

MECHANICAL ROOM IN A BOX[™]



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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.

Disclaimer

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Tools For Installation

- Level
- Screwdriver or power drill
- Flat head bit or Robertson Square Drive, #2
- Phillips head bit

Function

This snow melt panel provides mixing and distribution for outdoor snow and ice melting applications.

The effectiveness of the system is dependant on the system being designed and installed correctly. Proper consideration of factors such as BTU Loads, Outdoor Design Temperature, Differential Fluid Temperatures, Glycol Percentage, Head Loss, Flow Rates and transfer capacities of the heat emitters is critical. Once these factors have been considered and the system requirements determined, these can then be evaluated and compared to the panel capabilities (listed under Specifications on page 6 of this manual).

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

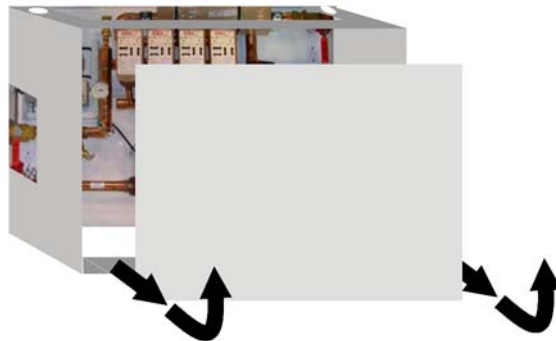
Unpacking

Step 1 Examine the panel for signs of visible damage that may have occurred during shipping. If damage is visible notify your courier and supplier immediately.

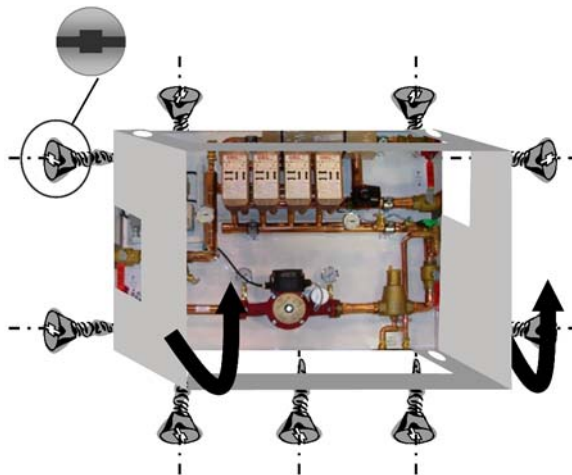
Verify the following items:

- Installation, Operation and Maintenance Manual
- ECL 302 Quick Guide U10
- (1) Outdoor sensor
- (1) Slab sensor
- (1) Precipitation Sensor

Step 2 Remove the cover of the enclosure by pulling the bottom of the cover and lifting the cover from the two pins.



Step 3 Removal of the enclosure requires a Flat Head bit or a Robertson Square bit #2. Loosen a total of 9 screws as seen in Figure 1b and carefully place the enclosure aside.

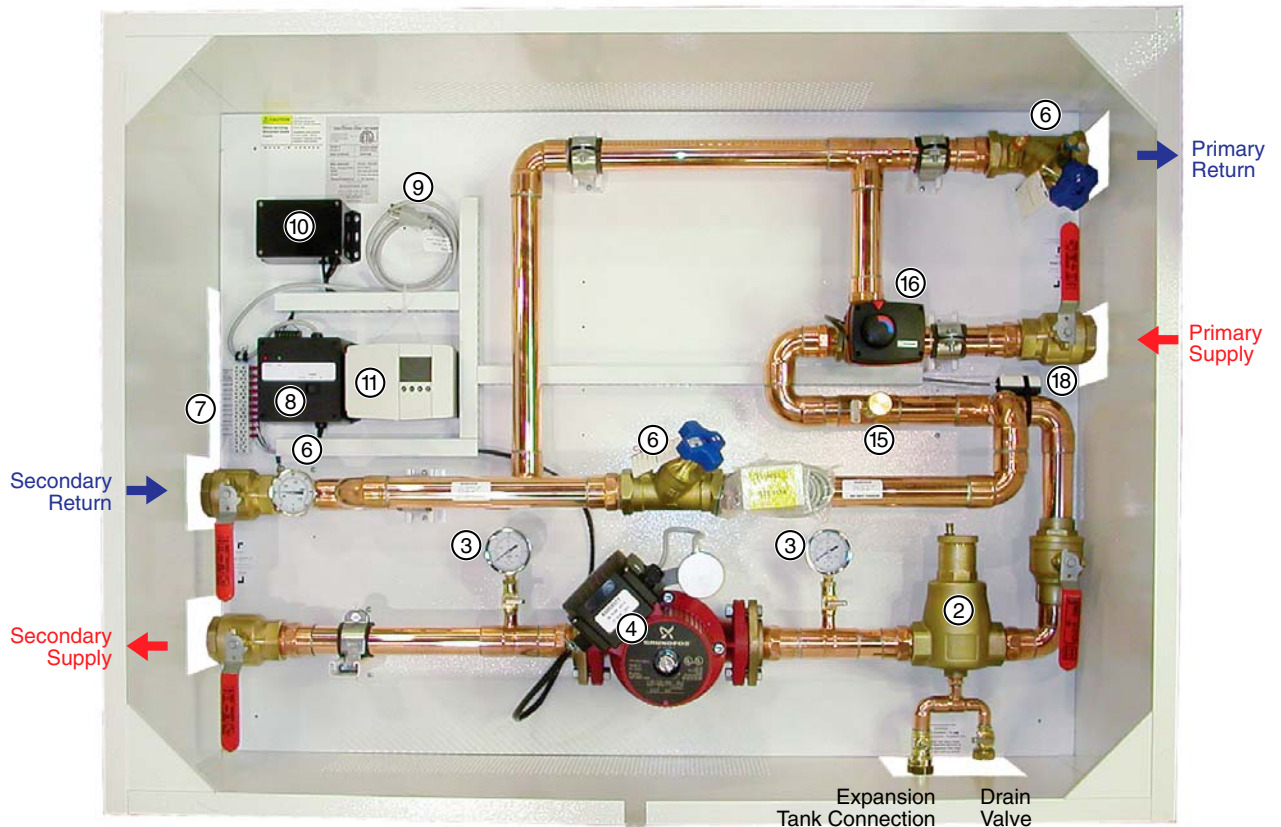
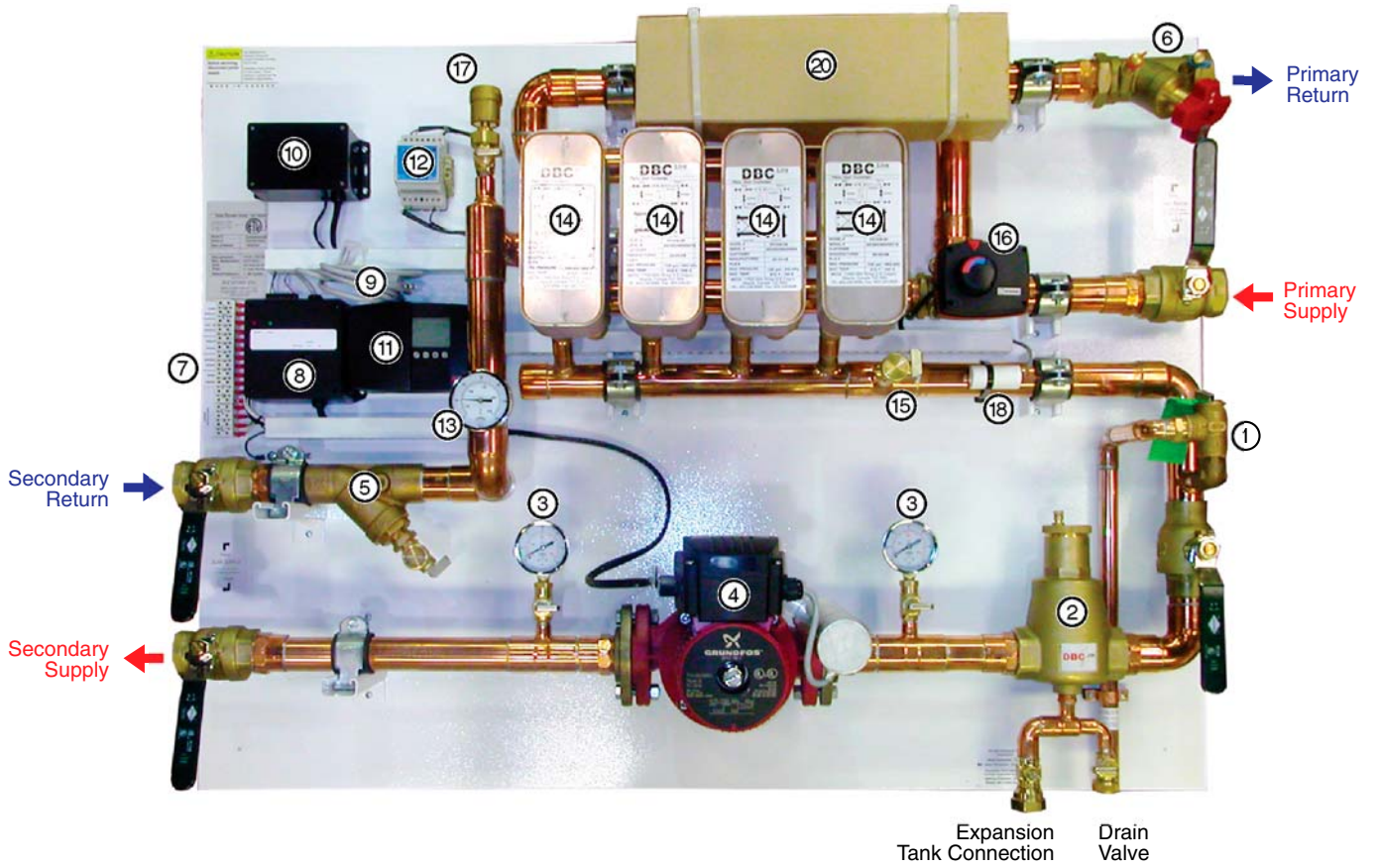


Panel Components

#	Component	Part Number				
		SMP105	SMP250	SMP335	SMP425	SMP400D
①	Pressure Relief Valve	-	-	-	-	n/a
②	Air Eliminator	-	-	-	-	-
③	Pressure Gauge	PG14NPT25160	PG14NPT25160	PG14NPT25160	PG14NPT25160	PG14NPT25160
④	Circulator	PUMP2699	-	-	-	-
⑤	Strainer / Drain Valve	-	-	-	-	n/a
⑥	Balancing Valve	-	-	-	-	-
⑦	Terminal Strip	-	-	-	-	-
⑧	Power Module	PWRB8AR1-SMP	PWRB8AR1-SMP	PWRB8AR1-SMP	PWRB8AR1-SMP	PWRB8AR1-SMP
⑨	115V Power Plug	-	-	-	-	-
⑩	Pump Contactor	-	-	-	-	-
⑪	System Controller	ECL302	ECL302	ECL302	ECL302	ECL302
⑫	Precipitation Sensor Controller	ETSTHRM	ETSTHRM	ETSTHRM	ETSTHRM	ETSTHRM**
⑬	Temperature Gauge	76940	76940	76940	76940	76940
⑭	Heat Exchanger	HTEX3820	HTEX3820	HTEX3820	HTEX3820	n/a
⑮	Drain Valve	-	-	-	-	-
⑯	3-way Valve	-	-	-	-	-
	Motorized Actuator	ACTMXVLV	ACTMXVLV	ACTMXVLV	ACTMXVLV	ACTMXVLV
⑰	Air Vent w/Cap	79932	79932	79932	79932	n/a
⑱	Supply Sensor	ESM11	ESM11	ESM11	ESM11	ESM11
⑲	Outdoor Sensor	ESM10**	ESM10**	ESM10**	ESM10**	ESM10**
⑳	Precipitation Sensor	DRVWSNS*	DRVWSNS*	DRVWSNS*	DRVWSNS*	DRVWSNS**
	Panel Enclosure & Cover	-	-	-	-	-

* shown as shipped

** not shown



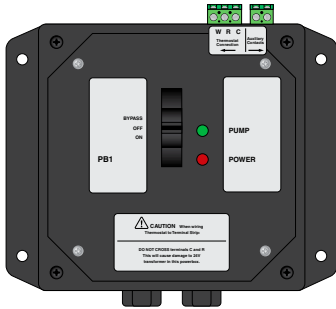
Specifications

	SMP105	SMP250	SMP335	SMP425
Listing	cETLus			
Conforms to	CAN/CSA-C22 No.14, UL508			
Dimensions	36"H x 48"W x 16"D			
Weight	500 lbs.			
Nominal panel output* - see conditions below	105,000 btu/hr	250,000 btu/hr	335,000 btu/hr	425,000 btu/hr
Max ambient temperature	120°F			
Max water temperature	200°F			
Settable fluid temp range	50°F to 180°F			
Max allowable operating pressure on secondary side	100 psi			
Power supply: pre-wired on system controller	Module with 120v plug & 6' cord. Requires dedicated receptacle, 15 Amp, 120V, 60Hz, single phase.			
Circulator	UPS26-99FC	Grundfos UP43-110		
Temperature control method	1-¼" 3-Way diverting valve and motorized actuator, controlled by snow melt control.			
Mix valve Cv	21			
Heat exchanger size	2x 3x8-20	3x 3x8-20	4x 3x8-20	4x 3x8-30
Auxiliary terminal	Yes, dry contacts, 1x2 terminal strip, screw type, max. load 2A.			
Piping	1-½" Copper			
Piping connections	1-½" FPT			
Expansion tank fitting	½" FPT			
Cold water fill	¾" hose bib			
Backplate and sides	Galvanized steel			
Cover	Powder coated steel			

Panel Output Conditions	SMP105		SMP250		SMP335		SMP425	
	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Fluid type	Water	50% glycol	Water	50% glycol	Water	50% glycol	Water	50% glycol
Entering fluid temp (°F)	180	100	180	100	180	100	180	100
Exiting fluid temp (°F)	140	130	140	130	150	130	140	130
Flow rate (US gpm)	5	7	12	16	17	22	21	28
Headloss	3.8	-	11.2	-	14.3	-	16.8	-
Pressure drop (ft head)	-	18	-	23	-	22	-	21

	SMP400D
Listing	cETLus
Conforms to	CAN/CSA-C22 No.14, UL508
Dimensions	36"H x 48"W x 16"D
Weight	480 lbs.
Nominal panel output	400,000 btu/hr
Nominal flow	32 US gpm @ 25°F ΔT
Nominal pressure drop outside of panel	25 ft
Max ambient temperature	120°F
Max water temperature	200°F
Settable fluid temp range	50°F to 180°F
Max allowable operating pressure on secondary side	100 psi
Power supply: pre-wired on system controller	Module with 120v plug & 6' cord. Requires dedicated receptacle, 15 Amp, 120V, 60Hz, single phase.
Circulator	Grundfos UP43-110
Temperature control method	1-¼" 3-Way diverting valve and motorized actuator, controlled by snow melt control.
Mix Valve Cv	21
Auxiliary terminal	Yes, dry contacts, 1x2 terminal strip, screw type, max. load 2A.
Piping	1-½" Copper
Piping connections	1-½" FPT
Expansion tank fitting	½" FPT
Cold water fill	¾" hose bib
Backplate and sides	Galvanized steel
Cover	Powder coated steel

Panel Component Specifications



Power Box

This module provides the required power for all electronic components on the panel, via the ON/OFF switch. Power box may not be exactly as shown.

Specifications:

- Requires 115V power source.
- Requires a maximum 15A circuit breaker.



System Controller

Based upon the feedback from the sensors for the system the controller will regulate the necessary supply fluid temperature that is required for the snow melt system by adjusting the control valve via motor actuator.

Specifications:

- Settable fluid temperature range for the system
- Possible sensors:
 1. Supply sensor (pre-installed)
 2. Outdoor sensor
 3. Slab temperature (optional)
 4. Precipitation sensor

Refer to ECL 302 Quick Guide U10 for setup.

System Controller Response

	Control Style	SMP
Situation	Warm weather shut down	Off
	Drop in temperature	Idle
	Snowfall occurs	On
	Snowfall stops	Idles 12 hrs, Then Off
	Cold weather shut down	Idle



Precipitation Sensor Controller

- Monitors the outdoor temperature and detects the presence of precipitation to determine when the snowmelt system needs to turn on.
- Provides an idle mode for the snow/ice melting system.



Supply Sensor

The supply fluid temperature to the snow/ice melting system is monitored by the system supply sensor. The sensed temperature is fed back to the system controller which in turn aids in the regulation of the control valve.



Outdoor Sensor

The outdoor ambient temperature is monitored by the outdoor sensor. The sensed temperature is fed back to the system controller which in turn aids in the regulation of the control valve.



Slab Sensor (optional)

To ensure the temperature of the slab is properly maintained to melt snow and ice a slab sensor is used to provide feedback to the system controller. Placement of the slab sensor should be within a metal conduit for easy accessibility and maintenance of the sensor.

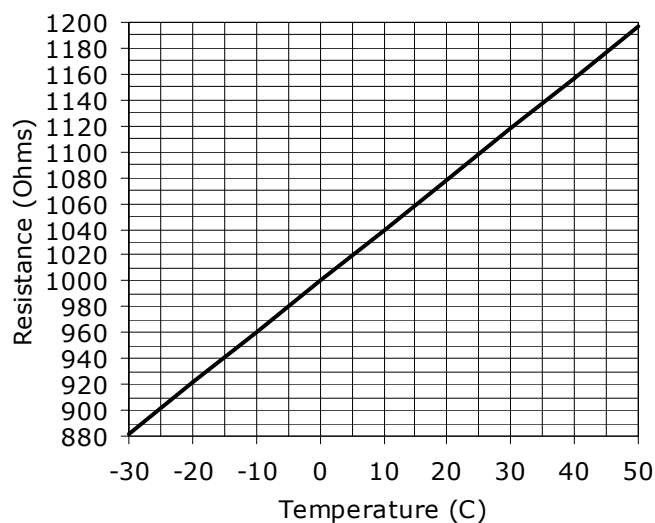
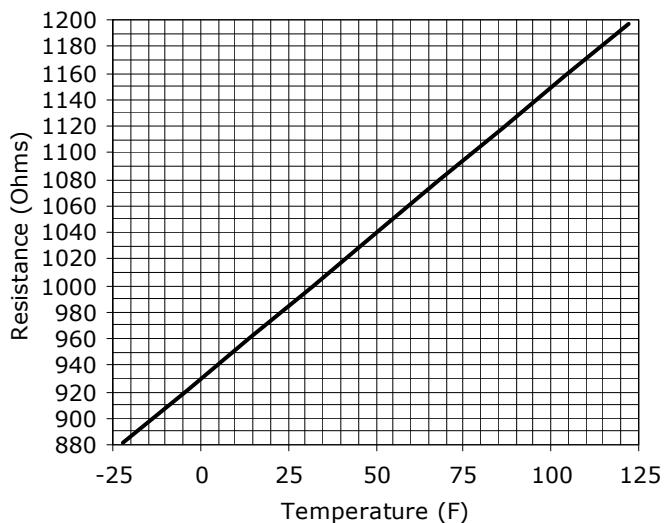


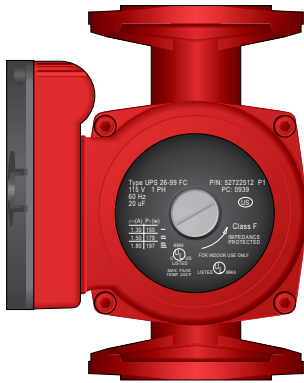
Precipitation Sensor

Included with the SMP is a precipitation sensor that is placed in the pavement to detect outdoor temperature and precipitation. Upon detection of either drop in temperature or precipitation, the snow melt system is started. The sensor should be installed as per installation instructions.

Sensor Resistance Graphs

The outdoor and system sensors are 1000 Ohm platinum based sensors. Below is a graph of the temperature vs. resistance graph for the sensors.





Circulator

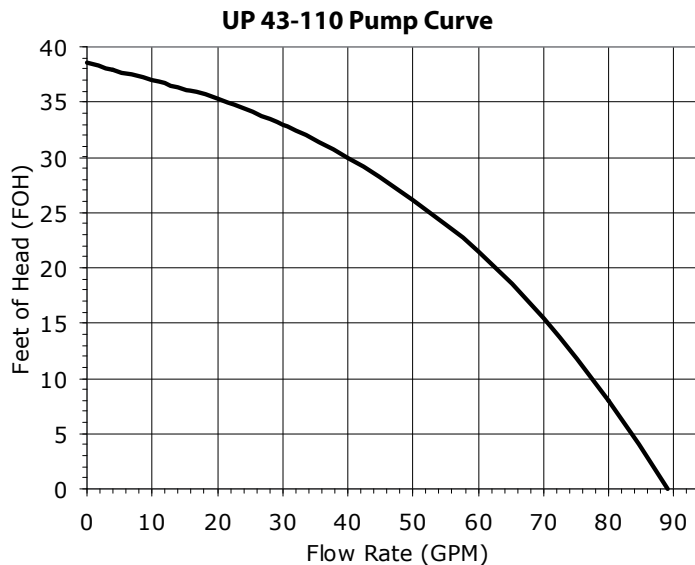
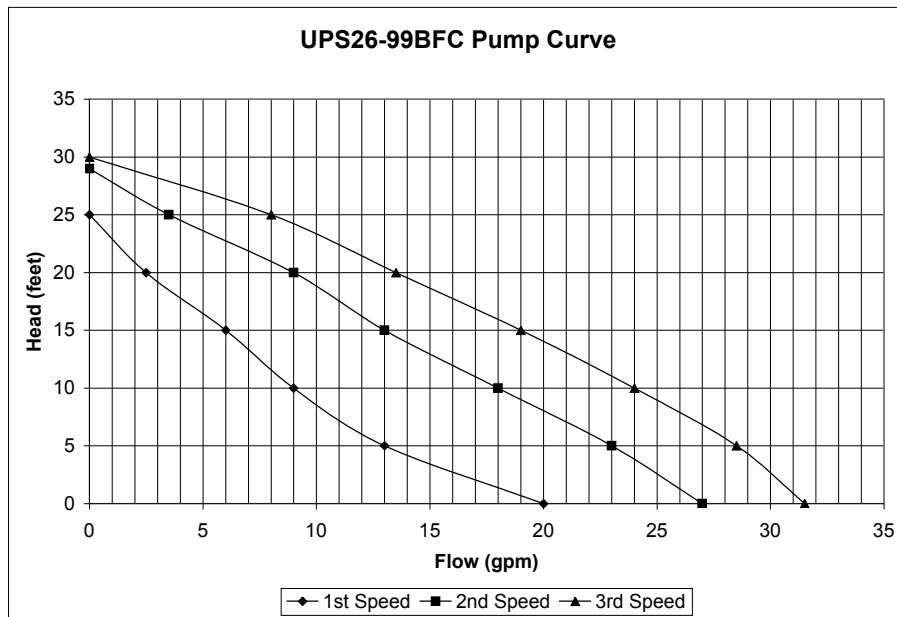
The circulator moves the heated fluid through the system when there is a call for heat from the system controller.

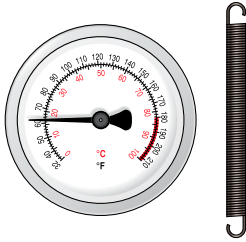
Pump Curve for Panel Circulator

Depending on the panel, the following pump curves apply. Note: The use of different percentages of propylene glycol should be taken into account when referring to the pump curve below.



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

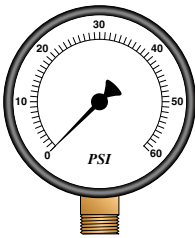


**Thermometer (76940)**

The pipe mounted thermometer reads the supply fluid temperature.

Specifications:

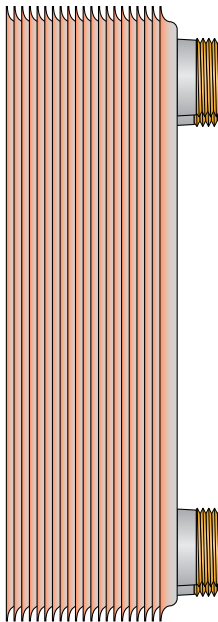
- Temperature range of 32-210°F (0-100°C).

**Pressure Gauge**

The two pressure gauges are mounted on the inlet and outlet ports of the circulator providing a reading of the system pressure drop.

Specifications:

- Pressure range, 0-60psi

**Heat Exchanger**

The brazed plate heat exchanger allows the transfer of heat from fluid on one side to fluid on the other side of the heat exchanger. This component also provides a separation between the two fluids so mixing does not occur.

Specification:

- Stainless steel plates copper brazed together

Fluid pH should be maintained within a range of 6.8-8.0

**Balancing Valve**

Located on the system supply and heat source return are 1-1/2" balancing valves that provides flow regulation based on load requirements.

Setting of Return Balancing Valve

Certain system information is required to properly set the balancing valve:

- 1) Total pressure drop across the supply and return for both the primary and secondary systems.
- 2) Flow requirements for both the primary and secondary sides of the system.

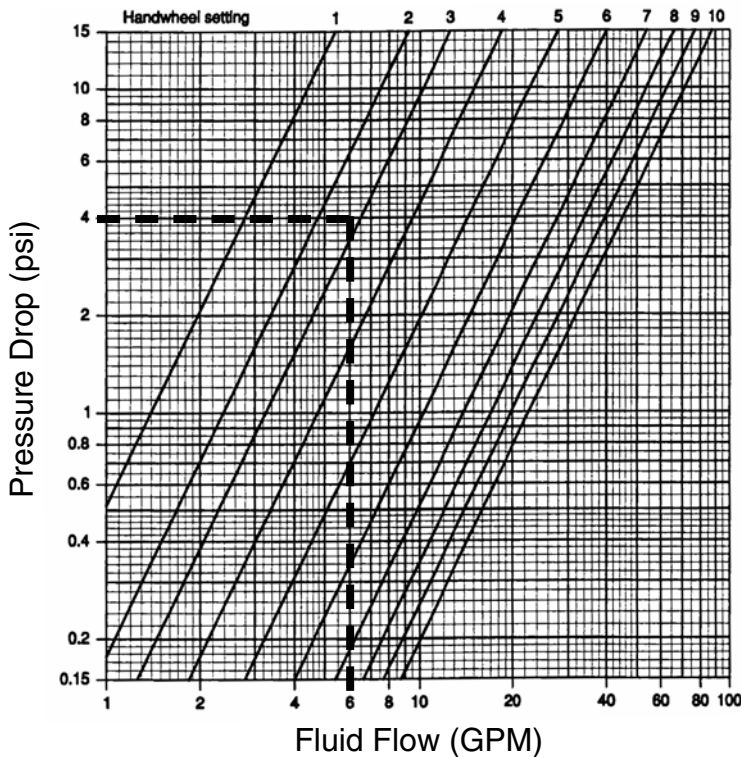
Taking this information and the graph to the left, the appropriate valve setting would then be set and read on the valve handle.

For example:

Pressure drop across the panel is 4 psi and the flow requirement is 6 GPM.

Following the dashed lines, seen on the graph to the left, the valve setting would be approximately 2.8. The blue knob would be turned clockwise until digits 2.8 appear (8 being red).

Available on the valve are two test ports. Appropriate test equipment can be utilized for verification of the required load requirements.



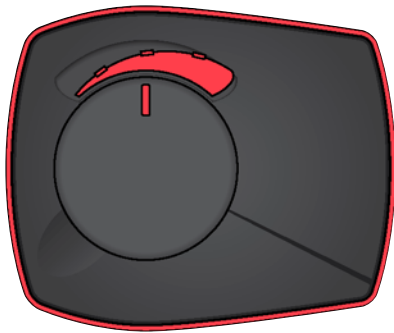
Note: Diagram above based upon 100% water.

**Control Valve**

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

Specifications:

- Cv=21
- 1-1/4" Female NPT

**Motorized Actuator**

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

Specifications:

- 3-point operation motor actuator
- Running time, close to open, is 1.7 minutes
- 24 volts AC

Manual Operation of Motorized Actuator

NOTE: Motorized actuator 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.

Mounting

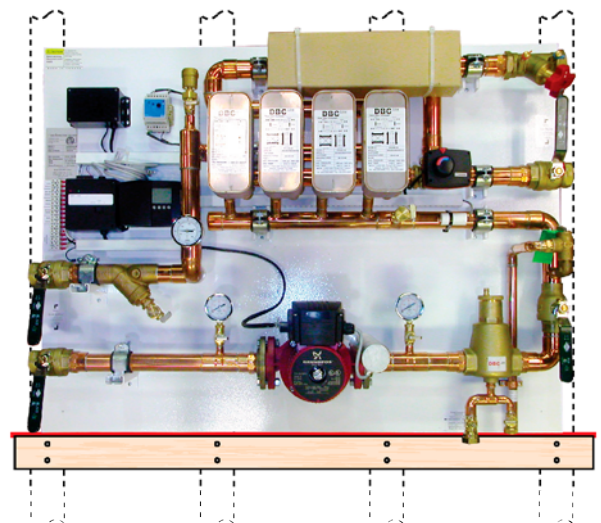
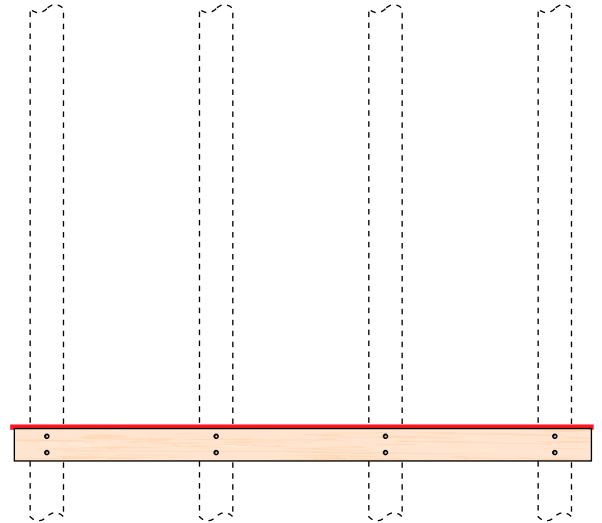
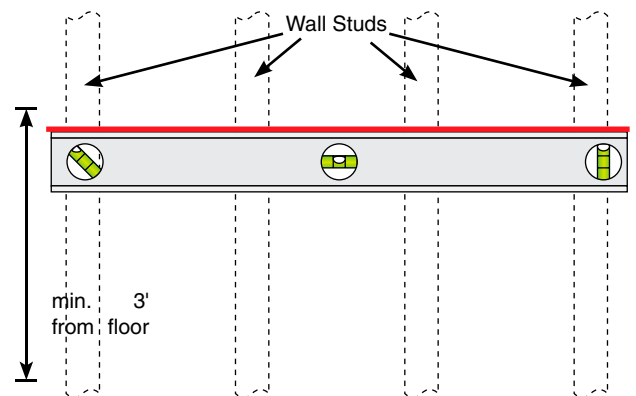
Prior to mounting the panel, ensure the wall is capable of supporting the weight of the panel.
Ensure that a 115V receptacle is within reach of the 6-foot cord and plug.

- Step 1** Determine the locations and distance of the studs within the walls. A 2x4 is recommended to be installed to assist in securely setting the panel to the wall. With a level draw a straight line on the wall.
- Step 2** Align the 2x4 to the line and secure this to the wall studs. Lift and place the panel onto the 2x4, and secure the panel to the wall. To ensure the panel is properly secured, it may be necessary to screw through the back plate.



This panel is heavy; 2-3 person lift required.

- Step 3** Before replacing the enclosure and cover, refer to pages 17-20, to connect the piping and the wires appropriately to the panel.



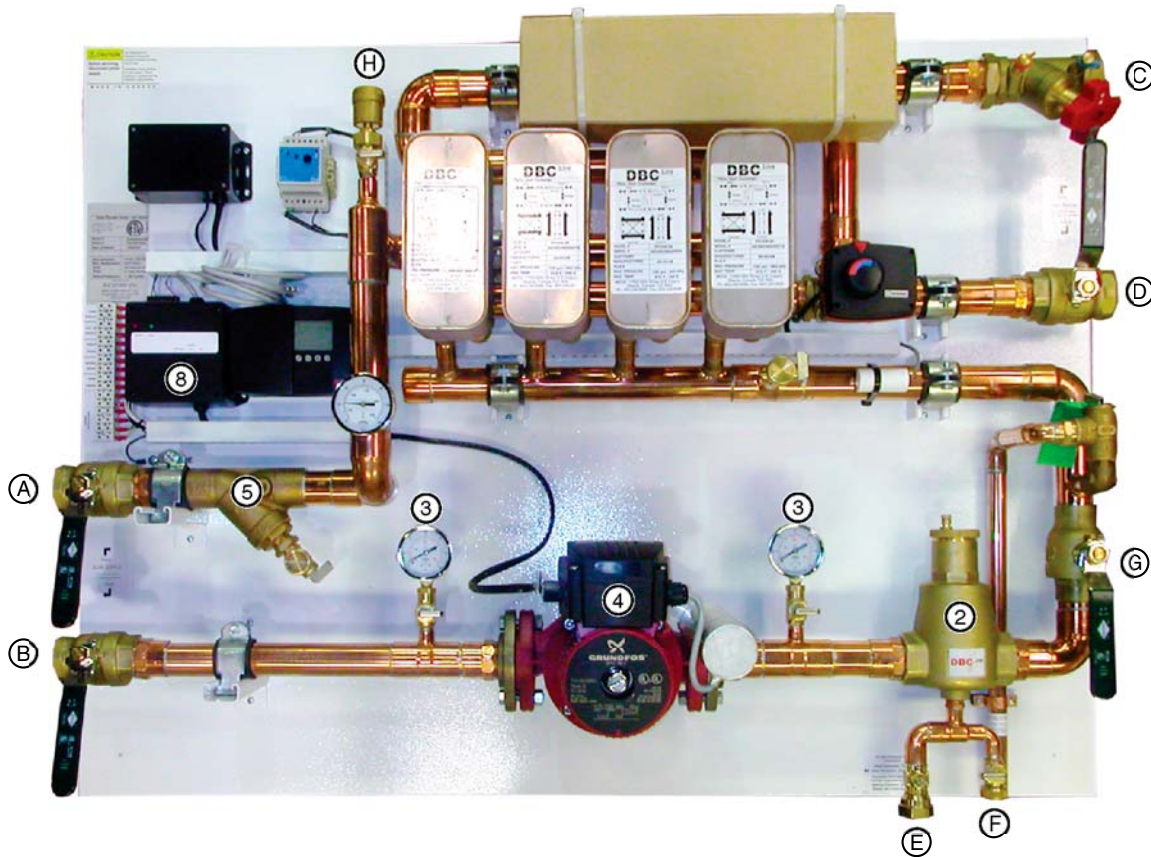
Fill And Purge

The following steps are recommended in order to fill the system side of the snow-melting panel prior to commissioning of the panel.



The discharged system fluid from the fill and purge process is not for consumption or washing.

Note: Additional purging steps may be required for the rest of the hydronic system.

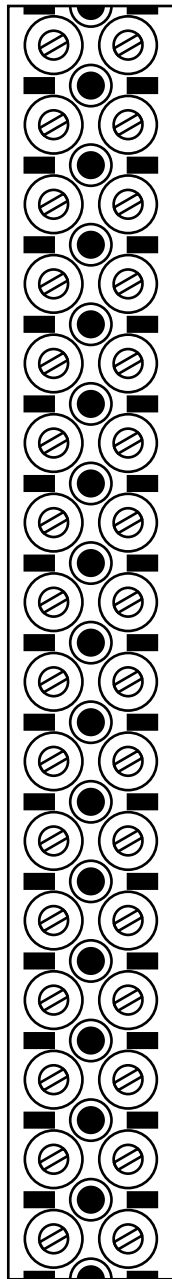


- Step 1** Turn off the power module (8).
- Step 2** Fully close valves (B) (clockwise rotation), (A), (F), (G), (5), and (3).
- Step 3** With an appropriate expansion tank connected, fully open (E), loosen the large silver flat head screw on (4) and the air vent knob on (2).
- Step 4** Connect the antifreeze solution charger to (F) and slowly open the valve. Reduce the flow if solution sprays out from (2).
- Step 5** After a minute or when water comes out of the circulator, tighten the screw on (4).
- Step 6** Remove air vent assembly from (H) and attach the purge hose to the valve. Tighten the air vent on the air eliminator, (2).
- Step 7** Fully open valve (G) and allow the water to fill through the heat exchangers and purge through (H).
- Step 8** When the water exiting from (H) is free of bubbles, close valves (H) and (F).
- Step 9** Remove the purge hose from valve (H) and reattach the air vent assembly. Loosen the air vent knob on (2).
- Step 10** Prior to fully opening valves (A) and (B), the rest of the snow melt system should be properly filled and purged.

Panel Wiring



- 24V low voltage power may be supplied to the thermostat. Wiring should be done by qualified electrician and should meet local codes and jurisdictions. Wiring to the terminal strip requires 18 gauge 4 wire.



Indicator Lamp (24 Volt)

Connected to a 24 volt indicator lamp to show when system is operating.

Auxiliary (Dry Contact)

Terminal that closes on any call for heat.

3rd Party Precipitation Sensor Input (Apply no voltage, Dry Contact Connection)

Connections for field supplied, field installed precipitation sensor.

Outdoor Sensor (Apply no voltage)

Connection for the Outdoor Sensor (ESM10).

Optional Slab Temperature Sensor (Apply no voltage)

A universal sensor placed within the slab to monitor its temperature.

Screen

White

Grey

Brown

Green

Yellow

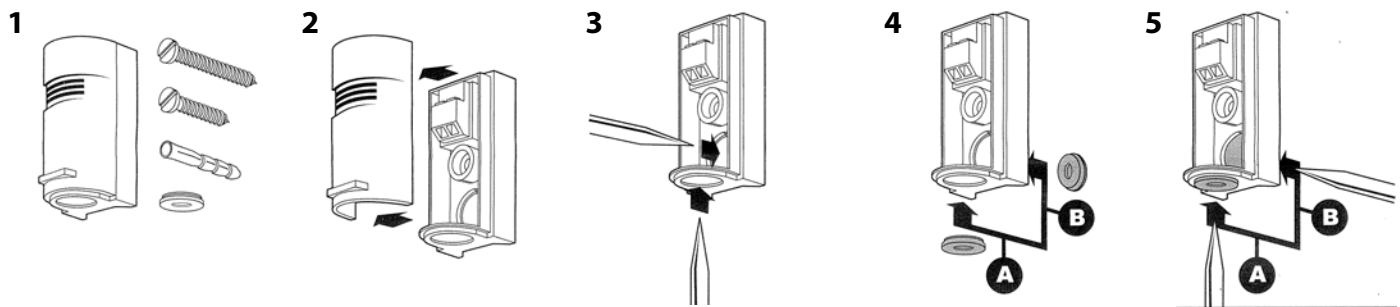
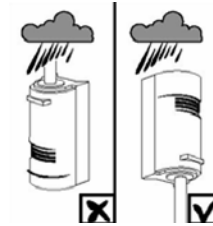
Precipitation Sensor Connections (Apply no voltage)

Terminal connections for factory supplied Precipitation Sensor (DRVWSNS).

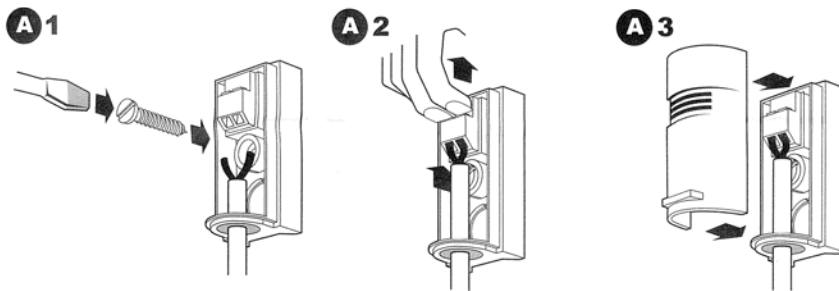
Outdoor Sensor Installation



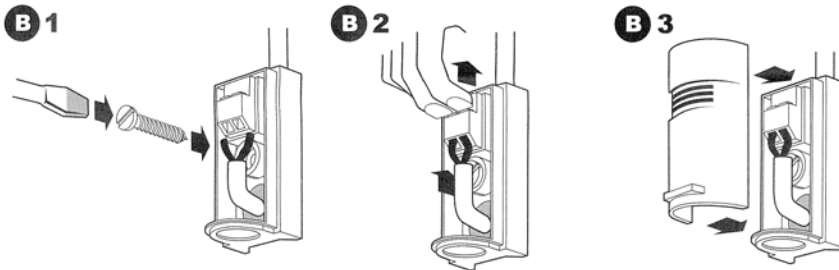
- Required 2 wire 18 gauge for outdoor sensor
- Placement of outdoor sensor on north side of building away from doors, windows, exhaust fans and direct sunlight.
- Mount approximately 10' above ground level
- Orient sensor as noted in the figure to the right



Wire entering from bottom of sensor.



Wire entering from bottom of sensor.



Slab Sensor Installation (optional)

The slab sensor should be placed within a conduit and as close as possible to the middle of the slab.

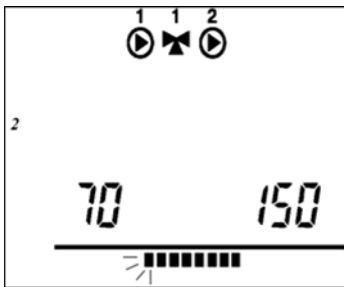
Precipitation Sensor Installation



- The installation of the pavement sensor should be done in the following manner:
- Placement of the sensor should be within an area where ice or snow accumulation is prevalent
 - Sensor placement should be spaced between tubing
 - The sensor should be mounted onto a hard foundation, for an asphalt application place the sensor in a concrete recess
 - The top of the sensor should be flush to the surface
 - Sensor wire should be run according to local authority, and recommended that the sensor wire be ran in conduit

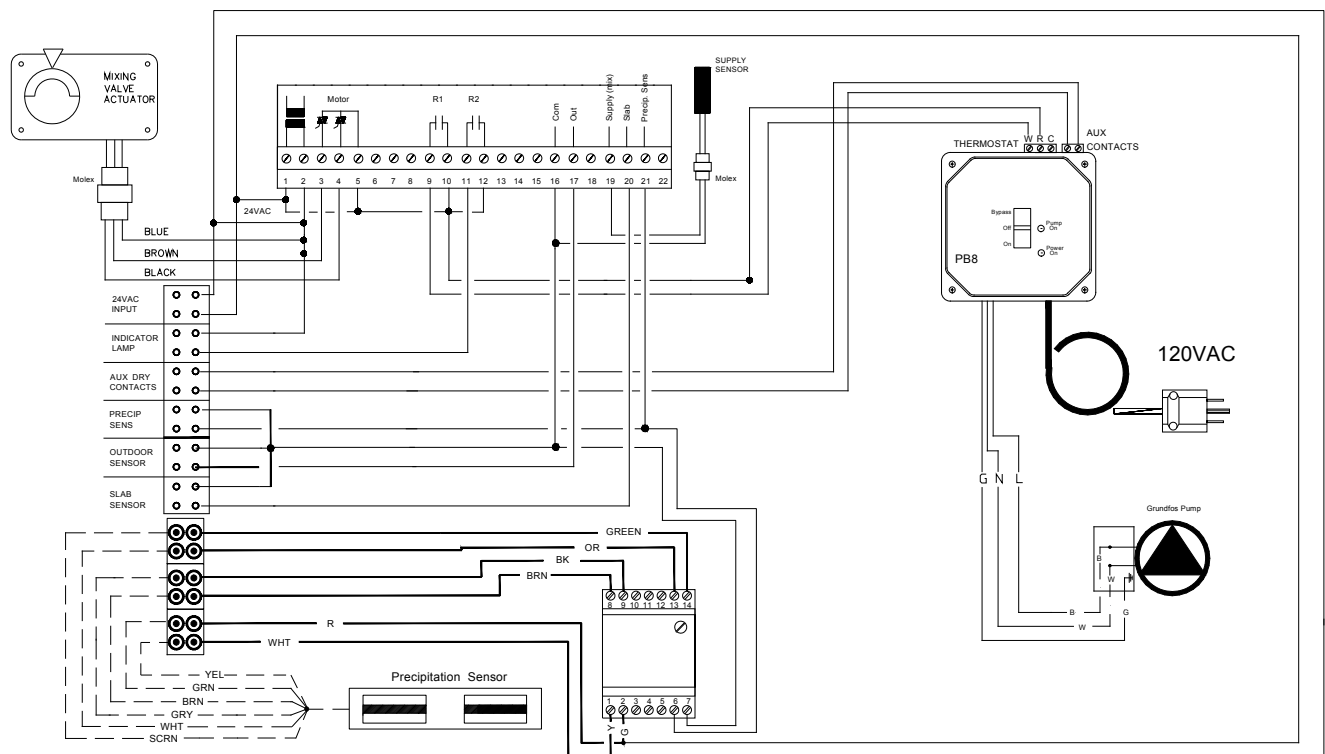
Extension of the sensor cable can be up to 164ft (50m) and the cable's extension resistance being less than 10 Ohms.

Setting of Fluid Temperature



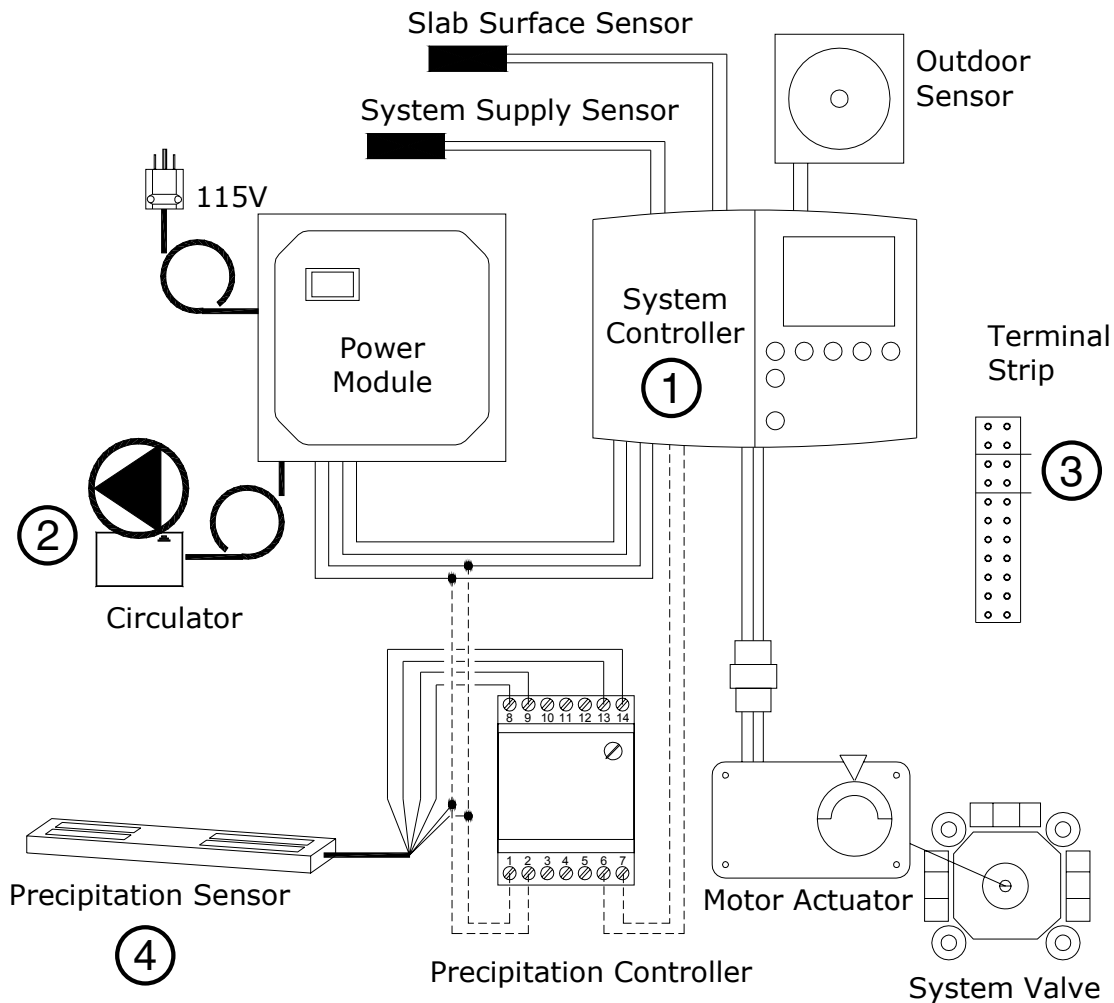
- With the grey side of the System Controller card facing out:
1. Using the Arrow buttons scroll to LINE 2
 2. Adjust the required temperatures with the + & - buttons
 3. Use the Shift button to switch between Min. and Max setting. Flashing segment indicates Min. or Max. selection.

Electrical Drawing



Panel Control Sequence

1. When the outdoor sensor detects temperature below the set warm weather shutdown, the System Controller ① will activate. It will begin to regulate the flow temperature by starting the Circulator ② and closing the Auxiliary Terminals ③. During this situation the System Controller places the snow/ice system in idle mode.
2. When the Precipitation Sensor ④ detects snow fall, the System Controller ① ramps the flow temperature to the maximum setting. When no snow is detected by the Precipitation Sensor ④, the System Controller ① continues to operate the system at maximum temperature for an additional 12 hours.



Troubleshooting

Problem	Check / Verify	Possible Cause
Low Temperature Within Snow Melt System	The panel fails to turn on.	The panel may not be powered. Check if the power module is in the ON position and there is supplied power to the panel.
	The motor actuator fails to open during a call for heat.	The motor actuator may have been left in a manual position. Refer to Operation & Maintenance manual for proper operation.
	One or both sensors may be defective. Without power to the panel take an Ohm reading across each of the two sensors. Refer to the Operations & Maintenance manual for appropriate sensor resistance graph.	Thermostat may be out of calibration or defective. Replace thermostat.
	Low supply mixed fluid temperature.	Adjust the system controller to the appropriate heating curve setting.
	Wiring from heat source to snow melt panel.	Check that the wiring is done properly. Consult qualified electrician prior to alteration of wiring between heat source and snow melt panel.
	Output of heat source is unable to meet demand of the required system.	Compare output of heat source to the requirements of the snow melting system.
	Circulator is not on during a call for heat. (Use a stethoscope or similar device to verify)	The system controller or circulator may be defective or the cut off temperature is not set properly.
Excessive High Temperature Within Snow Melt System	Check current settings of the system controller.	Adjust the settings on the system controller appropriately.
	High supply mixed fluid temperature.	Adjust the system control valve to the appropriate heating curve settings.
	The motor actuator remains open after the thermostat is satisfied.	An obstruction inside the valve is not allowing the actuator to fully close or the system controller is still calling for heat.
	Bypass may be on.	Check that the Power switch on the power box is in the "ON" position.

System Controller

To troubleshoot the system controller, refer to the ECL 302 U10 Quick Guide instruction booklet included with the panel.

Maintenance

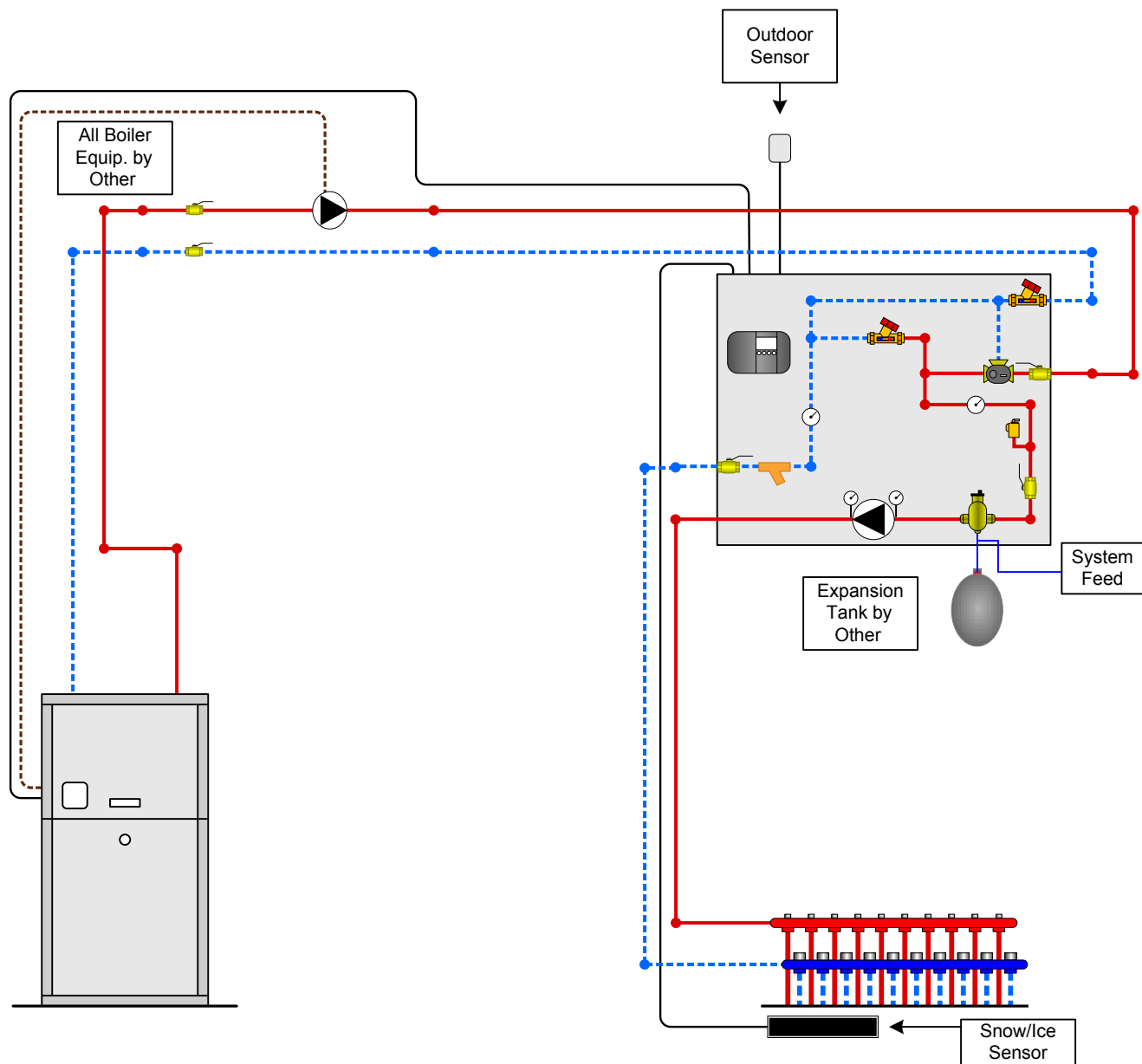
Yearly maintenance should be done on the panel prior to each heating season to ensure the efficient and accurate operation of the panel.

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.

SMP 400 MBH Snow Melt Panel without Heat Exchangers

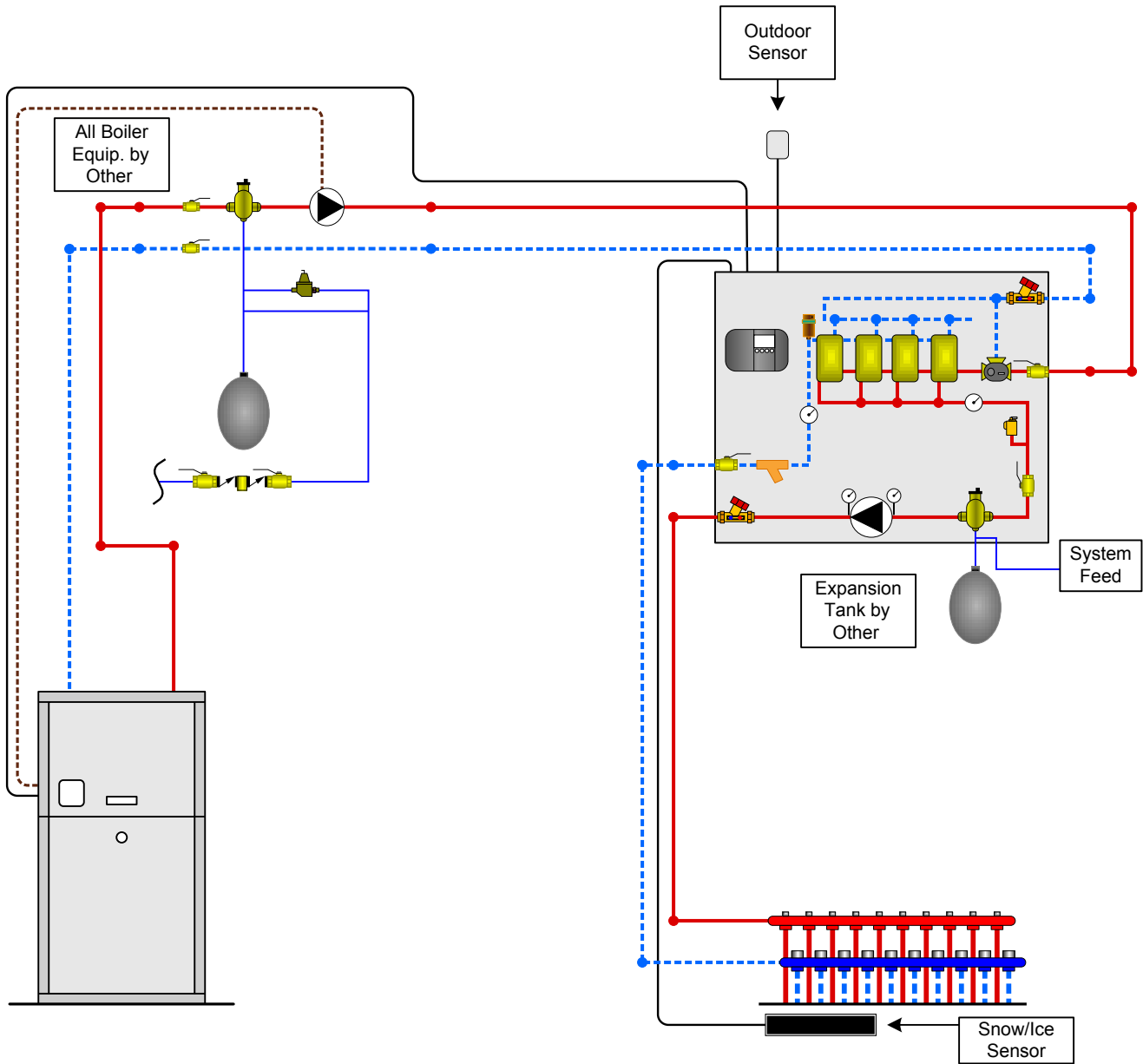


Notes:

A) This drawing is for illustrative purposes only. It is not intended to be used as a wiring or piping diagram.

Not all required components are shown. Local codes, regulations, and authorities have final jurisdiction.

SMP 105-425 MBH Snow Melt Panels with Heat Exchangers



Notes:

- A) This drawing is for illustrative purposes only. It is not intended to be used as a wiring or piping diagram.
Not all required components are shown. Local codes, regulations, and authorities have final jurisdiction.



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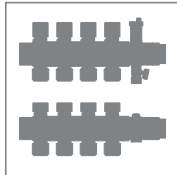
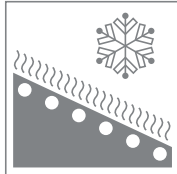
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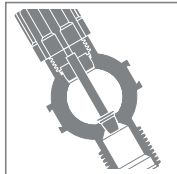
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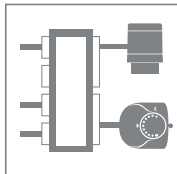
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