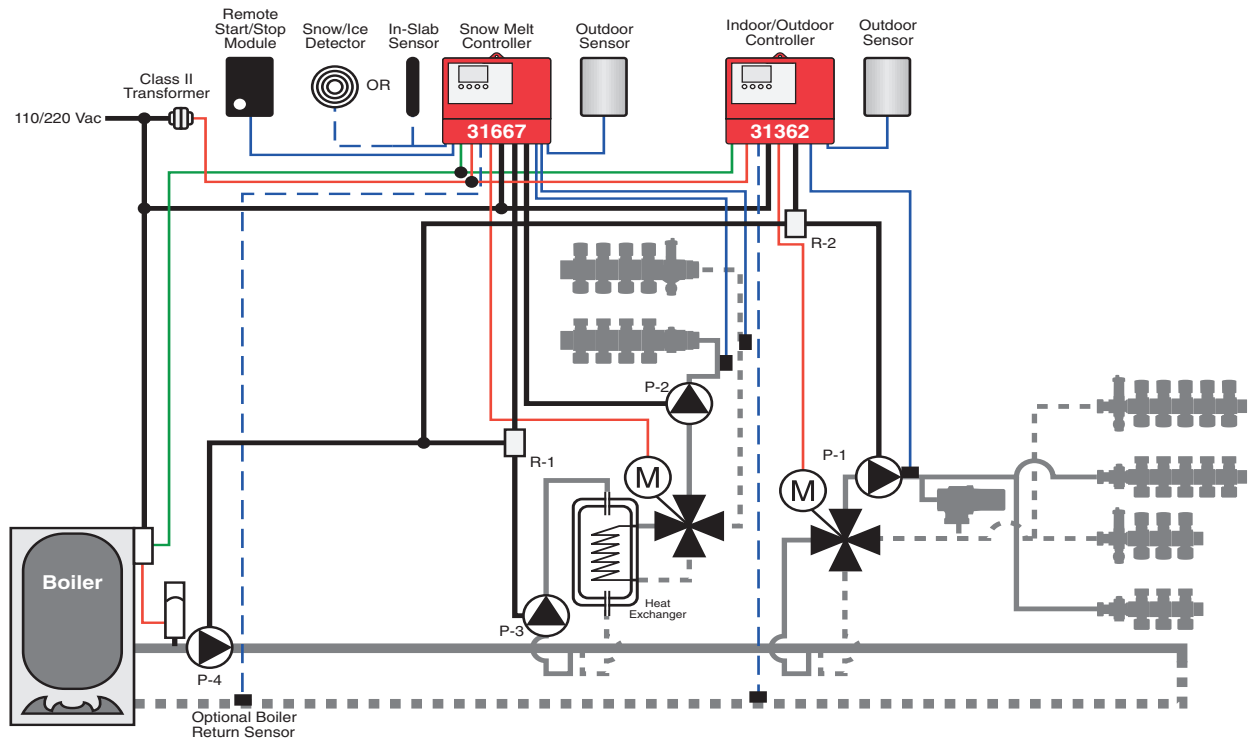
- Indoor/outdoor and Snow Melt control units provide the correct water temperature for the HeatLink® radiant floor heating & snow melting systems. By correlating outside air temperature, supply water temperature & room temperature for the floor heating circuit, supply and return system water, boiler return water & slab temperature for the snow melt circuit the control units then activate their respective 4-way mixing valve motors which in turn modulate the supply water temperatures to the floor & snow melting circuits. (See ELECT 1.12 & 1.13).
 - Boiler to fire either: 1) Independently on its own operating aquastat which in turn controls boiler water temperature or 2) By activation through a relay of the controllers. APPLICATION TO USE OPTION (____). (Note: Wire gas valve in series with high limit safety aquastat.)
 - Primary pump (P-4) to be wired through a relay which will be activated by the snow melt or floor heating controllers (see ELECT 2.1).
 - Pumps (P-1, P-2, P-3) to be wired directly with their own disconnect switches. Pumps to operate either: 1) Continually or 2) By activation through a relay of the respective indoor/outdoor or snowmelt controllers. (See ELECT 2.1)
- FOR THIS PARTICULAR APPLICATION P-1 TO OPERATE AS PER OPTION (____), & P-2, P-3 AS PER OPTION (____)

Automatic Snowmelting & Fl. Heat. Activating a 4-way Mixing Valve

Application:

Automatic Snow melt controller c/w slab or snow/ice & moisture sensor activating a 4-way mixing valve motor, plus automatic floor heating.

(High mass boiler c/w heat exchanger plus primary and system pumps)



Note:

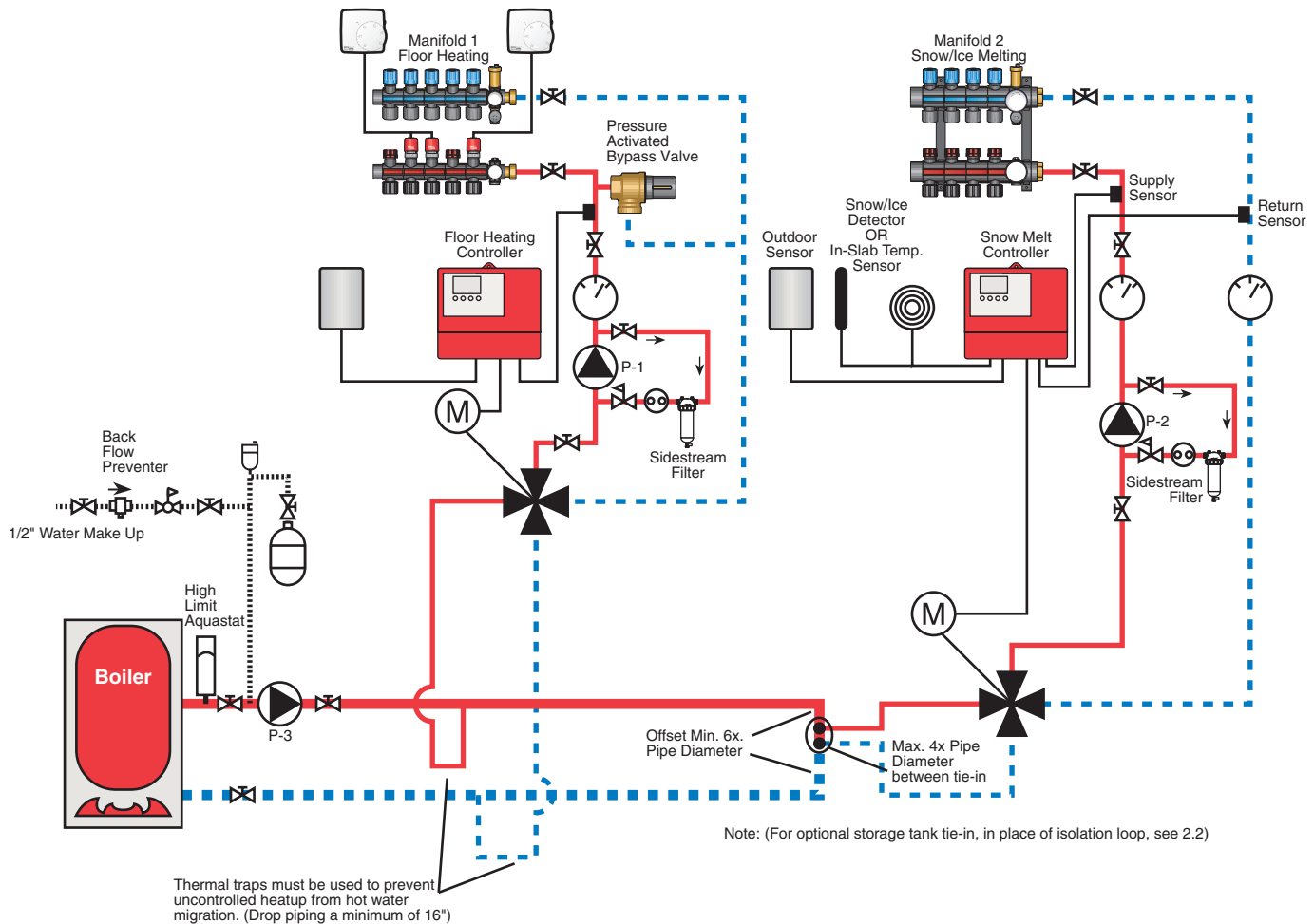
- Drawings are for HeatLink® suggested electrical schematics only! User must determine if electrical schematic will work for their particular application. User must also confirm all HeatLink® schematics with manufacturer schematics of each particular control chosen.
- In all cases manufacturer equipment schematics will take precedence over HeatLink® electrical schematics.
- All wiring as per applicable electrical codes!

2 Circuit (Fully Auto. Mod. Snowmelt & Fl. Heat. c/w Isolation Loop)

Application:

Cast iron high mass boiler c/w 2 circuits

(two low temp. circuit - fully automatic modulating water temperature for floor heating and snow melting.)
(snow melting circuit utilizes an isolation loop for proper mixing valve operation)



Note:

- Air vents, expansion tanks, pressure relief valves etc. For boiler as per local codes.
- Drawings are for HeatLink® suggested system layout only. User must determine if system layout will work for their particular application!
- Use isolation ball valves for all circuits and components.
- Expansion tank sizing for the snow melting circuit to take into account the ratio of glycol freeze protection in the system.

Control Sequence:

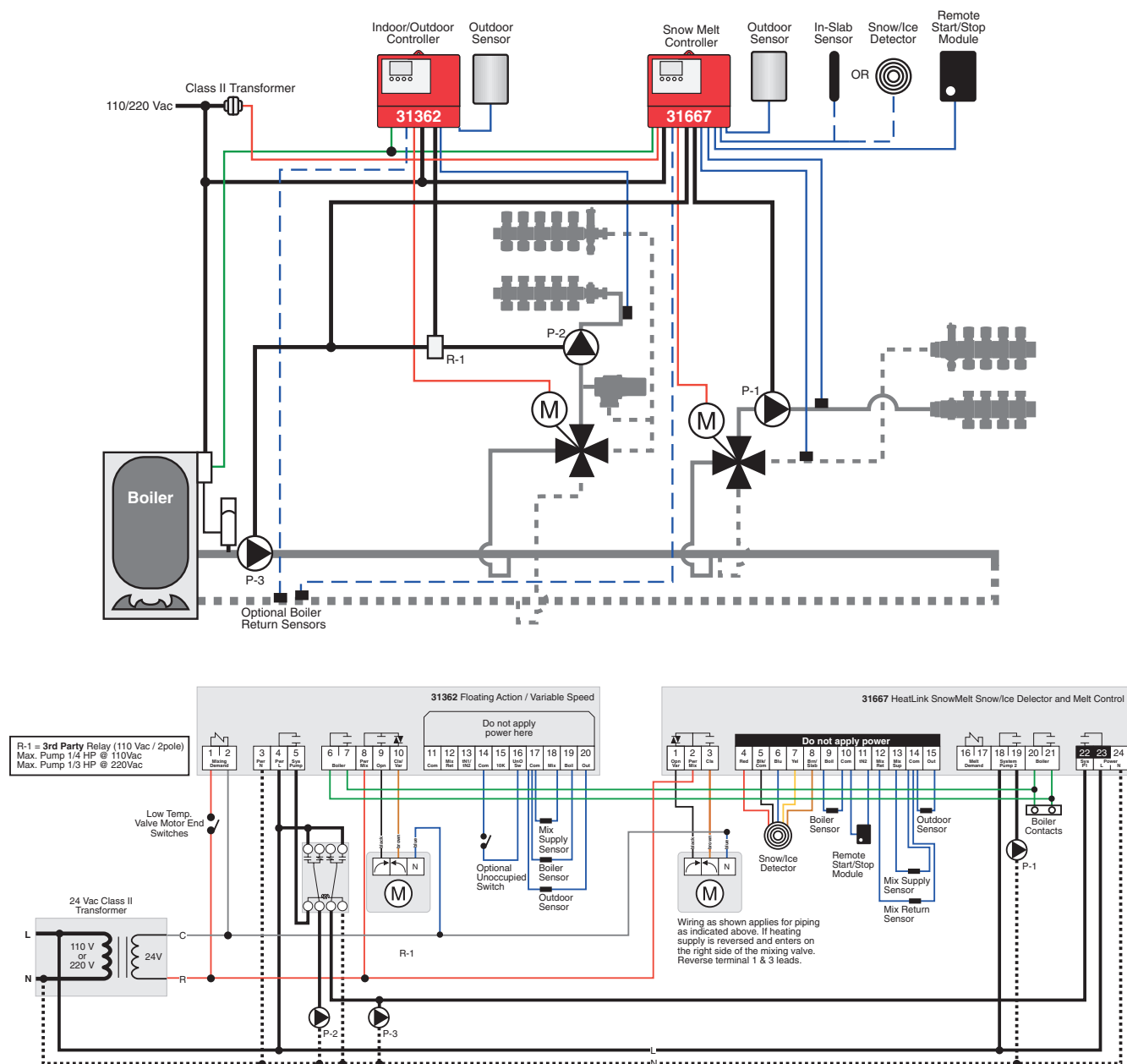
- Indoor/outdoor and SnowMelt control unit provides the correct water temperature for the HeatLink® radiant floor heating & snow melting systems. By correlating outside air temperature, supply water temperature & room temperature for the floor heating circuit, supply and return system water, boiler return water & slab temperature for the snow melt circuit the control units then activate their respective 4-way mixing valve motors which in turn modulate the supply water temperatures to the floor & snow melting circuits. (See ELECT 1.12 & 1.13).
 - Boiler to fire either: 1) Independently on its own operating aquastat which in turn controls boiler water temperature or 2) By activation through a relay of the controllers. APPLICATION TO USE OPTION (____). (Note: Wire gas valve in series with high limit safety aquastat.)
 - Primary pump (P-3) to be wired through a relay which will be activated by the snow melt or floor heating controllers (see ELECT 2.3).
 - Pumps (P-1, P-2, P-3) to be wired directly with their own disconnect switches. System pumps (P-1 & P-2) to operate either: 1) Continually or 2) By activation through a relay of the respective indoor/outdoor or snowmelt controllers. (See ELECT 2.3)
- FOR THIS PARTICULAR APPLICATION P-1 TO OPERATE AS PER OPTION (____), & P-2 AS PER OPTION (____)

Auto. Snowmelt Activating a 4-Way Mix. Valve (c/w Isolation Loop)

Application:

Automatic Snow melt controller c/w slab sensor or snow/ice & moisture detector activating a 4-way mixing valve motor.

(Dedicated high mass snowmelt boiler c/w primary and secondary pumps)



Note:

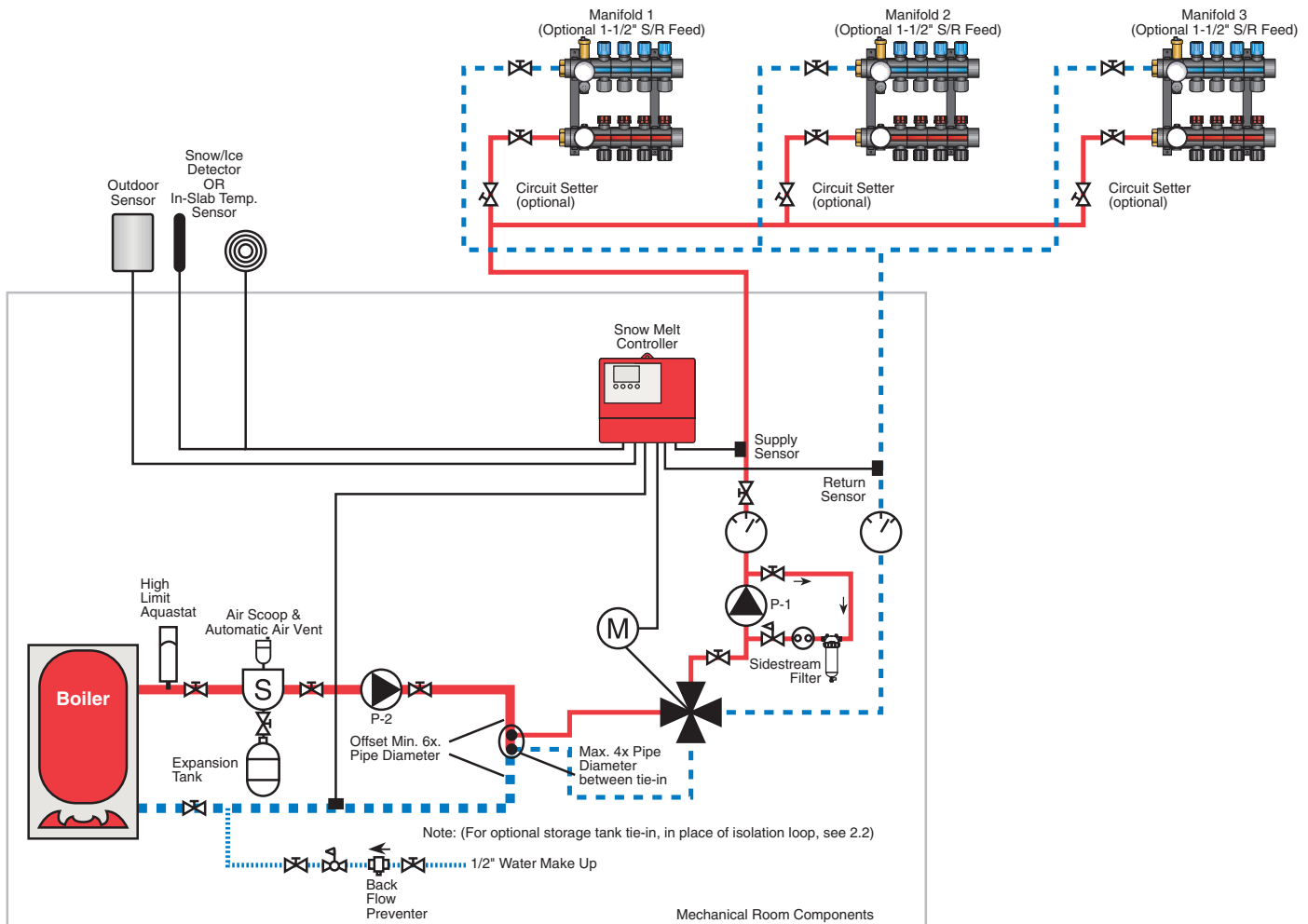
- Drawings are for HeatLink® suggested electrical schematics only! User must determine if electrical schematic will work for their particular application. User must also confirm all HeatLink® schematics with manufacturer schematics of each particular control chosen.
- In all cases manufacturer equipment schematics will take precedence over HeatLink® electrical schematics.
- All wiring as per applicable electrical codes!

1 Circuit (Fully Automatic Snowmelting c/w Dedicated Boiler)

Application:

Cast iron high mass dedicated boiler c/w fully automatic snow melt circuit

(one low temp. circuit - fully automatic modulating water temperature for snow melting c/w snow/ice detector and in-slab sensor.)



Note:

- Air vents, expansion tanks, pressure relief valves etc. For boiler as per local codes.
- Drawings are for HeatLink® suggested system layout only. User must determine if system layout will work for their particular application!
- Use isolation ball valves for all circuits and components.
- Expansion tank sizing for the snow melting circuit to take into account the ratio of glycol freeze protection in the system.

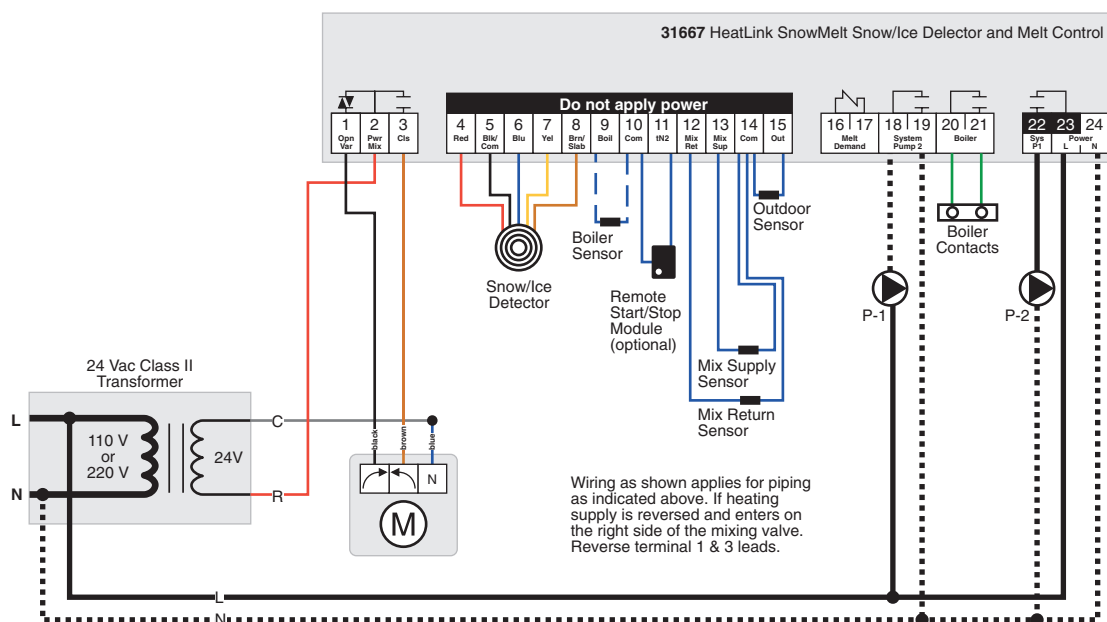
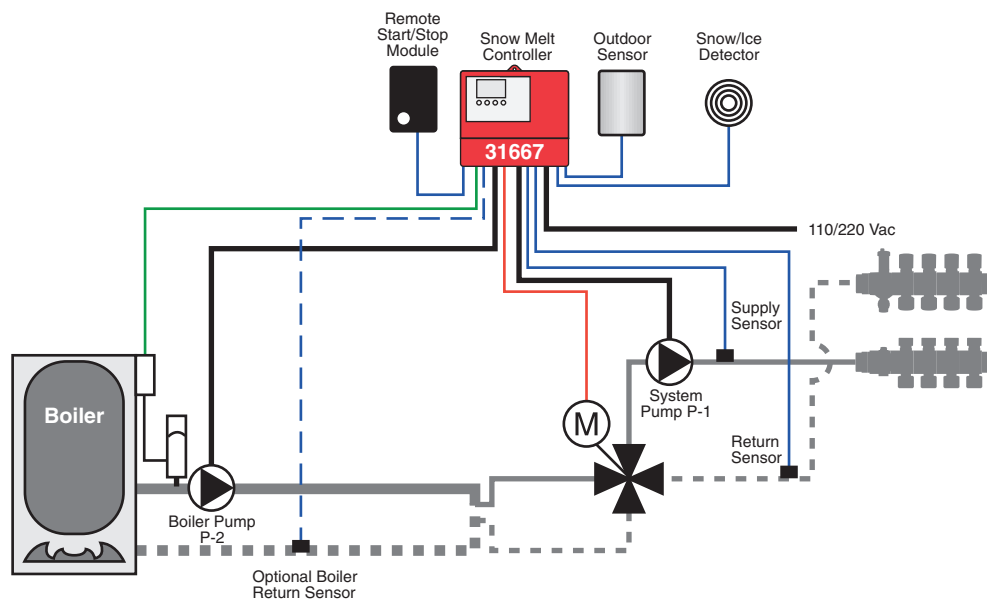
Control Sequence:

- SnowMelt control unit provides the correct water temperature for the HeatLink® snow melting system. By correlating outside air temperature, surface moisture, supply and return system water, boiler return water & slab temperature for the snow melt circuit, the control unit then activates the 4-way mixing valve motor which in turn modulates the supply water temperature to the snow melting circuits (see ELECT 1.12 & 1.13).
- Boiler to fire either: 1) Independently on its own operating aquastat which in turn controls boiler water temperature or 2) By activation through a relay of the controllers. APPLICATION TO USE OPTION (____). (Note: Wire gas valve in series with high limit safety aquastat.)
- Pumps (P-1 & P-2) to be wired directly with their own disconnect switches. Pump P-1 & P-2 to operate either: 1) Continually or 2) By activation through a relay of the snowmelt controller (see ELECT 2.4).
FOR THIS PARTICULAR APPLICATION P-1 & P-2 TO OPERATE AS PER OPTION (____).

Auto. Snowmelt Activating a 4-Way Mix. Valve (c/w Dedicated Boiler)

Application:

Automatic Snow melt controller c/w Snow/Ice & moisture detection activating a 4-way mixing valve motor
(Dedicated high mass snowmelt boiler c/w primary and secondary pumps)



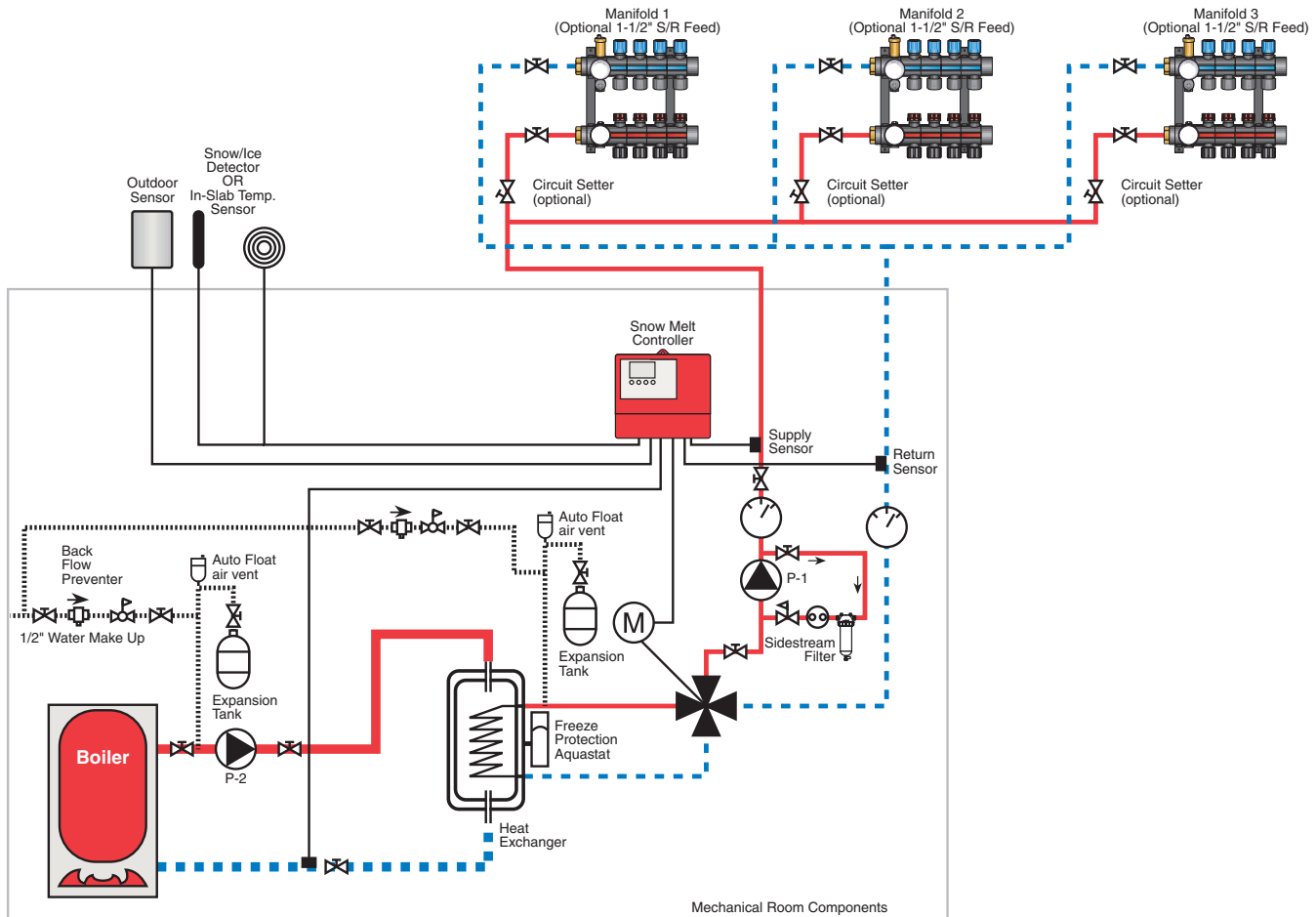
Note:

- Drawings are for HeatLink® suggested electrical schematics only! User must determine if electrical schematic will work for their particular application. User must also confirm all HeatLink® schematics with manufacturer schematics of each particular control chosen.
- In all cases manufacturer equipment schematics will take precedence over HeatLink® electrical schematics.
- All wiring as per applicable electrical codes!

1 Circuit (Fully Automatic Snowmelting c/w Heat Exchanger)

Application:

Fully automatic snow melt circuit isolated from boiler/heat source circuit through the use of a heat exchanger
(one low temp. circuit - fully automatic modulating water temperature for snow melting c/w snow/ice detector and in-slab sensor)
(one high temp. circuit off boiler/heat source primary loop for snow melt heat exchanger)



Note:

- Air vents, expansion tanks, pressure relief valves etc. For boiler as per local codes.
- Drawings are for HeatLink® suggested system layout only. User must determine if system layout will work for their particular application!
- Use isolation ball valves for all circuits and components.
- Expansion tank sizing for the snow melting circuit to take into account the ratio of glycol freeze protection in the system.

Control Sequence:

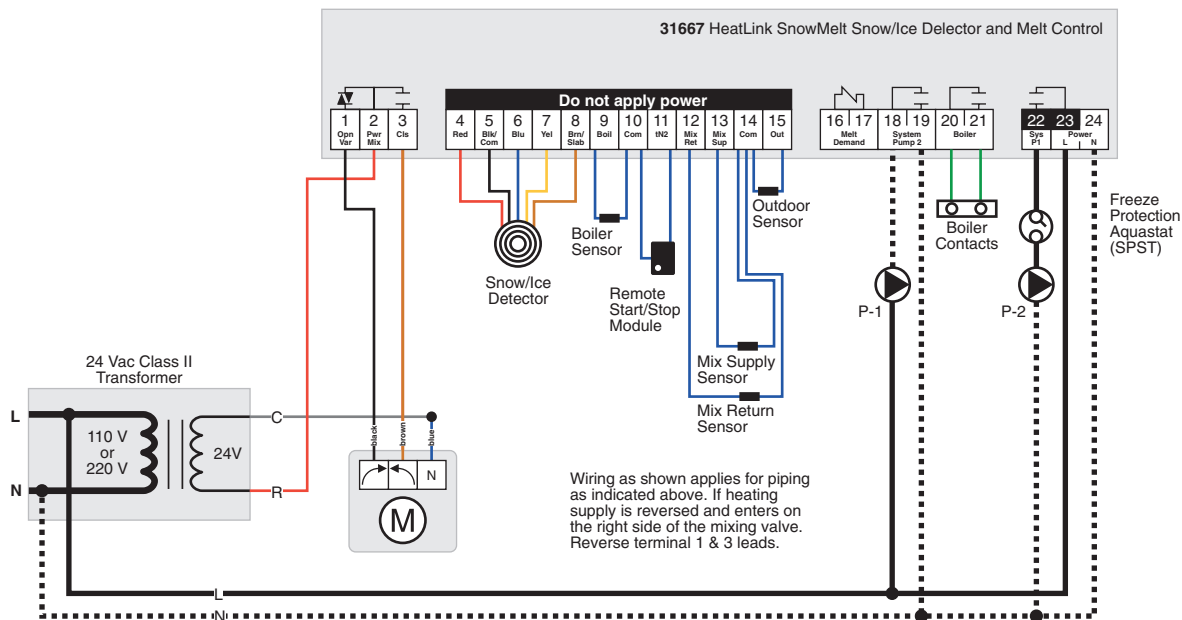
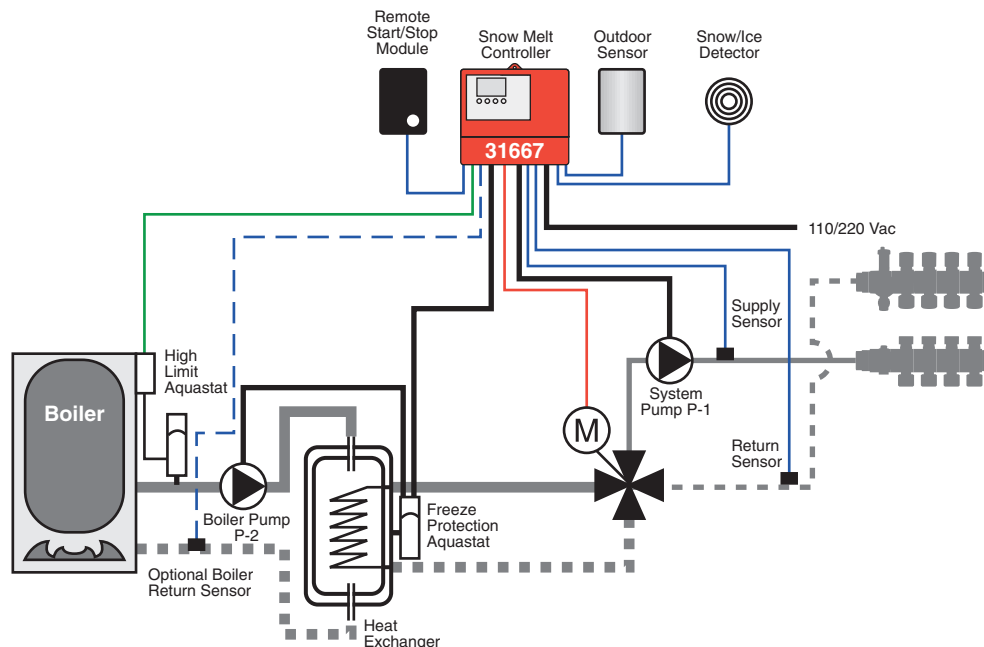
- SnowMelt control unit provides the correct water temperature for the HeatLink® snow melting system. By correlating outside air temperature, surface moisture, supply and return system water, boiler return water & slab temperature for the snow melt circuit, the control unit then activates the 4-way mixing valve motor which in turn modulates the supply water temperature to the snow melting circuits (see ELECT 1.12 & 1.13).
- Boiler to fire either: 1) Independently on its own operating controls or 2) By activation through a relay of the snow melting controls. APPLICATION TO USE OPTION (____).
- Primary pump (P-2) to be wired through a relay which will be activated by the snow melt control (see ELECT 2.5).
- Pumps (P-1 & P-2) to be wired directly with their own disconnect switches. System pump P-2 to operate either: 1) Continually or 2) By activation through a relay of the snowmelt controller (see ELECT 2.5)
FOR THIS PARTICULAR APPLICATION P-2 TO OPERATE AS PER OPTION (____).

Auto. Snowmelt Activating a 4-Way Mix. Valve (c/w Heat Exchanger)

Application:

Automatic Snow melt controller c/w Snow/Ice & moisture detection activating a 4-way mixing valve motor c/w heat exchanger freeze protection aquastat.

(Heat source tie-in through a heat exchanger c/w primary and secondary pumps)



Note:

- Drawings are for HeatLink® suggested electrical schematics only! User must determine if electrical schematic will work for their particular application. User must also confirm all HeatLink® schematics with manufacturer schematics of each particular control chosen.
- In all cases manufacturer equipment schematics will take precedence over HeatLink® electrical schematics.
- All wiring as per applicable electrical codes!

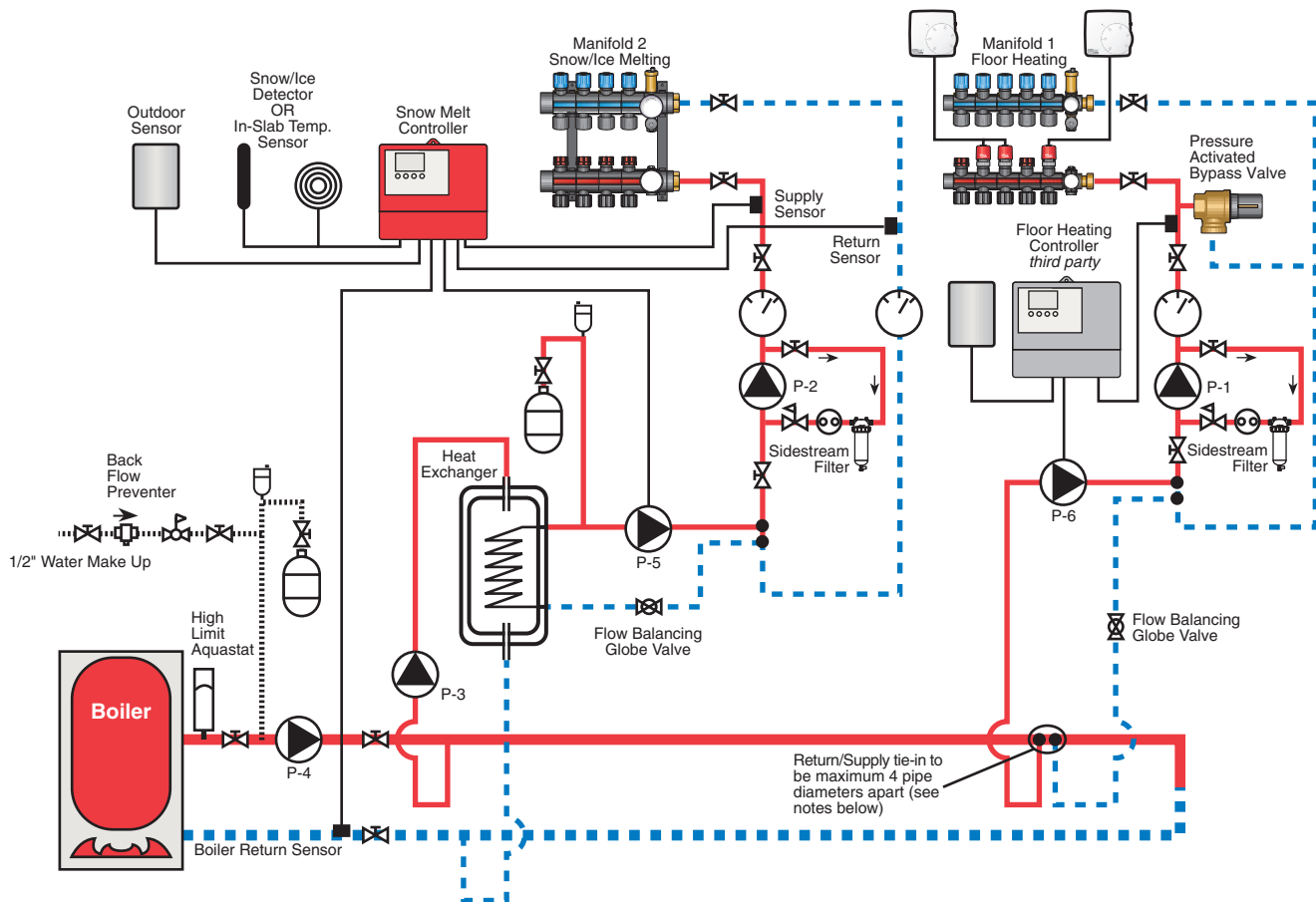
3 Circuit (Fully Auto. Mod. Snowmelt & Fl. Heat. c/w Heat Exchanger)

Application:

Cast iron high mass boiler c/w 3 circuits

(two low temp. circuit - fully automatic modulating water temp for floor heating & snow melting.)

(one high temp. circuit off boiler primary loop for snow melt heat exchanger.)



Note: • To maintain proper flow through boiler, piping MUST be completed as shown. ie. IFWH supply & return connections to be tied in BEFORE the mixing valve!
• Thermal traps must be used to prevent uncontrolled heat-up from hot water migration. (drop piping a minimum of 16")

Note:

- Air vents, expansion tanks, pressure relief valves etc. For boiler as per local codes.
- Drawings are for HeatLink® suggested system layout only. User must determine if system layout will work for their particular application!
- Use isolation ball valves for all circuits and components.
- Expansion tank sizing for the snow melting circuit to take into account the ratio of glycol freeze protection in the system.

Control Sequence:

- Indoor/outdoor and Snow Melt control units provide the correct water temperature for the HeatLink® radiant floor heating & snow melting systems. By correlating outside air temperature, supply water temperature & room temperature for the floor heating circuit, supply and return system water, boiler return water & slab temperature for the snow melt circuit the control units then activate their respective 4-way mixing valve motors which in turn modulate the supply water temperatures to the floor & snow melting circuits. (See ELECT 1.12 & 1.13).
- Boiler to fire either: 1) Independently on its own operating aquastat which in turn controls boiler water temperature or 2) By activation through a relay of the controllers. APPLICATION TO USE OPTION (____). (Note: Wire gas valve in series with high limit safety aquastat.)
- Primary pump (P-4) to be wired through a relay which will be activated by the snow melt or floor heating controllers (see ELECT 2.1).
- Pumps (P-1, P-2, P-3) to be wired directly with their own disconnect switches. Pumps to operate either: 1) Continually or 2) By activation through a relay of the respective indoor/outdoor or snowmelt controllers. (See ELECT 2.1)

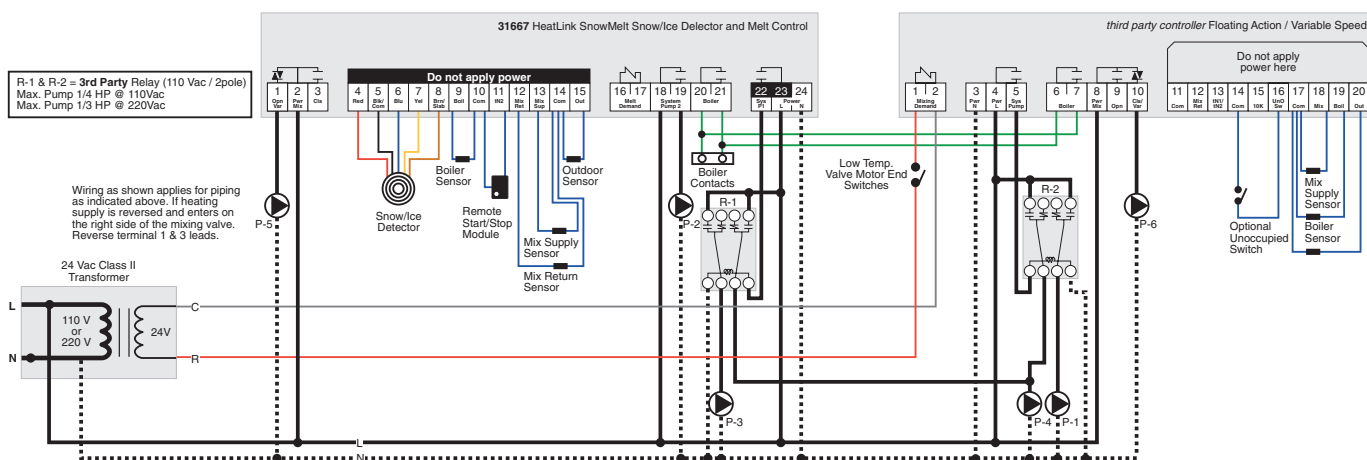
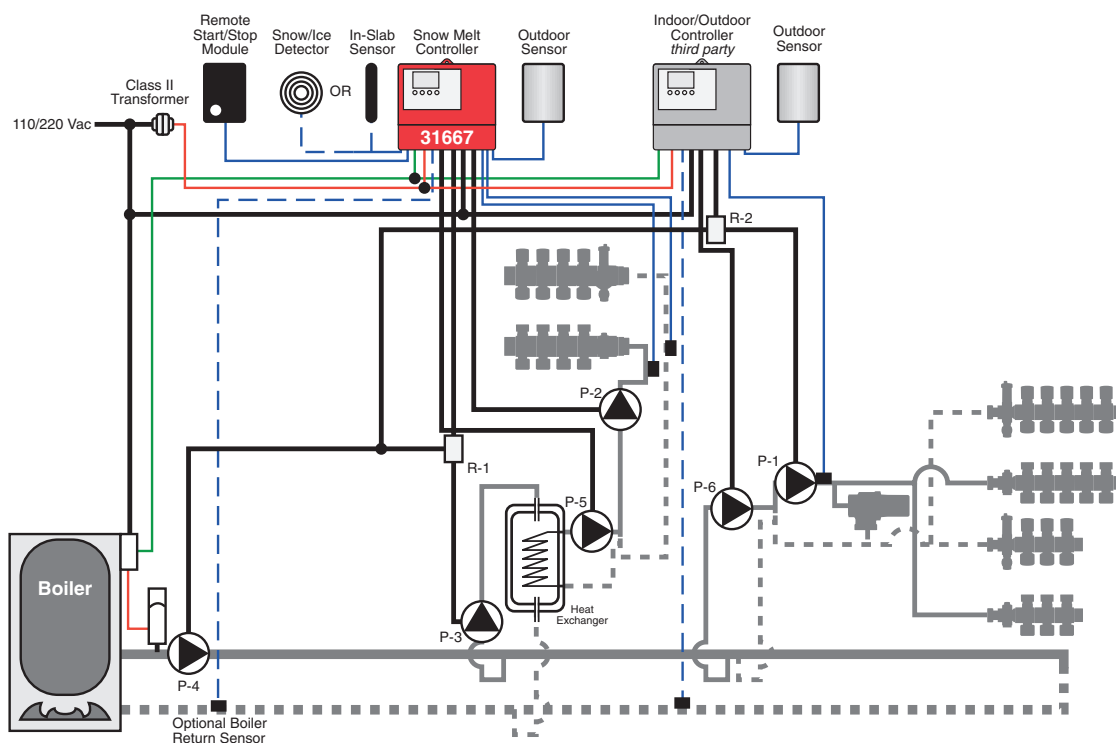
FOR THIS PARTICULAR APPLICATION P-1 TO OPERATE AS PER OPTION (____), & P-2, P-3 AS PER OPTION (____)

Automatic Snowmelting & Fl. Heat. Activating a Variable Speed Pump

Application:

Automatic snow melt controller c/w slab or snow/ice & moisture sensor activating a 4-way mixing valve motor, plus automatic floor heating.

(High mass boiler c/w heat exchanger plus primary and system pumps)



Note:

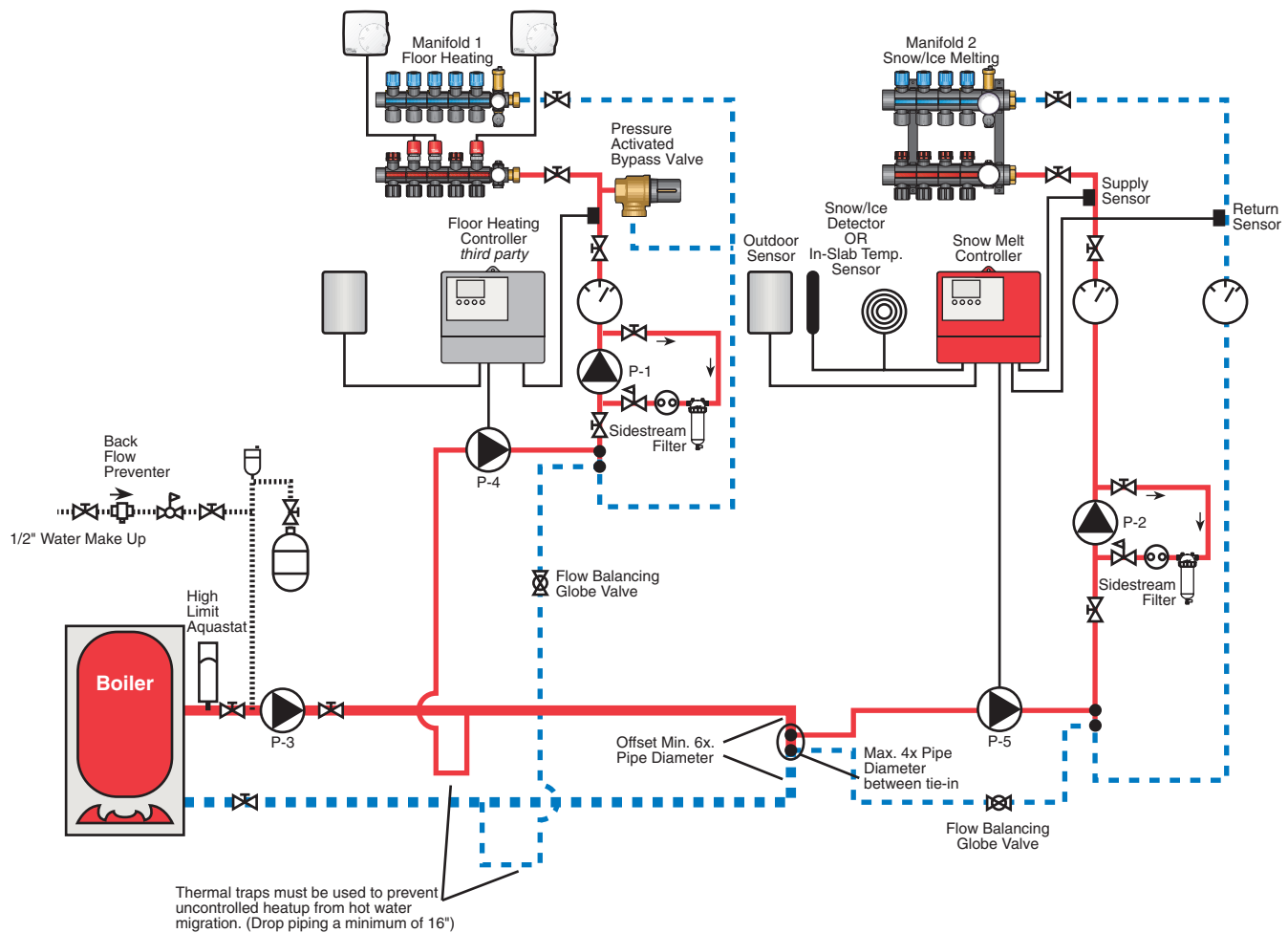
- Drawings are for HeatLink® suggested electrical schematics only! User must determine if electrical schematic will work for their particular application. User must also confirm all HeatLink® schematics with manufacturer schematics of each particular control chosen.
- In all cases manufacturer equipment schematics will take precedence over HeatLink® electrical schematics.
- All wiring as per applicable electrical codes!

2 Circuit (Fully Auto. Mod. Snowmelt & Fl. Heat. c/w Isolation Loop)

Application:

Cast iron high mass boiler c/w 2 circuits

(two low temp. circuit - fully automatic modulating water temperature for floor heating and snow melting.)
(snow melting circuit utilizes an isolation loop for proper mixing valve operation)



Note:

- Air vents, expansion tanks, pressure relief valves etc. For boiler as per local codes.
- Drawings are for HeatLink® suggested system layout only. User must determine if system layout will work for their particular application!
- Use isolation ball valves for all circuits and components.
- Expansion tank sizing for the snow melting circuit to take into account the ratio of glycol freeze protection in the system.

Control Sequence:

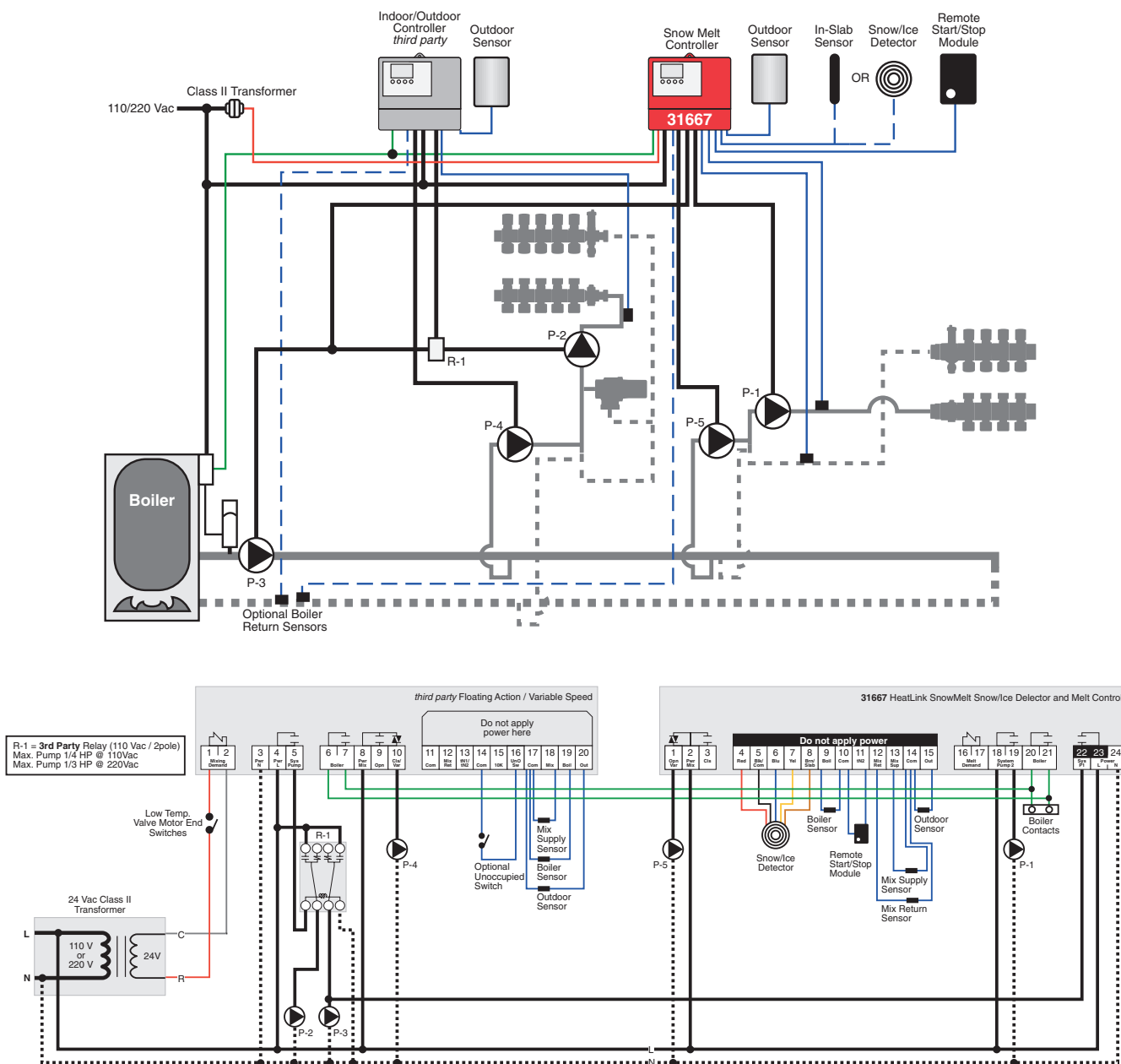
- Indoor/outdoor and snow melt control unit provides the correct water temperature for the HeatLink® radiant floor heating & snow melting systems. By correlating outside air temperature, supply water temperature & room temperature for the floor heating circuit, supply and return system water, boiler return water & slab temperature for the snow melt circuit the control units then activate their respective 4-way mixing valve motors which in turn modulate the supply water temperatures to the floor & snow melting circuits. (See ELECT 1.12 & 1.13).
 - Boiler to fire either: 1) Independently on its own operating aquastat which in turn controls boiler water temperature or 2) By activation through a relay of the controllers. APPLICATION TO USE OPTION (___). (Note: Wire gas valve in series with high limit safety aquastat.)
 - Primary pump (P-3) to be wired through a relay which will be activated by the snow melt or floor heating controllers (see ELECT 2.3).
 - Pumps (P-1, P-2, P-3) to be wired directly with their own disconnect switches. System pumps (P-1 & P-2) to operate either: 1) Continually or 2) By activation through a relay of the respective indoor/outdoor or snowmelt controllers. (See ELECT 2.3)
- FOR THIS PARTICULAR APPLICATION P-1 TO OPERATE AS PER OPTION (___), & P-2 AS PER OPTION (___)

Auto. Snowmelt Activating a Variable Speed Pump (c/w Isolation Loop)

Application:

Automatic snow melt controller c/w slab sensor or snow/ice & moisture detector activating a 4-way mixing valve motor.

(Dedicated high mass snowmelt boiler c/w primary and secondary pumps)



Note:

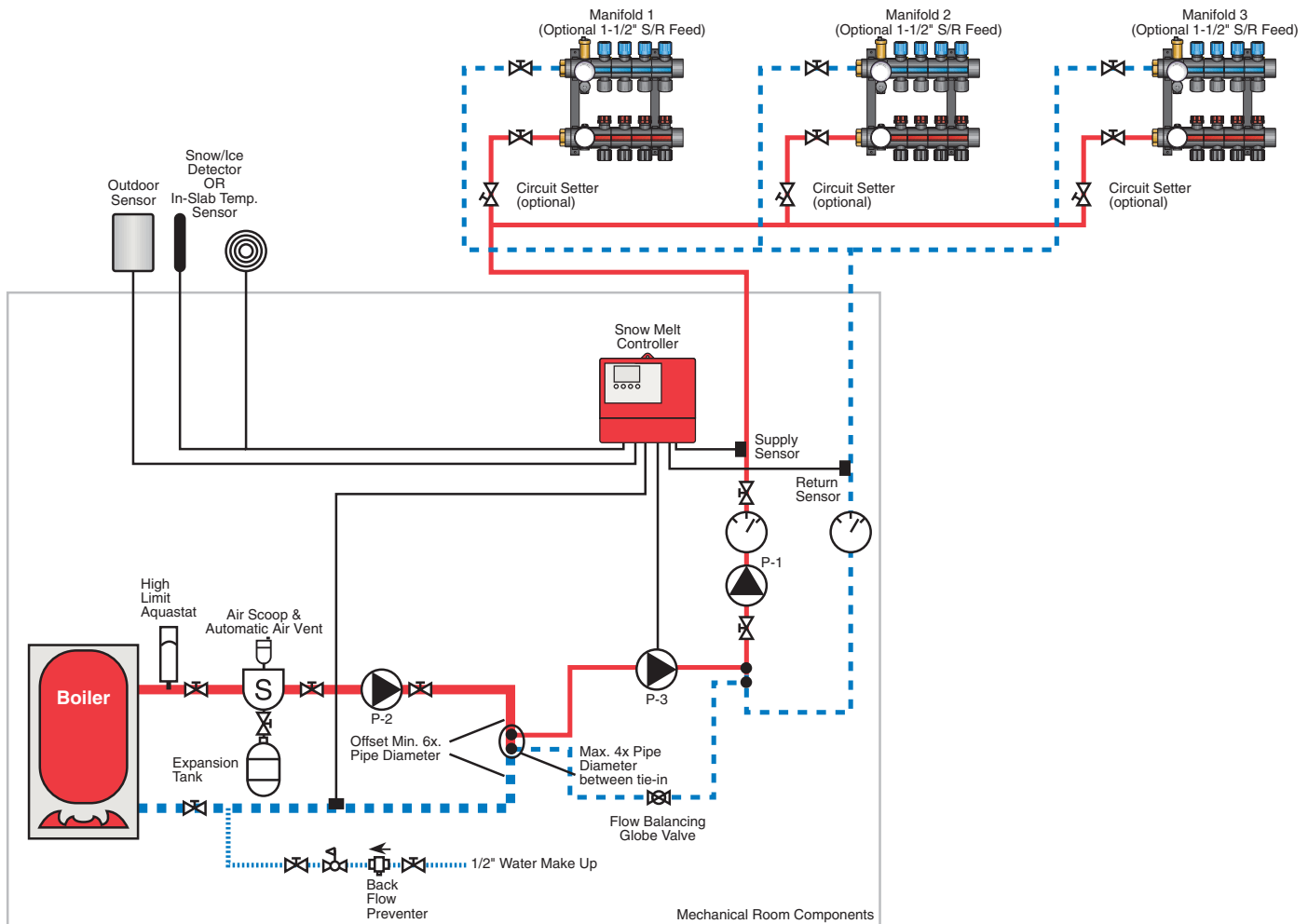
- Drawings are for HeatLink® suggested electrical schematics only! User must determine if electrical schematic will work for their particular application. User must also confirm all HeatLink® schematics with manufacturer schematics of each particular control chosen.
- In all cases manufacturer equipment schematics will take precedence over HeatLink® electrical schematics.
- All wiring as per applicable electrical codes!

1 Circuit (Fully Automatic Snowmelting c/w Dedicated Boiler)

Application:

Cast iron high mass dedicated boiler c/w fully automatic snow melt circuit

(one low temp. circuit - fully automatic modulating water temperature for snow melting c/w snow/ice detector and in-slab sensor.)



Note:

- Air vents, expansion tanks, pressure relief valves etc. For boiler as per local codes.
- Drawings are for HeatLink® suggested system layout only. User must determine if system layout will work for their particular application!
- Use isolation ball valves for all circuits and components.
- Expansion tank sizing for the snow melting circuit to take into account the ratio of glycol freeze protection in the system.

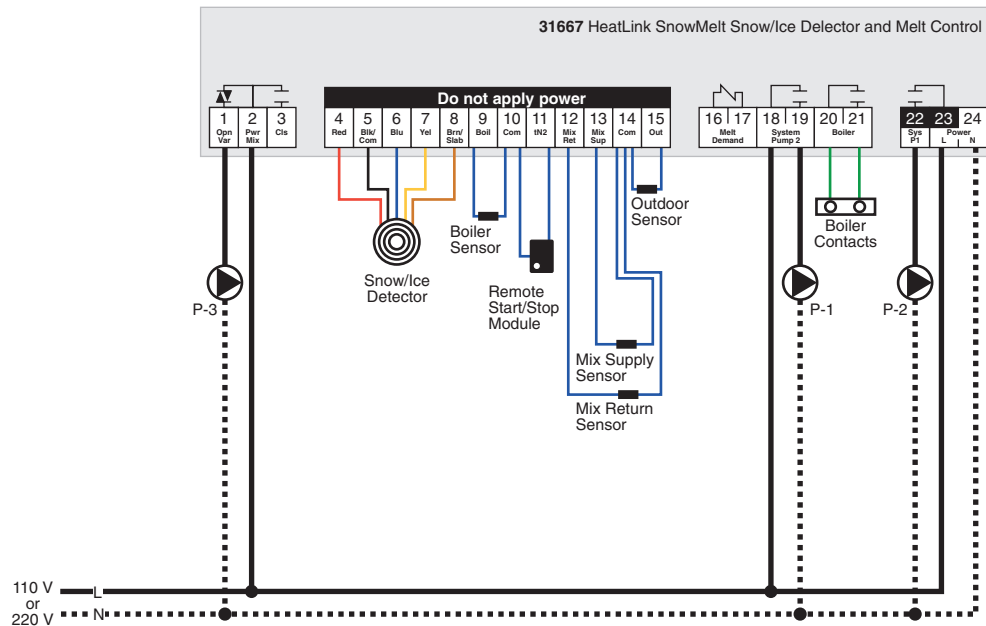
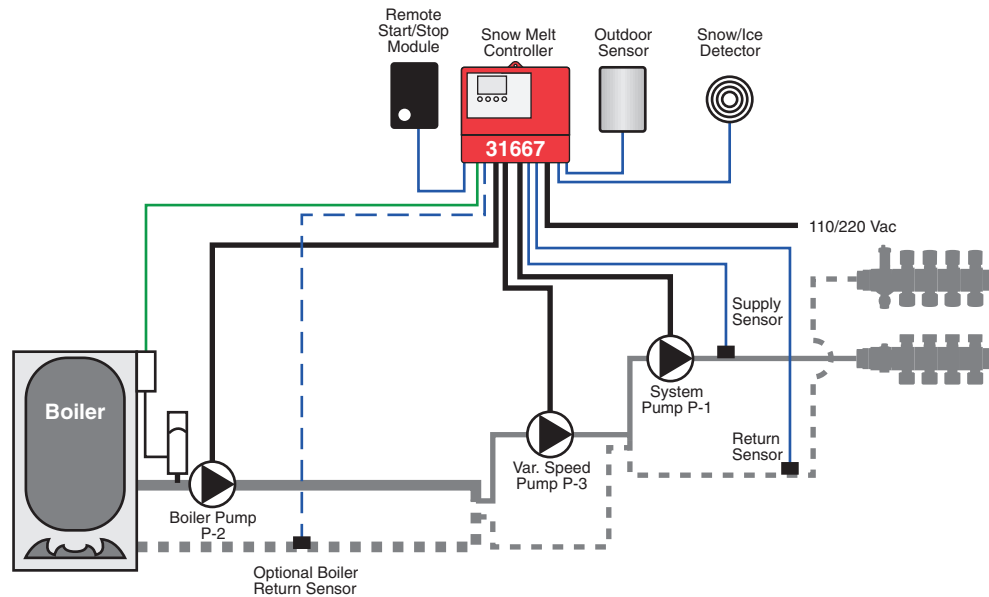
Control Sequence:

- Snow melt control unit provides the correct water temperature for the HeatLink® snow melting system. By correlating outside air temperature, surface moisture, supply and return system water, boiler return water & slab temperature for the snow melt circuit, the control unit then activates the 4-way mixing valve motor which in turn modulates the supply water temperature to the snow melting circuits (see ELECT 1.12 & 1.13).
- Boiler to fire either: 1) Independently on its own operating aquastat which in turn controls boiler water temperature or 2) By activation through a relay of the controllers. APPLICATION TO USE OPTION (____). (Note: Wire gas valve in series with high limit safety aquastat.)
- Pumps (P-1 & P-2) to be wired directly with their own disconnect switches. Pump P-1 & P-2 to operate either: 1) Continually or 2) By activation through a relay of the snowmelt controller (see ELECT 2.4).
FOR THIS PARTICULAR APPLICATION P-1 & P-2 TO OPERATE AS PER OPTION (____).

Auto. Snowmelt Activating a Variable Speed Pump (c/w Dedicated Boiler)

Application:

Automatic snow melt controller c/w snow/ice & moisture detection activating a 4-way mixing valve motor
(Dedicated high mass snowmelt boiler c/w primary and secondary pumps)



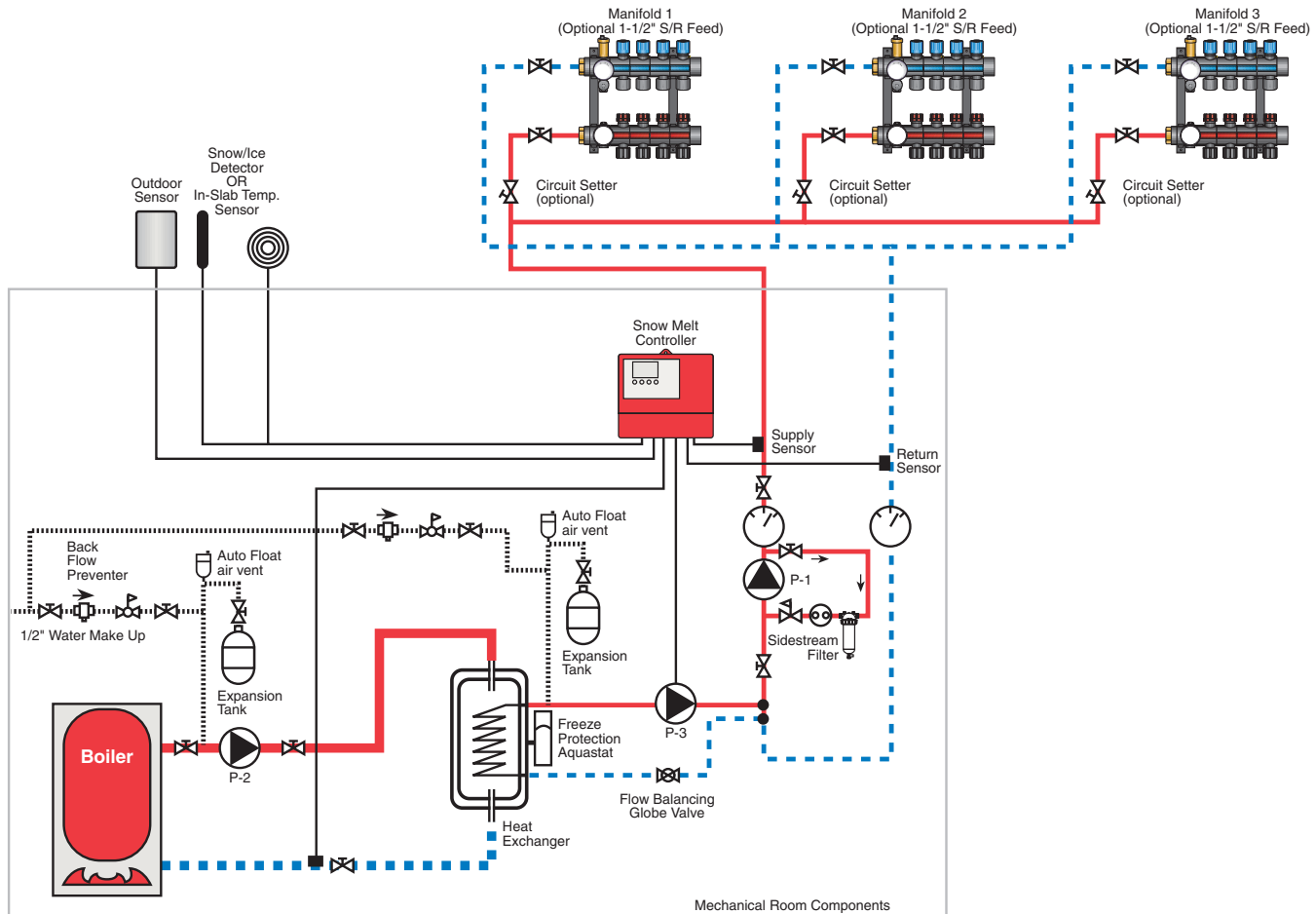
Note:

- Drawings are for HeatLink® suggested electrical schematics only! User must determine if electrical schematic will work for their particular application. User must also confirm all HeatLink® schematics with manufacturer schematics of each particular control chosen.
- In all cases manufacturer equipment schematics will take precedence over HeatLink® electrical schematics.
- All wiring as per applicable electrical codes!

1 Circuit (Fully Automatic Snowmelting c/w Heat Exchanger)

Application:

Fully automatic snow melt circuit isolated from boiler/heat source circuit through the use of a heat exchanger
 (one low temp. circuit - fully automatic modulating water temperature for snow melting c/w snow/ice detector and in-slab sensor)
 (one high temp. circuit off boiler/heat source primary loop for snow melt heat exchanger)



Note:

- Air vents, expansion tanks, pressure relief valves etc. For boiler as per local codes.
- Drawings are for HeatLink® suggested system layout only. User must determine if system layout will work for their particular application!
- Use isolation ball valves for all circuits and components.
- Expansion tank sizing for the snow melting circuit to take into account the ratio of glycol freeze protection in the system.

Control Sequence:

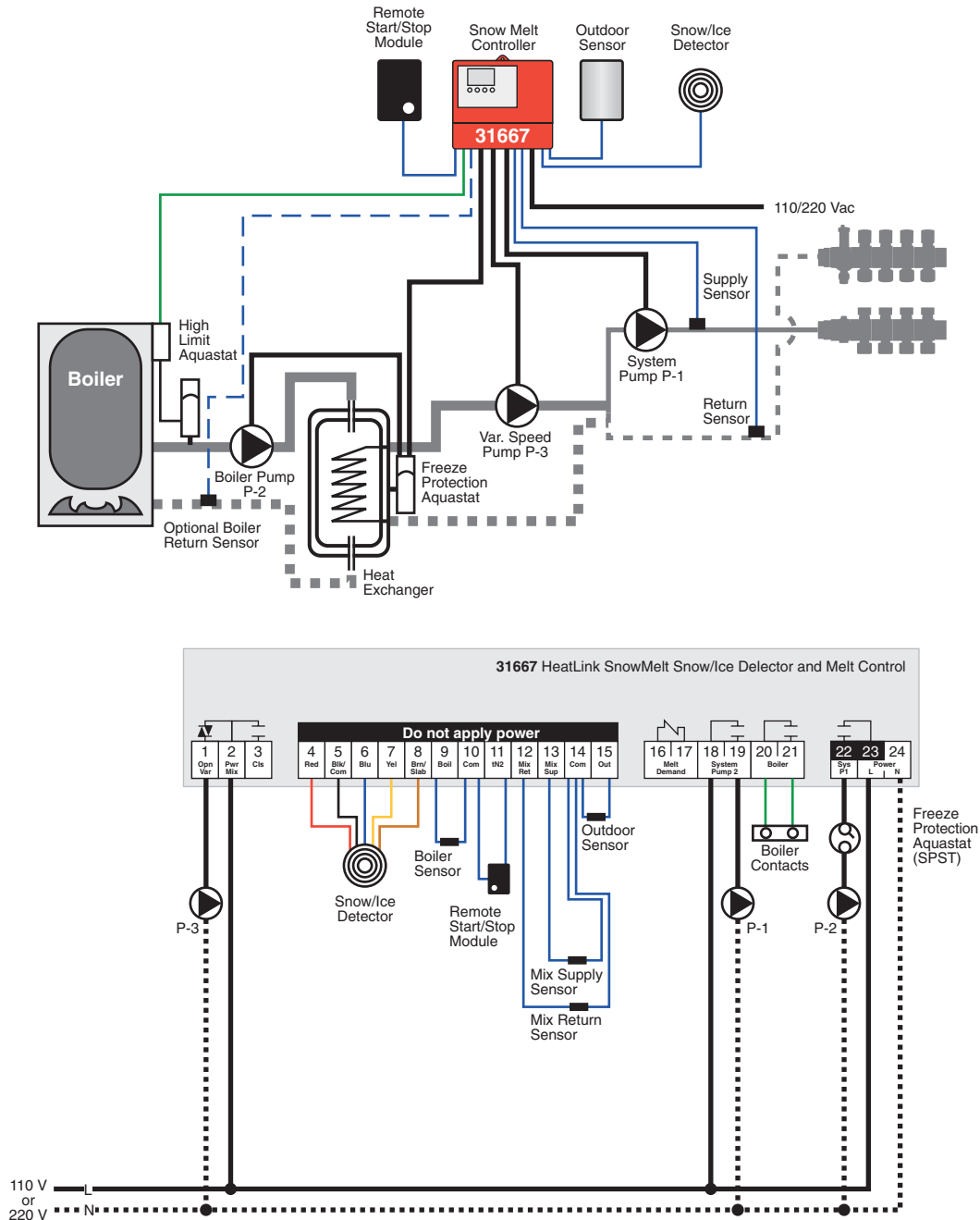
- Snow melt control unit provides the correct water temperature for the HeatLink® snow melting system. By correlating outside air temperature, surface moisture, supply and return system water, boiler return water & slab temperature for the snow melt circuit, the control unit then activates the 4-way mixing valve motor which in turn modulates the supply water temperature to the snow melting circuits (see ELECT 1.12 & 1.13).
- Boiler to fire either: 1) Independently on its own operating controls or 2) By activation through a relay of the snow melting controls. APPLICATION TO USE OPTION (____).
- Primary pump (P-2) to be wired through a relay which will be activated by the snow melt control (see ELECT 2.5).
- Pumps (P-1 & P-2) to be wired directly with their own disconnect switches. System pump P-2 to operate either: 1) Continually or 2) By activation through a relay of the snowmelt controller (see ELECT 2.5)
 FOR THIS PARTICULAR APPLICATION P-2 TO OPERATE AS PER OPTION (____).

Auto. Snowmelt Activating a Variable Speed Pump (c/w Heat Exchanger)

Application:

Automatic snow melt controller c/w snow/ice & moisture detection activating a 4-way mixing valve motor c/w heat exchanger freeze protection aquastat.

(Heat source tie-in through a heat exchanger c/w primary and secondary pumps)



Note:

- Drawings are for HeatLink® suggested electrical schematics only! User must determine if electrical schematic will work for their particular application. User must also confirm all HeatLink® schematics with manufacturer schematics of each particular control chosen.
- In all cases manufacturer equipment schematics will take precedence over HeatLink® electrical schematics.
- All wiring as per applicable electrical codes!

This image shows a full page of blank, lined paper. It features approximately 20 horizontal blue or grey lines spaced evenly apart, typical of notebook paper. The lines extend across the entire width of the page, leaving small margins at the top and bottom. There are no vertical lines, text, or other markings on the page.



31667 Specification:

Control	Microprocessor PID control; This is not a safety (limit) control.
Packaged weight	3.1 lb. (1400 g), Enclosure A, red PVC plastic
Dimensions	6-5/8" H x 7-9/16" W x 2-13/16" D (170 x 193 x 72 mm)
Approvals	CSA C US, meets ICES & FCC regulations for EMI/RFI.
Ambient conditions	Indoor use only, 32 to 104°F (0 to 40°C), < 90% RH noncondensing.
Power supply	120 V ±10% 50/60 Hz 600 VA
Relays	230 V (ac) 5 A 1/3 hp, pilot duty 240 VA
Var. Pump	230 V (ac) 2.4 A 1/6 hp, fuse T2.5 A 250 V
Demands	20 to 260 V (ac) 2 VA
Sensors included	NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C) B=3892 Outdoor Sensor 30070 and 3 of Universal Sensor 30071.

Limited Warranty and Product Return Procedure

HeatLink® warrants to the original purchaser each HeatLink® product against defects in workmanship and materials when the product is installed and used in compliance with HeatLink's instructions. This limited warranty covers the cost of parts and labor provided by HeatLink® to correct defects in the materials and/or workmanship. Returned products that are fully operational are not considered warranty cases. HeatLink® also does not cover parts and labor to remove, transport or reinstall a defective product. HeatLink® will not be liable for any damage other than repair or replacement of the defective part or parts and such repairs or replacement shall be deemed to be the sole remedy from HeatLink®. This warranty shall not apply to any defects caused or repairs required as a result of unreasonable or negligent use, neglect, accident, improper installation, or unauthorized repair or alterations. In case of defect, malfunction or failure to conform to warranty, HeatLink® will for a warranty period of 18 months from the date of invoice to the original purchaser or 12 months from the date of installation of the product, whichever occurs first, repair, exchange or give credit for the defective product. Any express or implied warranty which the purchaser may have, including merchantability and fitness for a particular purpose, shall not extend beyond 18 months from date of invoice or 12 months from the date of installation of the product, whichever occurs first.

Replacements: HeatLink® can send replacement product if requested. All replacements are invoiced. Any possible credit for the replacement will only be issued once the replaced product has been returned to HeatLink®.

Product Return Procedure: Product that are believed to have failed must be returned to HeatLink®. When agreed to by HeatLink®, the installer or other qualified service person must, at the owners expense, determine which component has failed. The product must be returned complete with all of its components (sensors, base, etc.) Products must be returned together with the proof of purchase to the original purchaser who then returns the product to HeatLink® After receiving a returned goods authorization (RGA) number from HeatLink®.

Please include the following information with the product: The full address of the original purchaser, the RGA number and description of the problem.

For returns in Canada and the U.S.A., please have product returned to HeatLink Group Inc., 4603E 13th Street N.E., Calgary, Alberta, Canada, T2E 6M3, Ph. 1-800-661-5332.

For returns in Ireland, please have product returned to HeatLink Ireland, Cappincur, Tullamore, Co. Offaly., Ph. 057 - 932 4062.

- If returned during the warranty period and the product is defective, HeatLink® will issue full credit for the returned product less cost of missing parts.
- If returned during the warranty period and the product is fully operational, HeatLink® will return the product to the original purchaser for a testing cost of \$40.00 plus shipping.
- If returned during the warranty period and the product is not damaged and is fully operational, HeatLink® can take back the product for a return charge of 50% of the product's net value. This request has to be specified otherwise the product will be returned with a testing cost of \$40.00 plus shipping.
- If returned after the warranty period and the product needs repair, HeatLink® will repair and return the product. Repair and shipping costs will be invoiced. HeatLink's repair costs are calculated at \$40.00 / hour plus the cost of parts. If the repair costs will be more than \$60.00 a repair estimate will be sent to the original purchaser.

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