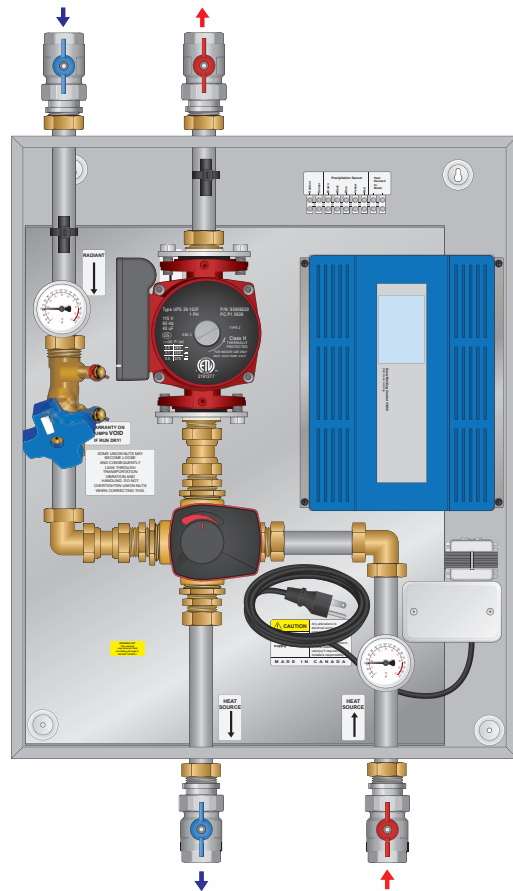
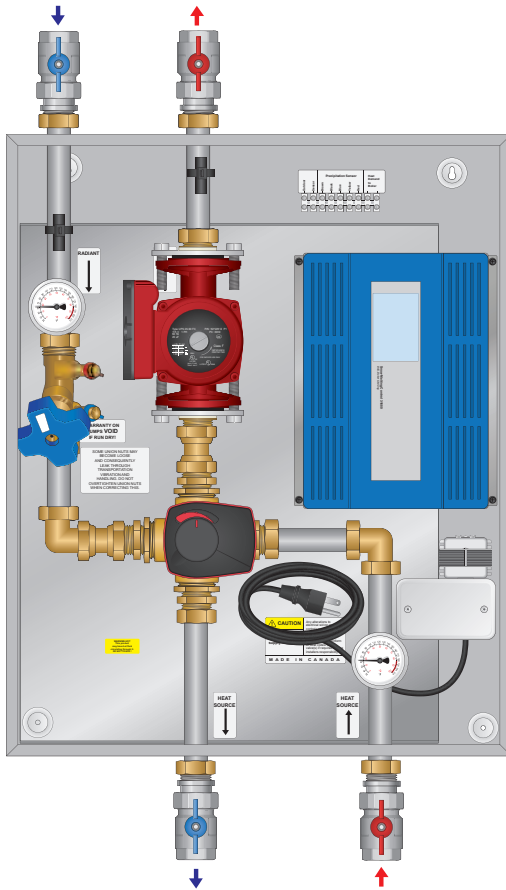




## 4WMIX-SMCP-BAC

### Installation, Operation, and Maintenance Manual



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2	Warnings
2	Servicing
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3	Unpacking
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## Disclaimer

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## Warnings

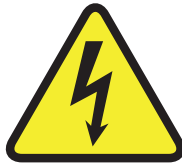
The zone control panel is for indoor use only and must be installed by a qualified installer/service technician. This product must be installed and operated in strict accordance with the terms set out in this manual and in accordance with the relevant requirements of the Local Authority Having Jurisdiction. Failure to comply will result in a void of warranty, and may also result in property damage, serious injury, or death.

## Servicing

Prior to commencing installation of this panel it is necessary to read and understand all sections of this manual. The symbols below are used throughout this document to ensure proper operation of the panel, and your safety. Please pay attention to these symbols.



**Warning  
Possible Hazard**



**Warning  
Live Power**



**Warning  
Hot Pipes**



**Warning  
Treated Water**



In order to avoid injury or death, switch off the power to the panel prior to inspecting or making connections to the terminal strip.

## Tools

- Level
- Screwdriver or power drill
- Flat head bit
- Phillips head bit # 2
- 2 adjustable wrenches (or 2 × 30mm wrenches)

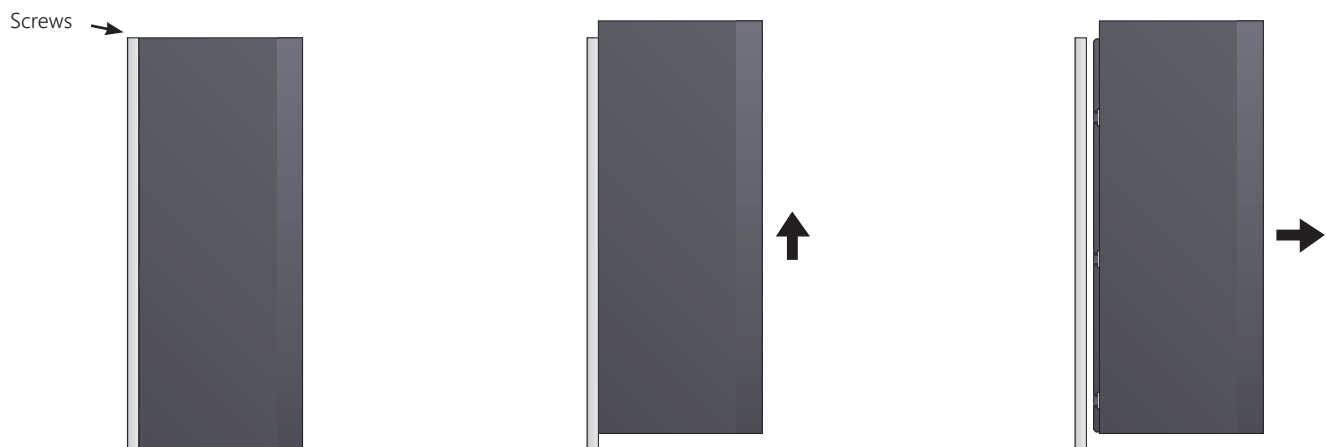
## Function

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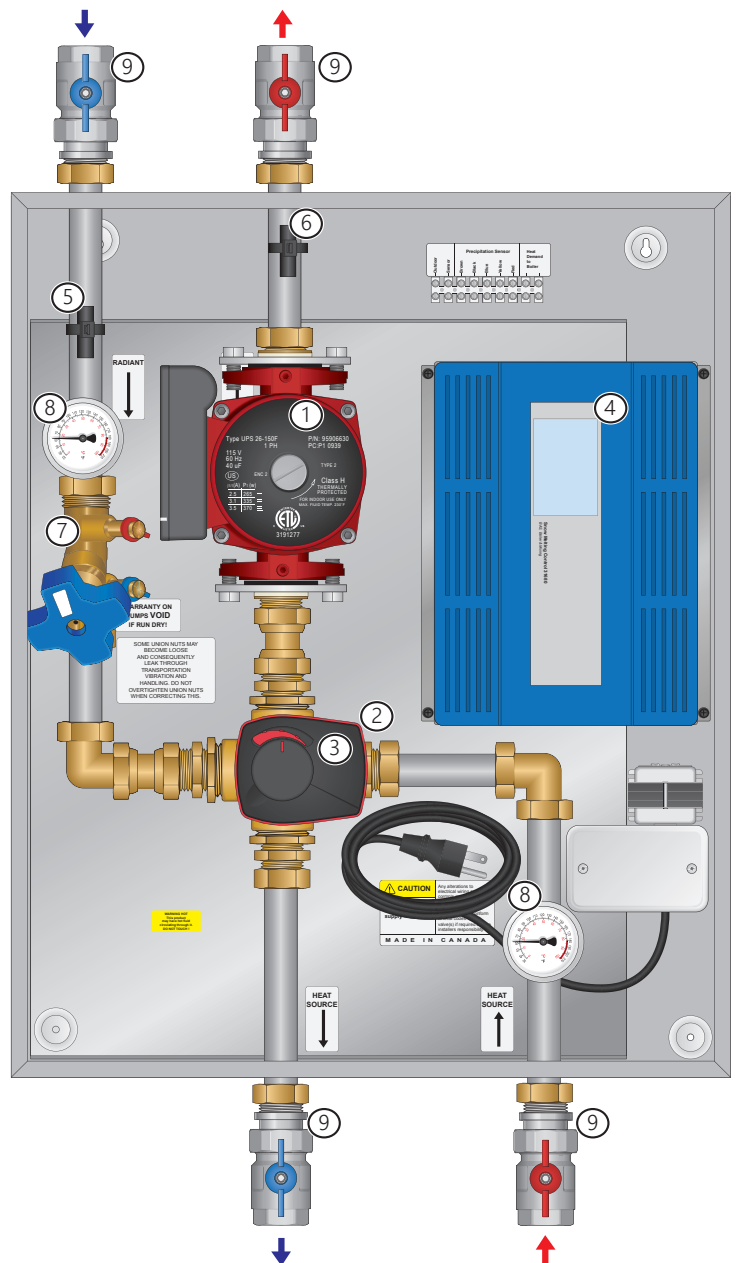
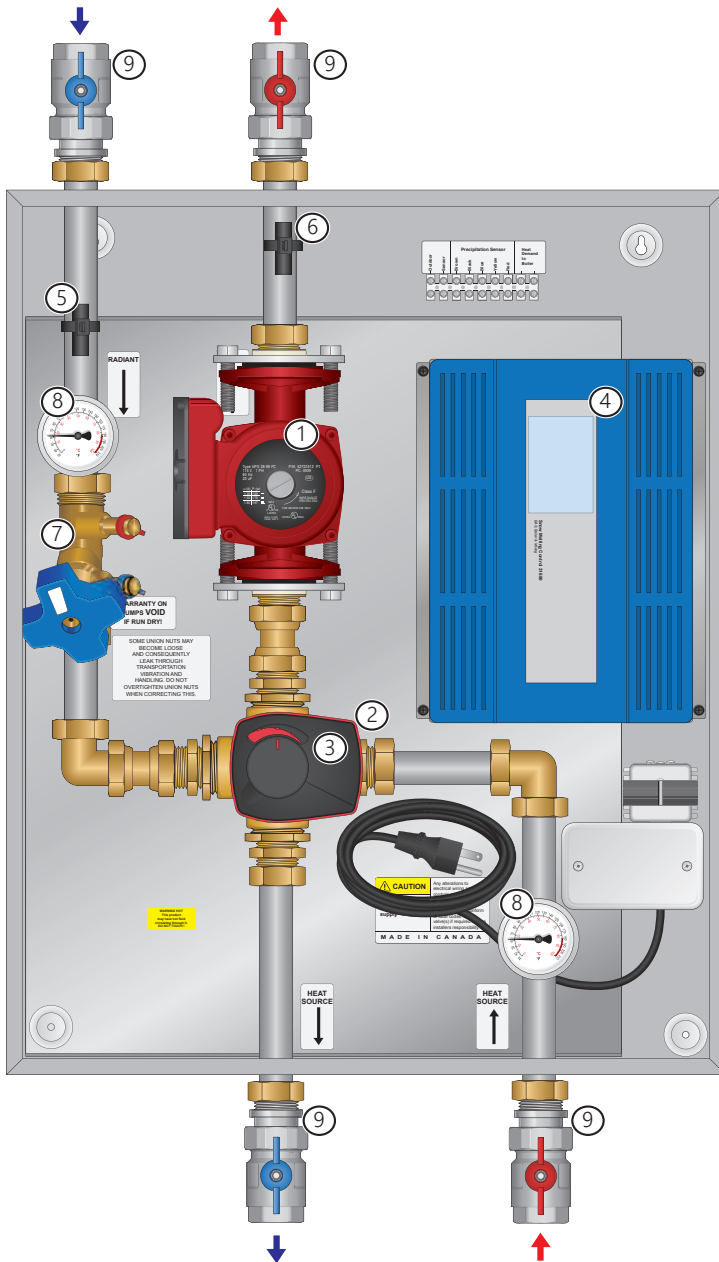
**Note:** This panel does not regulate or monitor the operating safety limit temperatures of the fluid leaving the heat source.

## Unpacking

- Step 1** Examine carton for any damage that may have occurred during shipping. If damage is visible notify your courier and supplier immediately.
- Step 2** Open the carton by removing the staples.
- Step 3** Remove the cardboard spacers from the carton, then remove the panel from the carton. Lift the panel by the base, not the enclosure.
- Step 4** There are 2 screws holding the enclosure in place during shipping. They are located at the top left & right of the panel base. Remove these 2 screws.
- Step 5** Remove the enclosure from the panel by sliding it upwards until it stops, then gently pulling outwards off.



#### Panel Components



## Panel Components (cont'd)

#	Components	Part Number	
		4WMIX-SMCP-BAC	4WMIX-HH-SMCP-BAC
1	Secondary pump	UPS26-99	UPS26-150
2	1½" Mixing valve (hidden)	64031	
3	Mixing valve motor	58132	
4	Snow Melt control	OPT-SMP-680	
5	Return sensor	ETF1899ASNS	
6	Supply sensor	ETF1899ASNS	
7	Balancing valve	n/a	
8	Thermometer	n/a	
9	Isolation valves*	n/a	

\*Packaged in accessory box for shipping. See page 10 for piping hookup instructions.

## Specifications & Listings

	4WMIX-SMCP-BAC	4WMIX-HH-SMCP-BAC
Listing	cETLus	
Conforms to	CAN/CSA-C22 No.14, UL508	
Dimensions	24"H × 18¾"W × 8"D	
Weight		
Max ambient temperature	120°F	
Max water temperature	200°F	
Settable fluid temperature range	100-145°F	
Power supply	120V(ac)	
Circulator	Ferrous, Grundfos UPS26-99FC	Ferrous, Grundfos UPS26-150FC
Auxiliary terminal	none	
Temperature control method	1½" 4-way mixing valve and [floating point] motor	
Temperature control range		
Mixing valve Cv	18.7	
Piping	1" 304 stainless steel tubing, 1" brass	
Piping connections	1" MNPT (can be increased to 1½" - not supplied)	
Backplate	Galvanized steel	
Enclosure	Galvanized steel	

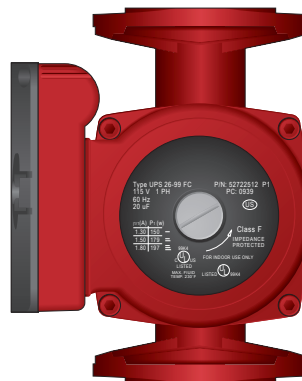
## Panel Component Specifications

### Circulator

The circulator moves the heated fluid through the system when there is a call for heat from the system controller.



The addition of glycol to the system will result in higher demand from the circulator due to the change in viscosity of the fluid.

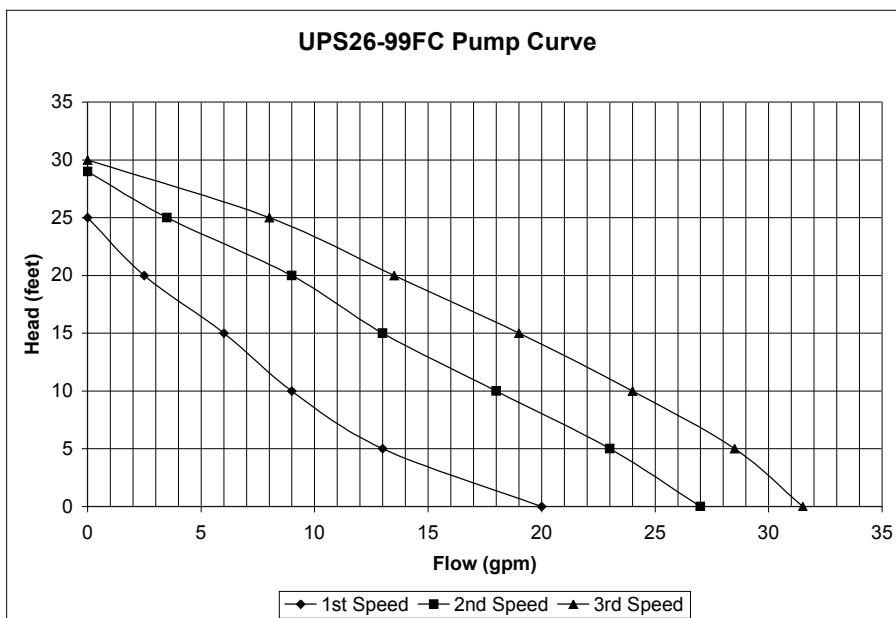


### Technical Data - UPS 26-99 FC

Material:

Inlet cone, bearing plate, bearing retainers, rotor can, rotor cladding, shaft retainer: ..... Stainless Steel  
Stator Housing: ..... Aluminium  
Shaft, upper and lower radial bearings: ..... Aluminium oxide ceramic  
Thrust bearing: ..... Carbon bearing and EPDM retainer  
Check valve: ..... ACETAL with 302 SS spring and nitrile rubber seats  
Pump housing (volute): ..... Cast iron  
O-ring and gaskets: ..... EPDM  
Impeller: ..... PES composite (30% glass-filled)  
Terminal box: ..... Noryl® with EPDM gasket  
Flow Range: ..... 0-33 US gpm (0-7.5 m³/h)  
Head Range: ..... 0-29 ft (0-8.8 m)  
Motors: ..... 2-pole, single-phase  
Max. Liquid Temperature: ..... 230°F (110°C)  
Min. Liquid Temperature: ..... 36°F (2°C)  
Max. System Pressure: ..... 145 psi (10 bar)

Speed	Volts	Amps	Watts	Hp	Capacitor
3	115	1.8	197	1/6	20 µF/180V
2		1.5	179	1/6	
1		1.3	150	1/6	

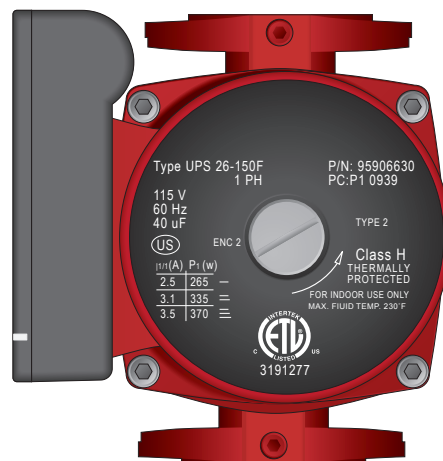


## Technical Data - UPS 26-150 FC

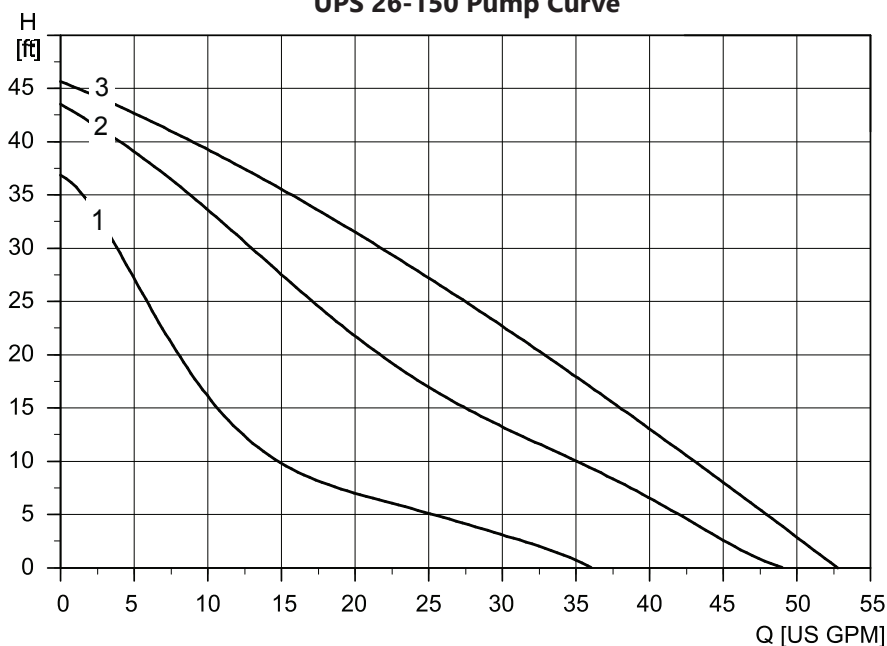
### Material:

Inlet cone, bearing plate, bearing retainers,  
rotor can, rotor cladding, shaft retainer: ..... Stainless Steel  
Stator Housing: ..... Aluminium  
Shaft, upper and lower radial bearings: ..... Aluminium oxide ceramic  
Thrust bearing: ..... Carbon bearing and EPDM retainer  
Check valve: ..... ACETAL with 302 SS spring and nitrile rubber seats  
Pump housing (volute): ..... Cast iron  
O-ring and gaskets: ..... EPDM  
Impeller: ..... PES composite (30% glass-filled)  
Terminal box: ..... Noryl® with EPDM gasket  
Flow Range: ..... 0-53 US gpm (0-12 m³/h)  
Head Range: ..... 0-46 ft (0-14 m)  
Motors: ..... 2-pole, single-phase  
Max. Liquid Temperature: ..... 230°F (110°C)  
Min. Liquid Temperature: ..... 36°F (2°C)  
Max. System Pressure: ..... 145 psi (10 bar)

Speed	Volts	Amps	Watts	Hp	Capacitor
3	115	3.5	370	1/6	40 μF/180V
2		3.1	335	1/6	
1		2.5	265	1/6	



UPS 26-150 Pump Curve





## Control Valve

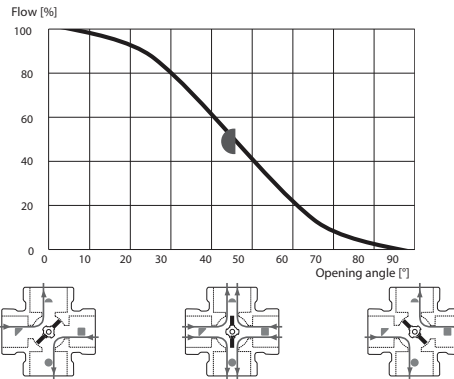
4-way brass mixing valve regulates the temperature in the hydronic system with the help of the electric motor actuator and system controller.



### Technical Data - 4-way mixing valve

Material - Valve Body & Slide:	Brass DZR
Material - Shaft & Bushing:	PPS composite
Material - O-ring:	EPDM
Max. Operating Temperature:	230°F (110°C)
Min. Operating Temperature:	-15°F (-10°C)
Max. Operating Pressure:	145 psi (10 bar)
Max. Differential Pressure:	14.5 psi (1 bar)
Leaking in % of flow*:	<1.0%
Max. Torque:	<44lb <sup>f</sup> *in (<5Nm)

\*based on diff. pressure of 14.5 psi (1 bar)



## Mixing Valve Motor

The mixing valve motor is mounted to the control valve and moves the valve appropriately to allow the heated fluid to enter. This motor works in conjunction with the system controller.

### Manual Operation of Mixing Valve Motor

NOTE: Mixing Valve Motor should not be placed in manual mode for an extended period of time.

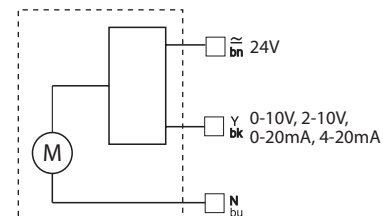
- Pull knob out on motorized actuator.
- Rotate knob clockwise or counter-clockwise.
- To return to automatic mode, push the knob in.



### Technical Data for 58132 DDC mixing valve motor

Ambient Temperature:	23 to 131°F (-5 to 55°C)
Power Supply:	24Vac/dc ± 10%, 50/60 Hz
Enclosure Rating:	NEMA 1, IP41
Protection Class:	II
Torque:	53.1 lbf.in (6 Nm)
Power Consumption - Operation:	AC: 5W DC: 2.5W
Power Consumption - Dimensioning:	AC: 8 VA DC: 4 VA
Angle of Movement:	90°
Running Time 90°:	45/120 sec
Control Signal:	0-10V, 2-10V, 0-20mA, 4-20mA
Cable Length:	4.9 ft (1.5 m)

The motor should be preceded by a multi-pole contact breaker in the fixed installation.

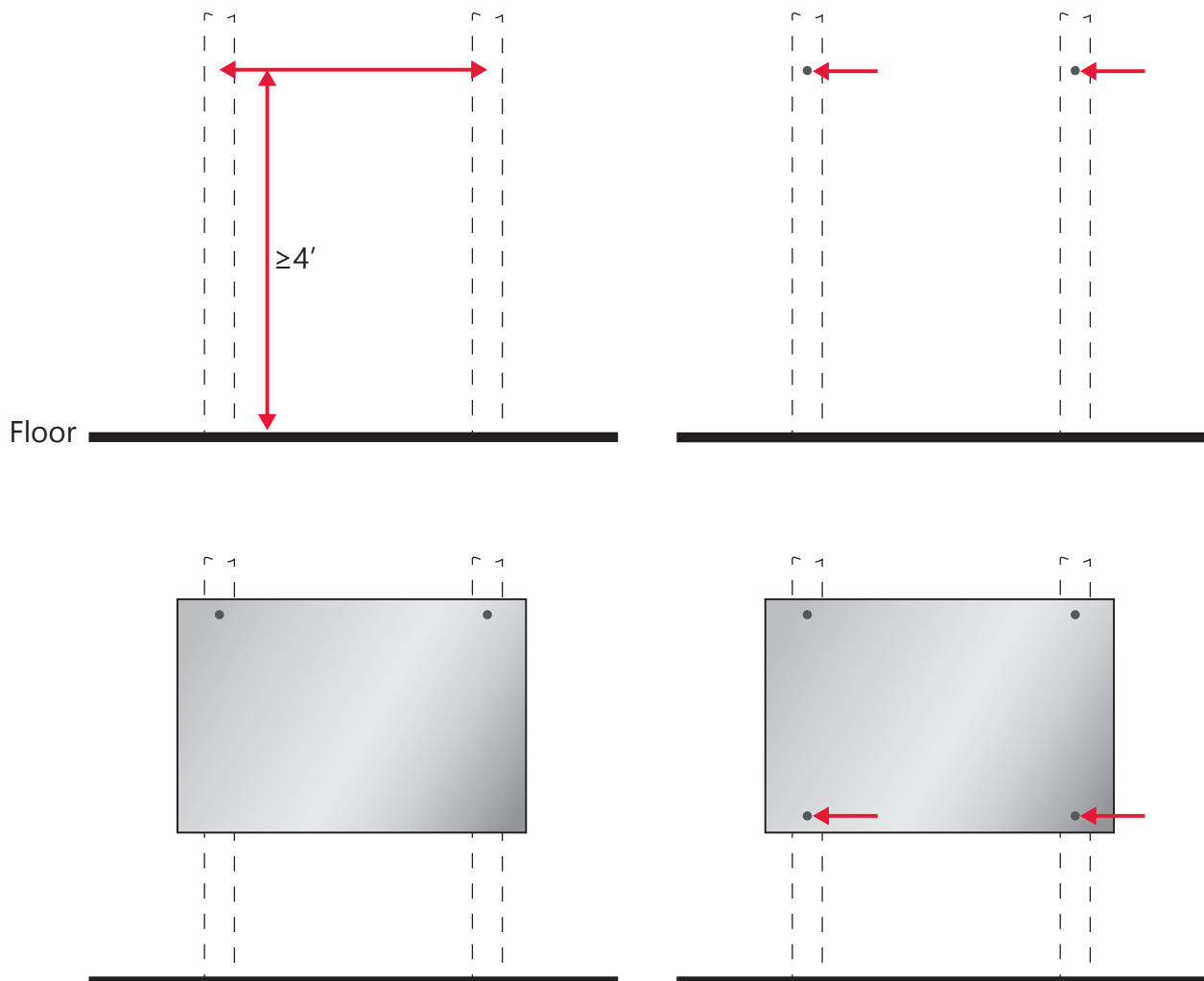


CE LVD 2006/95/EC  
EMC 2004/108/EC  
RoHS 2002/95/EC

## Panel Mounting

Prior to mounting the panel, ensure the wall is capable of supporting the weight of the panel, and that all required power outlets and/or wiring is available at the installation location.

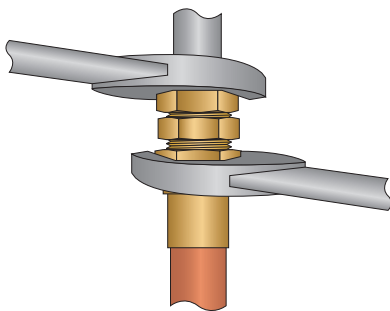
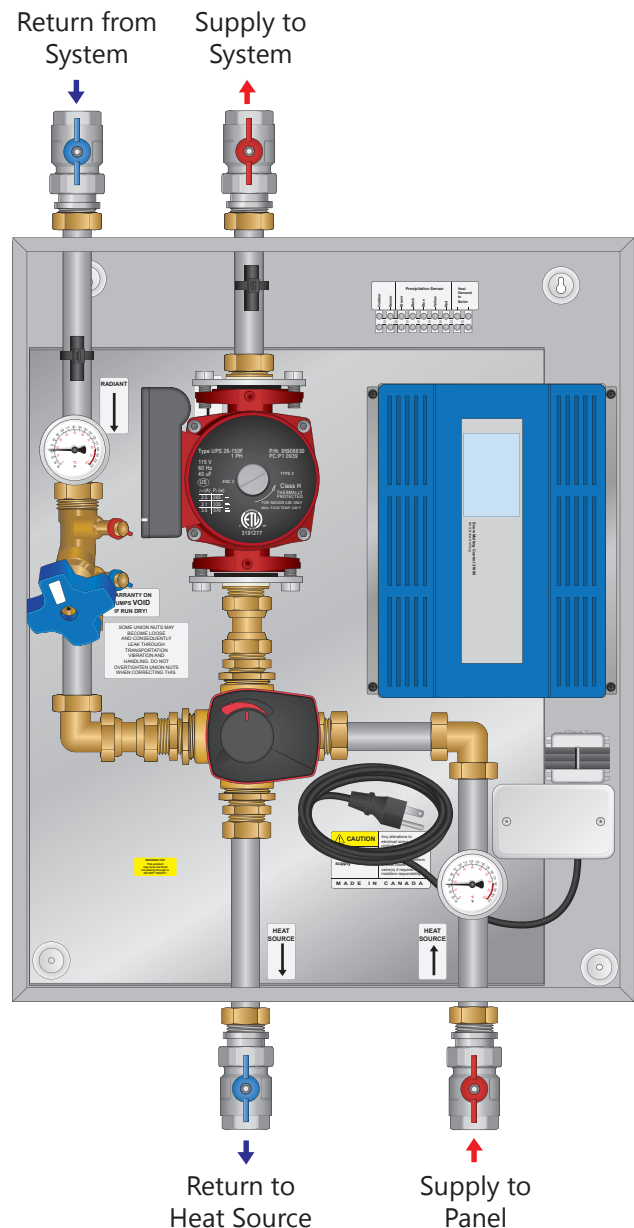
- Step 1** Determine the location and distance between the wall studs. With a level at a minimum height of 4' from the floor, draw a straight line and mark the stud locations. If the panel cannot be secured directly to the studs, or suitable backing boards, plywood may need to be installed behind the panel to properly secure it in place.
- Step 2** Screw two of the supplied mounting screws into the wall studs (or backing plywood) 3/4" and 6 1/2" from the top of the desired height, and 16" apart, leaving 1/4" of the screw out from the wall.
- Step 3** Lift and place the panel onto the mounting screws. Two person lift may be required.
- Step 4** Screw the remaining mounting screws into the holes at the bottom of the panel, and tighten the top two screws.



## Piping Hookup

The 4WMIX-SMCP-BAC ships with the isolation valves packaged in the accessory pack, which must be connected to the panel *after* the system connections have been made.

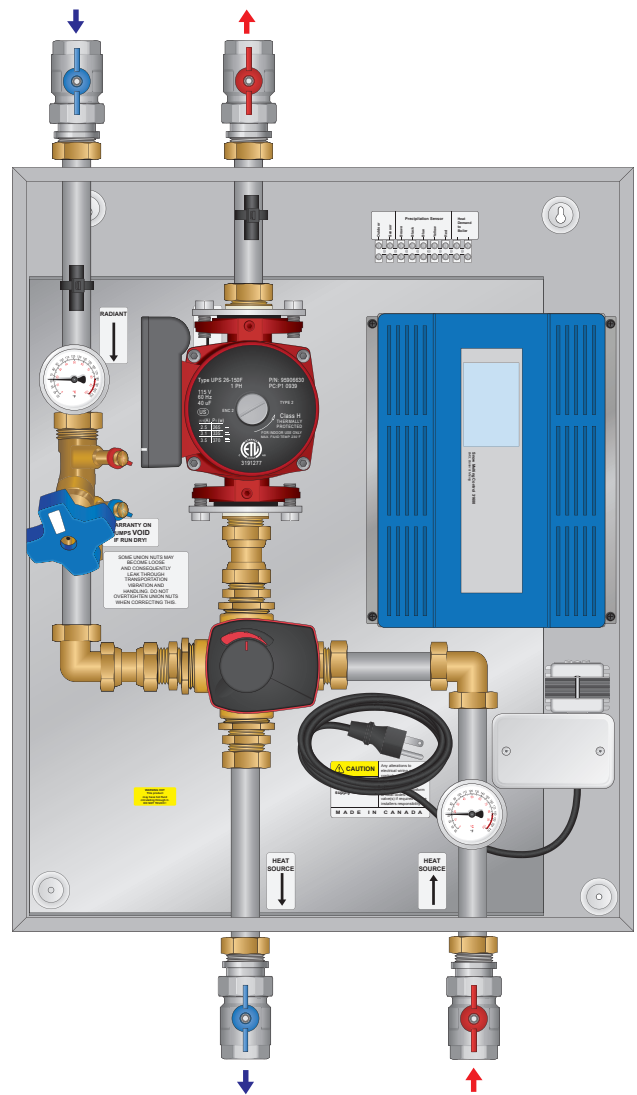
- Step 1** Piping connections are 1" FNPT. Use appropriate thread sealant and backup wrench when making connections.
- Step 2** Connect adapter assemblies to the panel. The supplied washers must be used, and nuts must not be overtightened as this may damage the washers.



*Always use a Backup Wrench  
Do not overtighten brass nuts!*

## Fill & Purge

- Step 1 Ensure the panel is not plugged in.
- Step 2 Fully open the mixing valve
- Step 3 Close all isolation ball valves, and attach the fill and purge hoses (not included) to the system fill and purge valves. Open valves.
- Step 4 Open isolation valves and allow water to run until it is free of bubbles.
- Step 5 Close system fill and purge valves.
- Step 6 Detach fill and purge hoses.
- Step 7 Check for leaks at connections. If any leaks are found, use a back-up wrench and carefully tighten until the leak stops. **Do not overtighten!**



## Piping Options

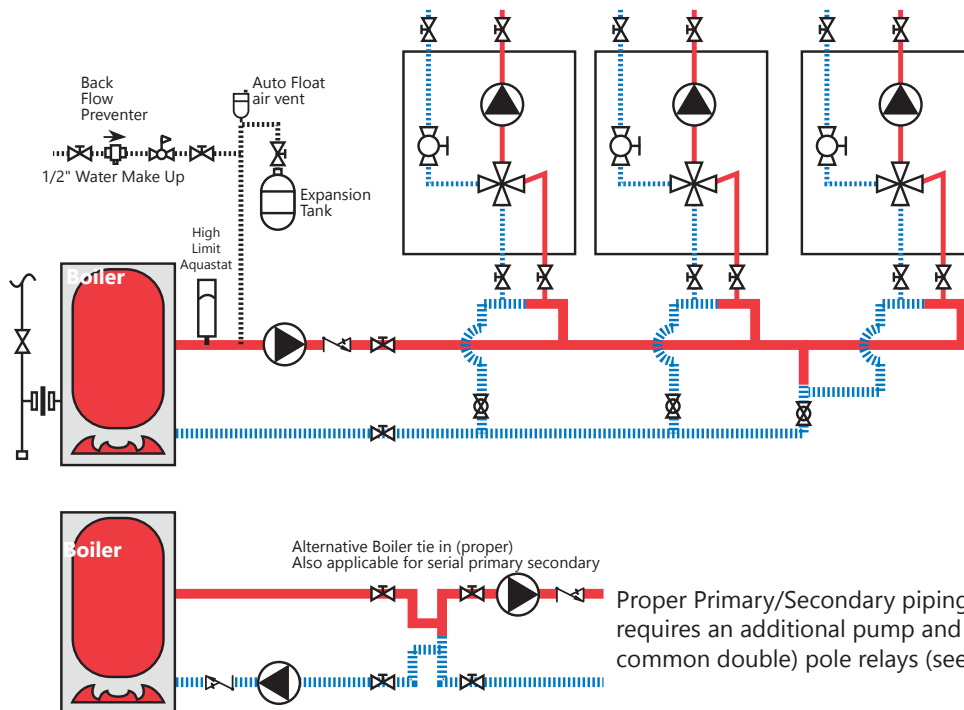
### Option #1: Parallel Primary/Secondary

#### Pros:

- Supply water temperature the same for each load
- No possible pump interference

#### Cons:

- Requires additional balancing valves for each load take off.
- Hot water migration/gravity flow possible in return riser. Flow check, Spring loaded check valve or thermal trap required in return riser.
- Critical on site installation (Tee spacing and pipe sizing)
- Complex piping



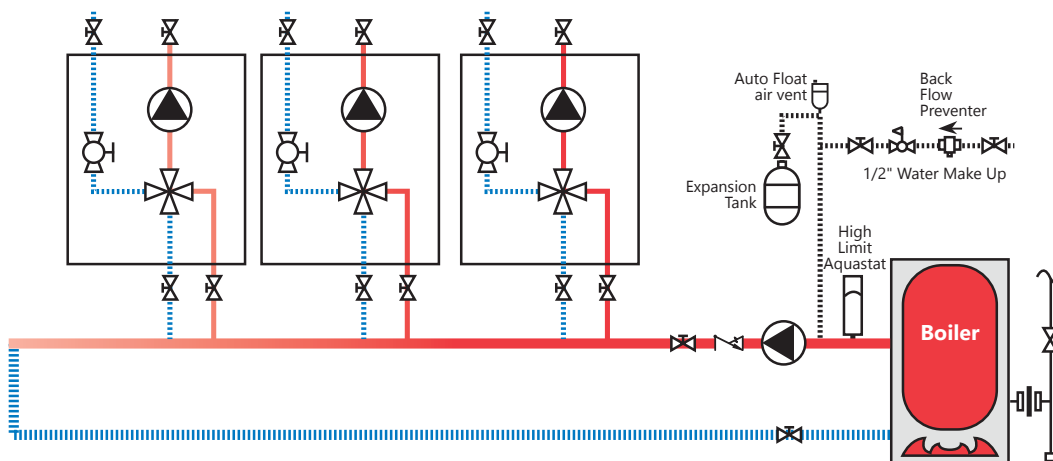
### Option #2: Series Primary/Secondary

#### Pros:

- Automatic priority
- No possible pump interference

#### Cons:

- Supply water temperature lowers for each load, this change of temperature is not constant. Some loads may not function if temperature is too low.
- Very expensive to alter priority sequence (note: all loads are prioritized)
- Hot water migration/gravity flow possible in return line. Flow check, Spring loaded check valve or thermal trap required in return riser.
- Critical on site installation (Tee spacing and pipe sizing)



## Panel Wiring

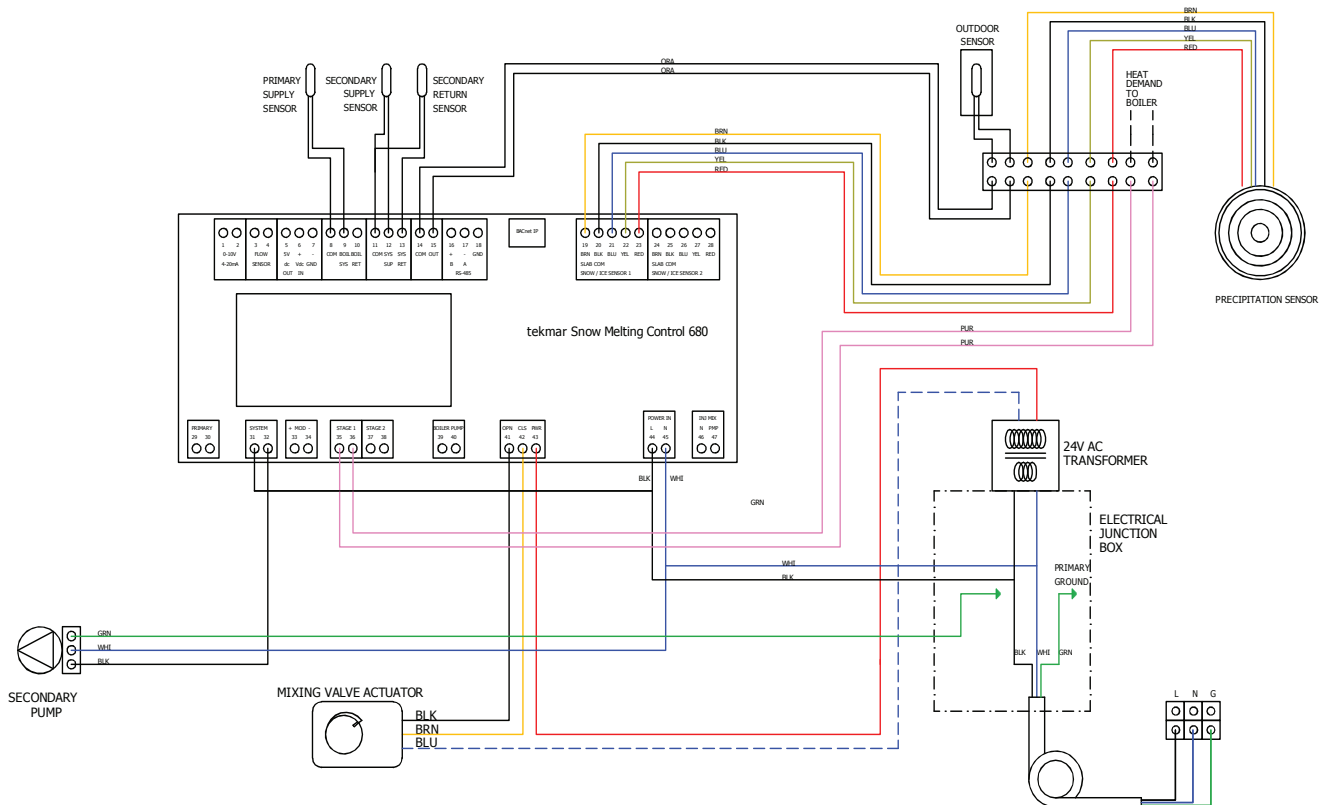


- Wiring should be done by a qualified electrician and should meet local codes and jurisdictions.

## Auxiliary Contacts

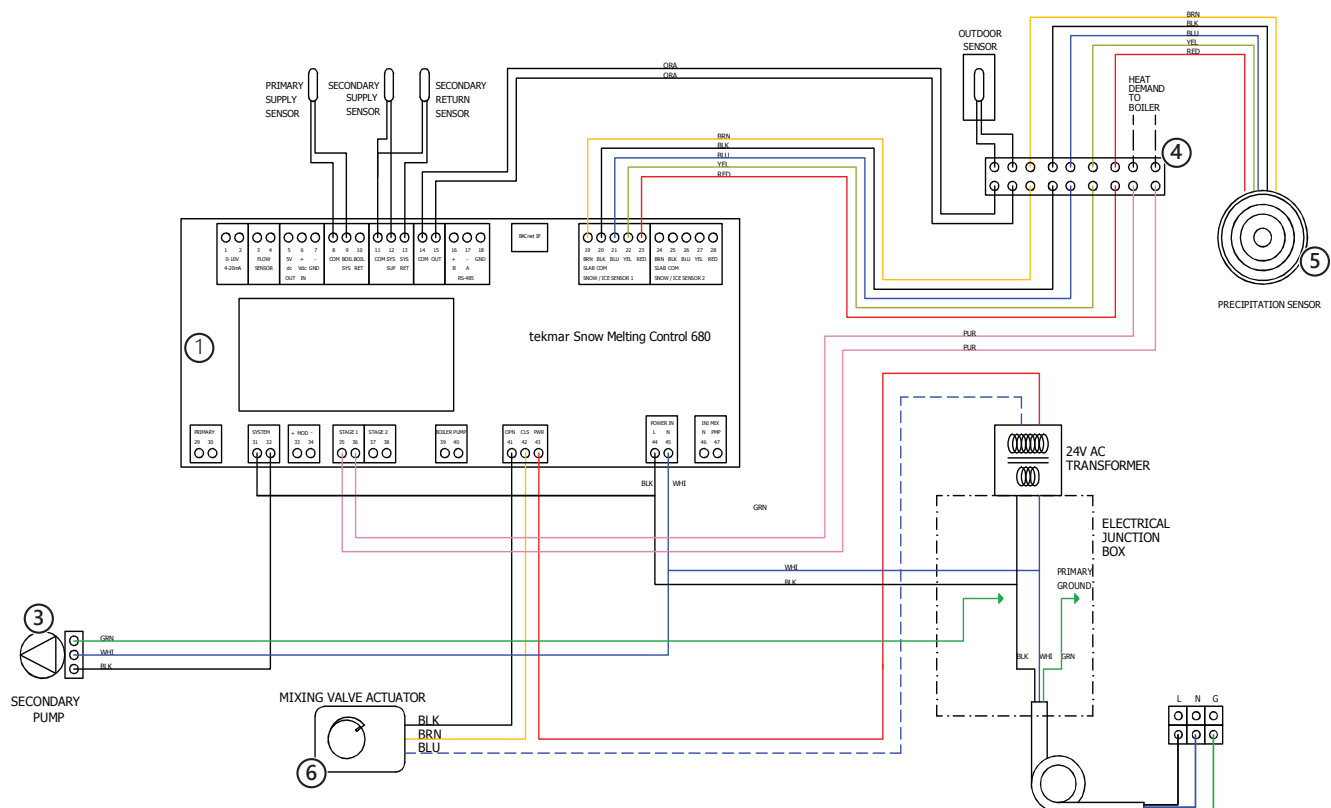
The auxiliary contact set is dry, meaning no supply of power is present at the terminal. The maximum allowable load is 1.5A. The auxiliary dry contact located on the terminal is to switch another device (ie. the heat source) when there is a call for heat from any zone.

## Wiring Diagram



## Panel Control Sequence

- Step 1** When the Precipitation Sensor ⑤ detects temperature below SET TEMP 1 (warm weather shutdown), the System Controller ① will activate. It will start the Primary ② and Secondary ③ Circulators, close the Auxiliary Terminals ④ for 1 minute every 15 minutes to check the return water temperature. If the return water temperature is below the minimum return water temperature (MIN WATER) the System Controller will start the Primary ② and Secondary ③ Circulators, close the Auxiliary Terminals ④, and open the mixing valve ⑥ to increase the return water temperature to the required level (MIN WATER).
- Step 2** When the Precipitation Sensor ⑤ detects snow fall, the System Controller ① will start the Primary ② and Secondary ③ Circulators, close the Auxiliary Terminals ④, and open the mixing valve ⑥ to increase the flow temperature to the maximum supply water temperature (MAX WATER). When no more snow is detected by the Precipitation Sensor ⑤, the System Controller ① continues to operate the system for an additional user adjustable period of time (default 2 h; AFTERRUN 1).
- Step 3** When the Precipitation Sensor ⑤ detects temperature below OFF TEMP 1 (cold weather cutoff), the System Controller ① will be in standby mode.

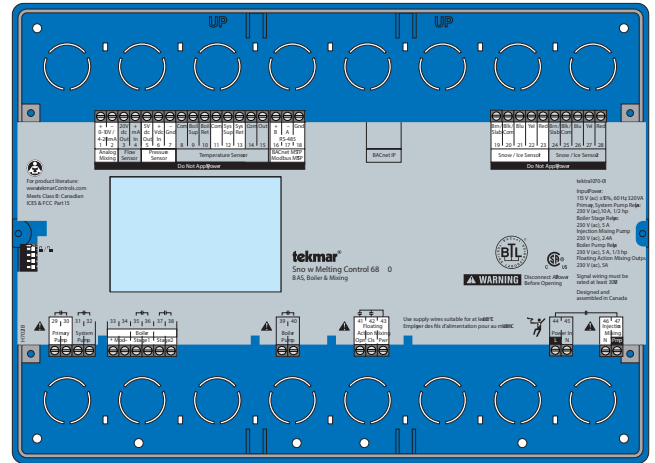


## 31680 Functions

### System Controller Instructions

The system controller has been setup at the factory. Minimal or no adjustments should be required for operation.

Switch	Position	Action
1	ON	The control is locked and the access level cannot be changed. Set to lock when installation has been completed.
	OFF	The control is unlocked and the access level may be changed. Go to the Toolbox level to change the access level. Set to unlock during the installation process.
2	ON	Not used
	OFF	Not used
3	ON	Not used
	OFF	Not used
4	ON	Not used
	OFF	Not used



The control is shipped pre-programmed with common settings. The control has an "Installer" access level that allows full access to all settings and a "User" access level that restricts the number of settings available. The control defaults to the "User" access level after 12 hours of operation.

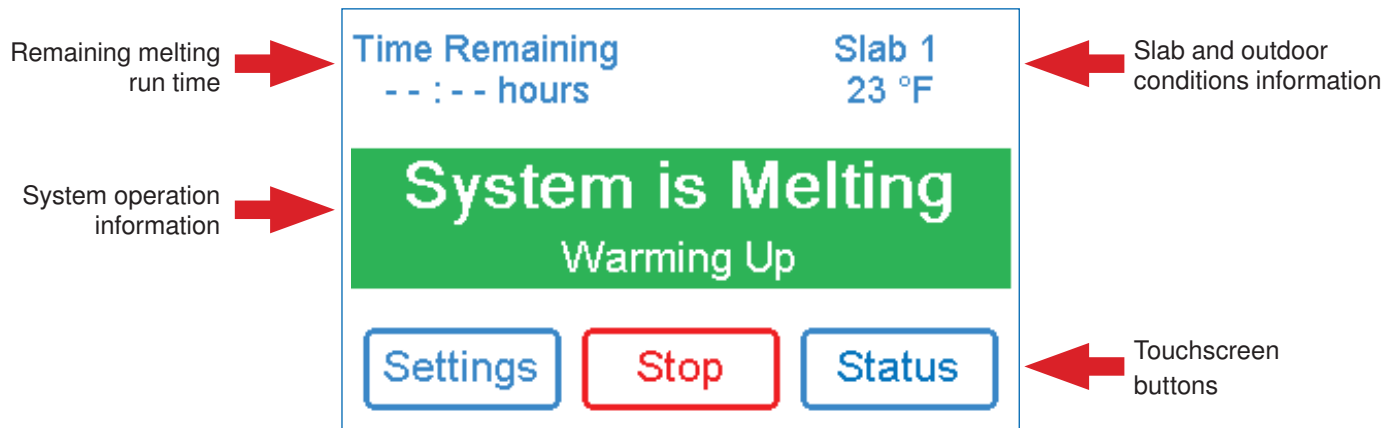
To change to the "Installer" access level:

- Step 1: Press the Settings button.
- Step 2: Press the Toolbox button.
- Step 3: Press Access Level.
- Step 4: Press the Installer radio button.

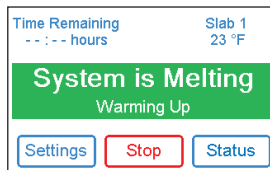


## User Interface

### Home Screen



## System Operation



### SYSTEM IS MELTING

#### • Warming Up

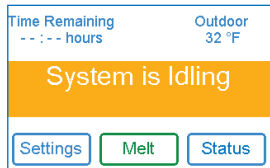
The slab has not yet reached the slab target temperature.



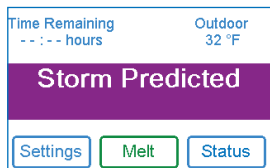
### SYSTEM IS OFF

- Warm Weather Shut Down
- Cold Weather Cut Off
- Melt Pending

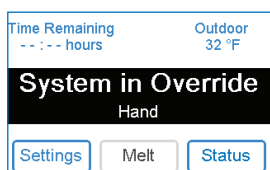
The slab and outdoor temperature have exceeded the WWSD setting.  
The outdoor temperature has fallen below the CWCO setting.  
System will resume melting once outdoor temperature increases above the CWCO setting.



### SYSTEM IS IDLING



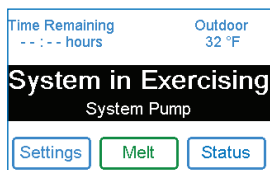
### STORM PREDICTED



### SYSTEM IN OVERRIDE

- Hand
- Max Heat
- Purge
- Test
- Off

The control is in hand manual override.  
The control is operating at Max Heat for hydronic systems.  
The control is purging air from the hydronic system.  
The electric heating cable is in manual override.  
The system is permanently off.



### SYSTEM IN EXERCISING

- Opening Mixing
- Closing Mixing
- System Pump
- Primary Pump
- Boiler Pump
- Injection Pump

Mixing valve is opening.  
Mixing valve is closing.  
System pump is exercising.  
Primary pump is exercising.  
Boiler pump is exercising.  
Injection pump is exercising.

## Symbols

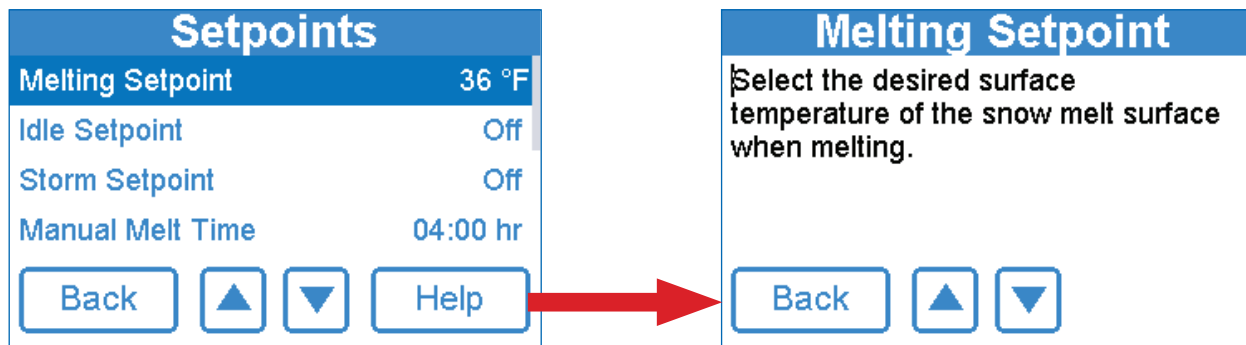


### Warning Symbol

The control has an error message. Press the warning symbol to determine the error code and information on how to take corrective action. Refer to the Troubleshooting section (pg xx) for a list of error codes.

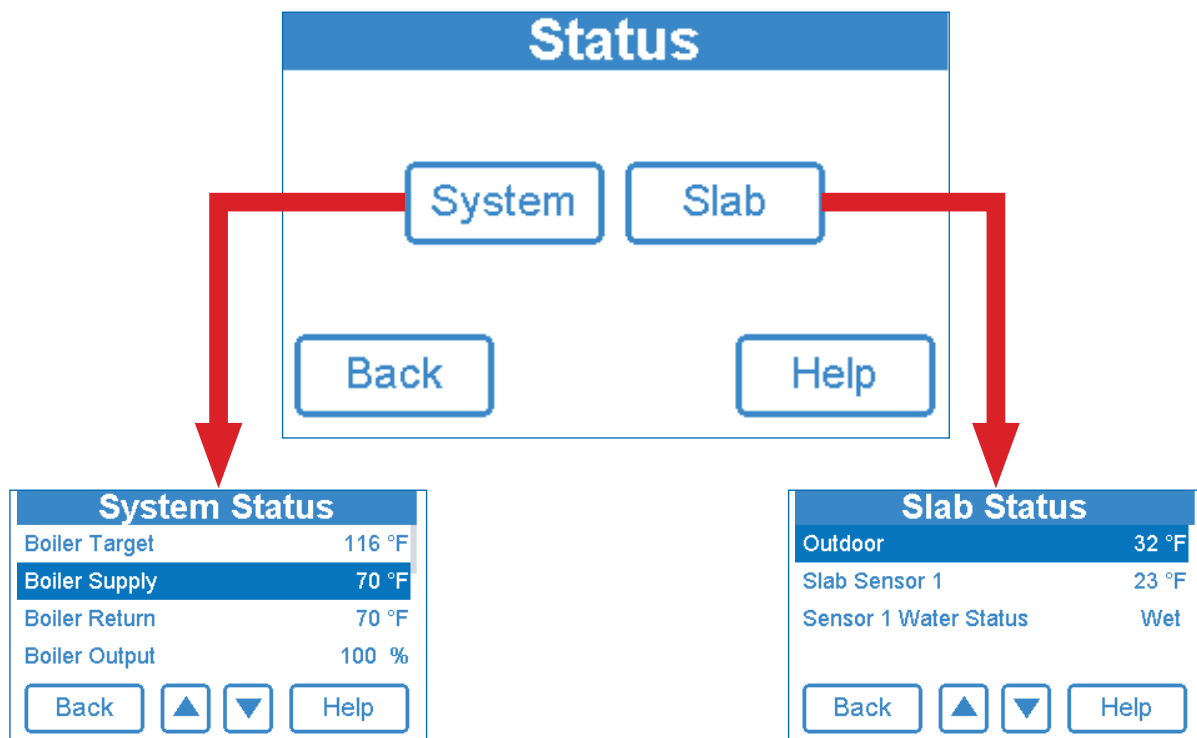
## Help Screen

The display includes a Help screen for each setting. The Help screen provides a description of the setting that is identical to the description found in the Installation and Operation Manual.



## Status Menu Navigation

- Step 1** Press the Status button on the Home Screen.
- Step 2** Press either the System or Slab button.
- Step 3** Press up or down buttons to scrolls through the list.



## Slab Status Screen

ConditionDescription	Range	Access
<b>OUTDOOR</b> Current outdoor air temperature as measured by the outdoor sensor or provided by the BAS system. "---" is displayed when no outdoor sensor is available. Conditions: Always available.	---, -67 to 149°F (-55.0 to 65.0°C)	User Installer
<b>SLAB TARGET</b> The slab target calculated by the control based on outdoor temperature and the melting, idling, or storm setpoints. "---" is displayed when no heat is required. Conditions: Always available.	---, -76 to 149°F (-60.0 to 65.0°C)	Installer
<b>SLAB SENSOR 1</b> Current slab sensor 1 temperature. Conditions: Snow/ice sensor 1 set to In-slab or slab sensor is set to On.	-58 to 167°F (-50.0 to 75.0°C)	User Installer
<b>SENSOR 1 WATER STATUS</b> Current status of snow/ice sensor 1 moisture detector. Conditions: Snow/ice sensor 1 set to In-slab or Aerial.	DRY or WET	User Installer
<b>SLAB SENSOR 2</b> Current slab sensor 2 temperature. Conditions: Snow/ice sensor 2 is set to In-slab or Snow sensor to On.	-58 to 167°F (-50.0 to 75.0°C)	User Installer
<b>SENSOR 2 WATER STATUS</b> Current status of snow/ice sensor 2 moisture detector. Conditions: Snow/ice sensor 2 is set to In-slab or Aerial.	DRY or WET	User Installer
<b>COLDEST SLAB</b> The coldest temperature between the two slab sensors. Conditions: 1) Snow/ice sensor 1 is set to In-slab or slab sensor 1 is set to On, and 2) snow/ice sensor 2 is set to In-slab or slab sensor 2 is set to On.	-58 to 167°F (-50.0 to 75.0°C)	User Installer
<b>COMBINED WATER STATUS</b> Combined status of both snow/ice sensor 1 and 2 moisture detectors. If either sensor is wet the the staus is "Wet". Conditions: Snow/ice sensor 1 and 2 are both set to In-slab or Aerial.	DRY or WET	User Installer

Description	Range	Access
<b>BOILER TARGET</b> The boiler target calculated by the control based on outdoor temperature, slab temperature, and the melting, idling, or storm setpoints. "---" is displayed when no heat is required. Conditions: application mode is set Boiler or Boiler+Mix	---, 50 to 230°F (10.0 to 110.0°C)	User Installer
<b>BOILER SUPPLY</b> Current boiler supply water temperature. Conditions: Application mode is set to Boiler or Boiler+Mix	-31 to 266°F (-35.0 to 130.0°C)	Installer
<b>BOILER RETURN</b> Current boiler return water temperature. Conditions: Application mode is set to Boiler or Boiler+Mix	-31 to 266°F (-35.0 to 130.0°C)	User Installer
<b>BOILER OUTPUT</b> Current boiler plant percent output. Conditions: Application mode is set to Boiler or Boiler+Mix	0 to 100%	User Installer
<b>STAGE 1</b> Current status of the stage 1 relay Conditions: Application mode is set to PWM Zone, Mixing, Boiler or Boiler+Mix	On or Off	User Installer
<b>STAGE 2</b> Current status of the stage 2 relay. Conditions: Boiler type is set to Stage 2.	On or Off	User Installer
<b>PRIMARY PUMP</b> Current status of the primary loop pump. Conditions: Application mode is set to PWM Zone, Boiler, or Boiler+Mix	On or Off	User Installer
<b>BOILER PUMP</b> Current status of the boiler loop pump. Conditions: Application mode is set to PWM Mode, Boiler or Boiler+Mix and the Boiler type is not set to Off.	On or Off	User Installer
<b>MIX SYSTEM TARGET</b> The mix system target calculated by the control based on outdoor temperature, slab temperature, and one of either the melting, idling, or storm setpoints. "---" is displayed when no heat is required. Condition: Application mode is set to Mixing or Boiler+Mix.	---, 70 to 200°F (21.0 to 93.5°C)	User Installer
<b>SYSTEM SUPPLY</b> Current system supply water temperature. Conditions: Application mode is not set to Electric.	-31 to 266°F (-35.0 to 130.0°C)	User Installer
<b>SYSTEM RETURN</b> Current system return water temperature. Conditions: 1) Application mode is set to PWM Zone, Mixing, or Boiler+Mix and 2) a system return sensor is installed.	-31 to 266°F (-35.0 to 130.0°C)	User Installer
<b>MIX SYSTEM OUTPUT</b> Current position of the mixing valve or output of the variable speed injection pump. Conditions: Application mode is set to Mixing or Boiler+Mix.	0 to 100%	User Installer
<b>SYSTEM PUMP</b> Current status of the system loop pump. Condition: Application mode is set to PWM Zone, Mixing or Boiler+Mix.	On or Off	User Installer
<b>SYSTEM FLOW RATE</b> The system flow rate measured by the flow meter. Conditions: 1) Application mode is set to PWM Zone, Boiler, Mixing or Boiler+Mix, and 2) a flow sensor is installed.	0 to 1000 GPM (0 to 227 m³/h)	User Installer
<b>SYSTEM PRESSURE</b> The system pressure measured by the pressure sensor. Conditions: Application mode is set to PWM Zone, Boiler, Mixing or Boiler+Mix, and 2) a pressure sensor is installed.	0 to 300psi (0 to 2069 kPa)	User Installer
<b>ELECTRIC ENABLE RELAY</b> Current status of the electric snow melt enable relay. Conditions: Application mode is set to Electric.	On or Off	User Installer

## Settings Menu Navigation

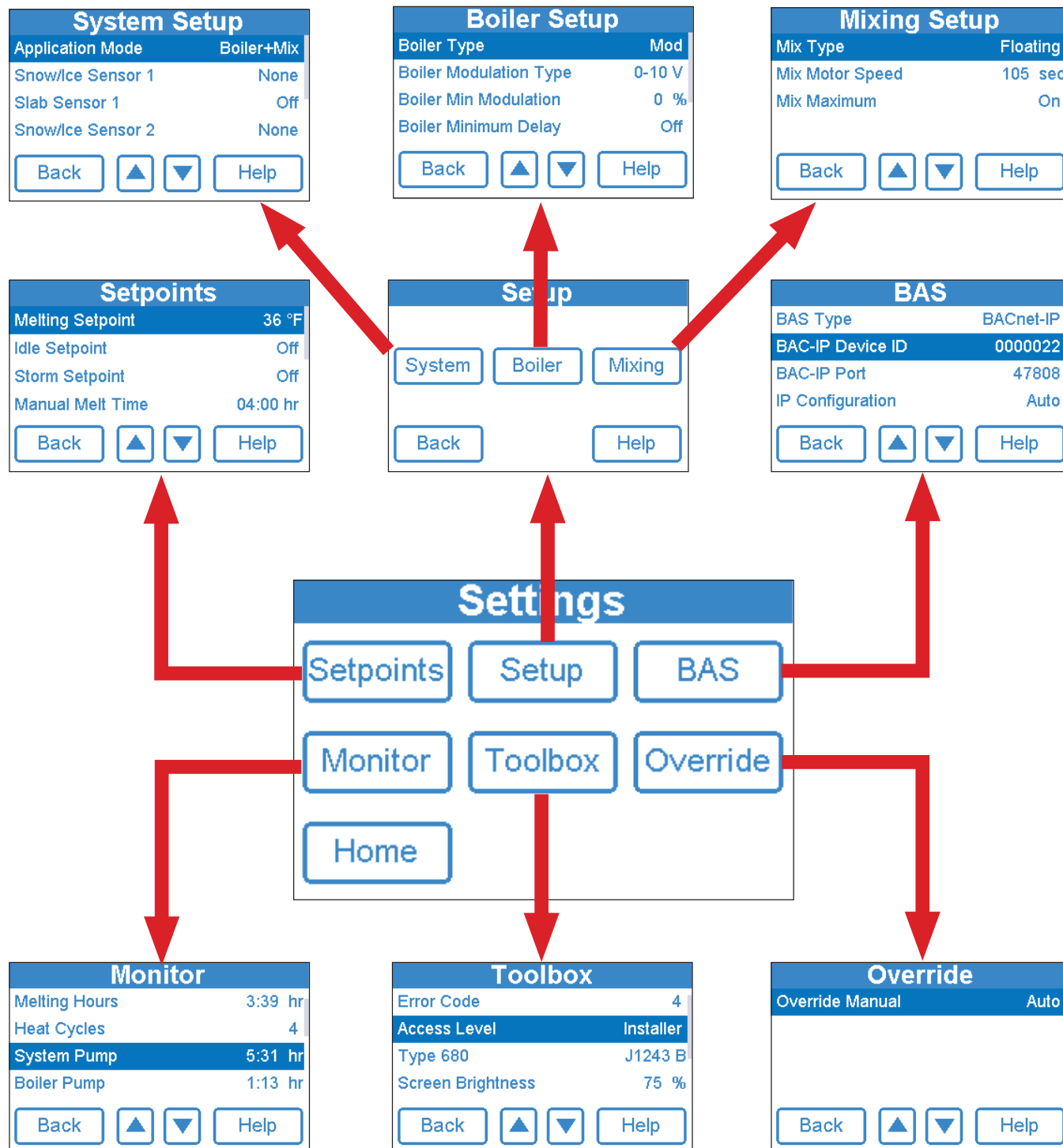
**Step 1** Press the Settings button on the Home Screen.

**Step 2** Press one of the six buttons.

**Step 3** Press up or down buttons to scroll through the list.

**Step 4** Press the highlighted setting name to change the setting value.

In the BAS menu, settings using a number keypad require touching the number field and then pressing the "Clear" button before entering the number.



## Setpoints Menu

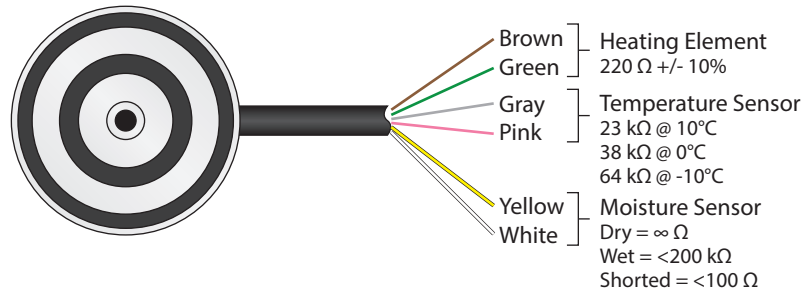
Description	Range	Access
<b>MELTING SETPOINT</b> Select the desired temperature of the snow melt surface when melting. Conditions: Always available.	32 to 95°F (0.0 to 35.0°C) Default = 36°F (2.0°C)	User Installer
<b>IDLING SETPOINT</b> Select the desired temperature of the snow melt surface when idling. Idling pre-heats the slab when the slab is dry but cold and allows faster reaction time to reach the melting temperature when snow is detected. Recommended for commercial use only. Conditions: Always available.	OFF, 20 to 95°F (-6.5 to 35.0°C) Default = Off	User Installer
<b>STORM SETPOINT</b> Select the desired temperature of the snow melt surface while operating in the storm operation. Storm operation temporarily pre-heats the slab to allow faster reaction time to reach the melting temperature when snow is detected. Storm operation is activated through a BACnet or Modbus command. Conditions: Always available.	-31 to 266°F (-35.0 to 130.0°C)	User Installer
<b>MANUAL MELT TIME</b> Select the amount of running time when manually starting the system. Conditions: Always available.	0:30 to 24:00 hours Default = 4:00 hours	User Installer
<b>ADD MELT TIME</b> Select the amount of additional melting time after the Snow/Ice Sensors are dry. This allows low spots on the slab to fully dry before the snow melting system is shut off. Conditions: 1) Snow/ice sensor 1 is set to In-slab or Aerial, or 2) Snow/ice sensor 2 is set to In-slab or Aerial.	0:30 to 24:00 hours Default = 4:00 hours	Installer
<b>STORM RUN TIME</b> Select the amount of storm run time to pre-heat the slab when advised of a winter storm warning. Conditions: Storm setpoint is set to a temperature.	0:30 to 24:00 hours Default = 8:00 hours	Installer
<b>SENSITIVITY 1</b> Select how sensitive Snow/Ice Sensor 1 is to water detection. Conditions: Snow/ice sensor 1 is set to In-slab or Aerial.	Auto, Min, -2, -1, Mid, +1, +2, Max Default = Auto	Installer
<b>SENSITIVITY 2</b> Select how sensitive Snow/Ice Sensor 2 is to water detection. Conditions: Snow/ice sensor 2 is set to In-slab or Aerial.	Auto, Min, -2, -1, Mid, +1, +2, Max Default = Auto	Installer
<b>WWSD</b> Select the temperature above which the snow melting system is shut off during warm weather. This allows the snow or ice to melt off the slab naturally. Conditions: Always available.	Auto, 32 to 95°F (0.0 to 35.0°C) Default = Auto	Installer
<b>CWCO</b> Select the temperature below which the snow melting system is shut off during extremely cold weather. Below this temperature, the heat loss of the slab exceeds the capacity of the boiler or heating appliance. Conditions: Always available.	Off, -30 to 50°F (-34.5 to 10.0°C) Default = 10°F (-12.0°C)	Installer

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## Testing the Sensors

### Precipitation Sensor

Measure resistance between the Precipitation Sensor wires.



### Supply and Return Sensors

Measure resistance between the sensor wires and compare to the NTC 12k resistance table below.

Celsius	Fahrenheit	Resistance
-20°C	-4°F	112246 $\Omega$
-10°C	14°F	63929 $\Omega$
0°C	32°F	37942 $\Omega$
5°C	41°F	29645 $\Omega$
10°C	50°F	23364 $\Omega$
11°C	51.8°F	22300 $\Omega$
12°C	53.6°F	21292 $\Omega$
13°C	55.4°F	20335 $\Omega$
14°C	57.2°F	19428 $\Omega$
15°C	59°F	18567 $\Omega$
16°C	60.8°F	17750 $\Omega$
17°C	62.6°F	16974 $\Omega$
18°C	64.4°F	16237 $\Omega$
19°C	66.2°F	15537 $\Omega$
20°C	68°F	14871 $\Omega$
21°C	69.8°F	14238 $\Omega$
22°C	71.6°F	13636 $\Omega$
23°C	73.4°F	13064 $\Omega$
24°C	75.2°F	12519 $\Omega$

Celsius	Fahrenheit	Resistance
25°C	77°F	12000 $\Omega$
26°C	78.8°F	11506 $\Omega$
27°C	80.6°F	11035 $\Omega$
28°C	82.4°F	10587 $\Omega$
29°C	84.2°F	10159 $\Omega$
30°C	86°F	9752 $\Omega$
35°C	95°F	7978 $\Omega$
40°C	104°F	6569 $\Omega$
45°C	113°F	5442 $\Omega$
50°C	122°F	4535 $\Omega$
55°C	131°F	3800 $\Omega$
60°C	140°F	3201 $\Omega$
70°C	158°F	2306 $\Omega$
80°C	176°F	1692 $\Omega$
90°C	194°F	1263 $\Omega$
100°C	212°F	958 $\Omega$

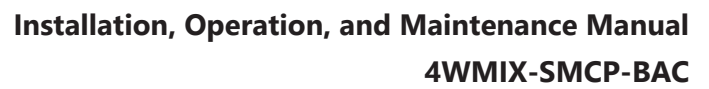
## Maintenance

Yearly maintenance should be done on the panel prior to each heating season to ensure the efficient and accurate operation of the panel.

Complete the following check list:

- Check and/or replenish the appropriate amount of system antifreeze solution required for the snow/ice melting system.
- Manually override the system controller to turn on the circulator to verify if it starts, via stethoscope or similar device.

You are now ready for another heating season with HeatLink.



# Installation, Operation, and Maintenance Manual

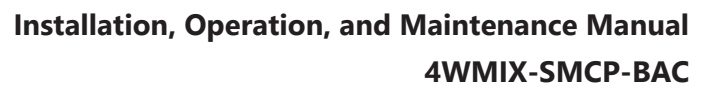
## 4WMIX-SMCP-BAC





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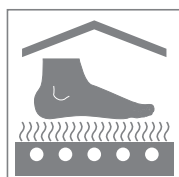
## 4WMIX-SMCP-BAC



# Installation, Operation, and Maintenance Manual

## 4WMIX-SMCP-BAC





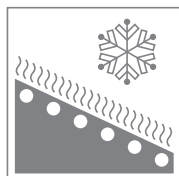
### **Heat Link<sup>®</sup> Canada**

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**Head Office:**

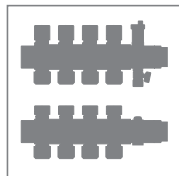
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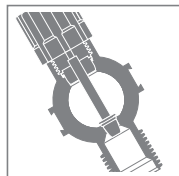
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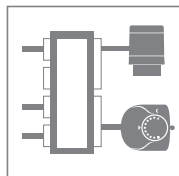
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