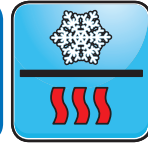


Application Brochure

WiFi Snow Melting Control 670

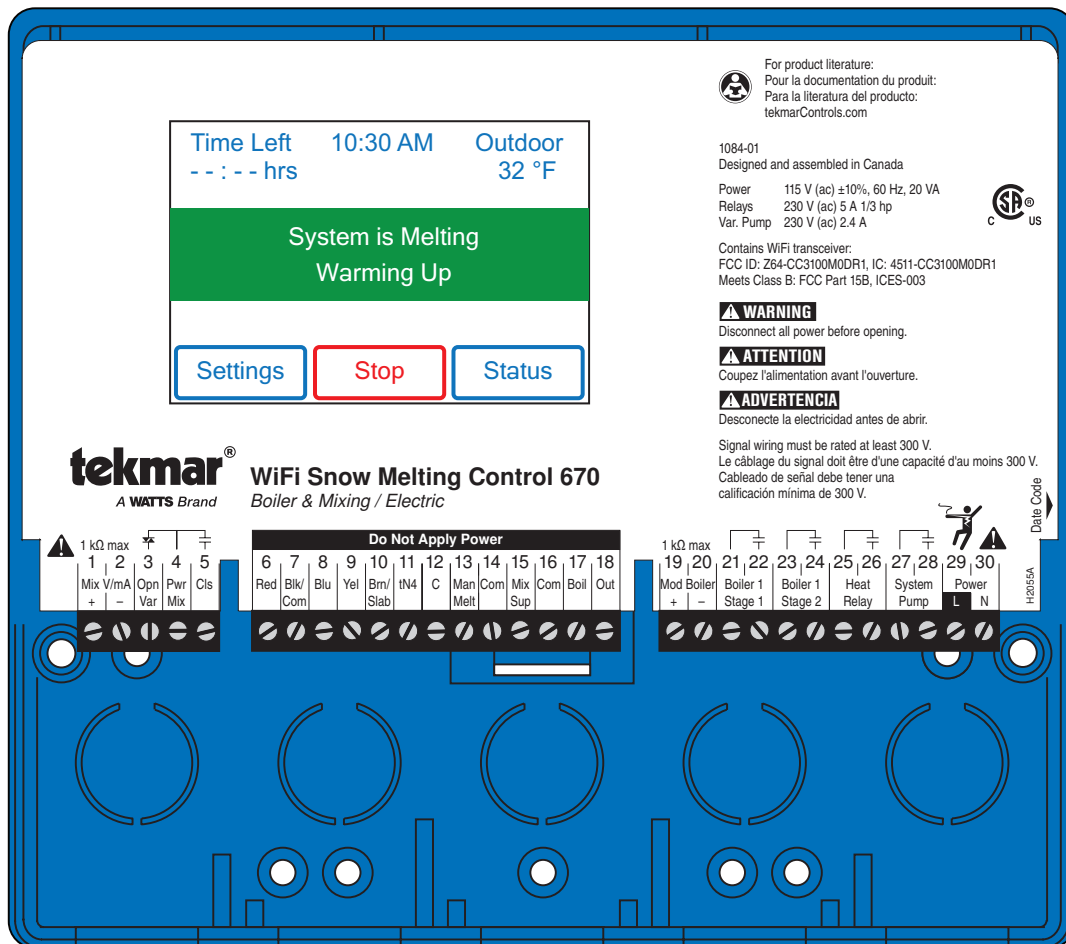


670_A

10/16

Snow Melting Replaces: New

The WiFi Snow Melting Control 670 operates hydronic and electric heating equipment designed to melt snow and/or ice from roads and walkway surfaces. The control works with the tekmar Snow/Ice Sensor 090 or Snow Sensor 095 to automatically detect snow or ice and operates a single boiler, steam valve, or electric cable to supply heat to the slab. Boiler return protection is provided to non-condensing boilers using a mixing valve or variable speed injection mixing pump. The tekmar Connect mobile application allows for remote operation and monitoring of the snow melting system from anywhere in the world.



For product literature:
Pour la documentation du produit:
Para la literatura del producto:
tekmarControls.com

1084-01

Designed and assembled in Canada

Power 115 V (ac) ±10%, 60 Hz, 20 VA
Relays 230 V (ac) 5 A 1/3 hp
Var. Pump 230 V (ac) 2.4 A



Contains WiFi transceiver:
FCC ID: Z64-CC3100MODR1, IC: 4511-CC3100MODR1
Meets Class B: FCC Part 15B, ICES-003

WARNING

Disconnect all power before opening.

ATTENTION

Coupez l'alimentation avant l'ouverture.

ADVERTENCIA

Desconecte la electricidad antes de abrir.

Signal wiring must be rated at least 300 V.
Le câblage du signal doit être d'une capacité d'au moins 300 V.
Cableado de señal debe tener una calificación mínima de 300 V.

Date Code
H2155A

Application	Page
Dedicated Boiler	2
Dedicated Boiler and Mixing Valve	4
Shared Boiler and Heat Exchanger	6
Shared Boiler and Mixing Valve with Optional Tandem Sensors	8
Shared Boiler and Injection Mixing	10
Modulating Steam Valve	12
Electric Cable	14
Multiple Zones with Multiple Boilers and Shared Mixing Valve	16

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Description

The WiFi Snow Melting Control 670 operates a boiler that is dedicated for the snow melting system. The system is piped in primary-secondary to allow constant flow rates through the low-mass boiler and filled with glycol to prevent freezing.

- The system pump operates continuously when heating the slab during melting/idling/storm operation.
- The boiler pump cycles on and off together with the boiler.
- The slab temperature is controlled by modulating the boiler firing rate or cycling the boiler on and off.
- The slab target is determined by the melting/idling/storm setpoint and by the measured outdoor air temperature.
- Optional slab protection limits the temperature differential between the boiler supply and slab.

The system operation is dependent on sensor selection, as listed in the table below.

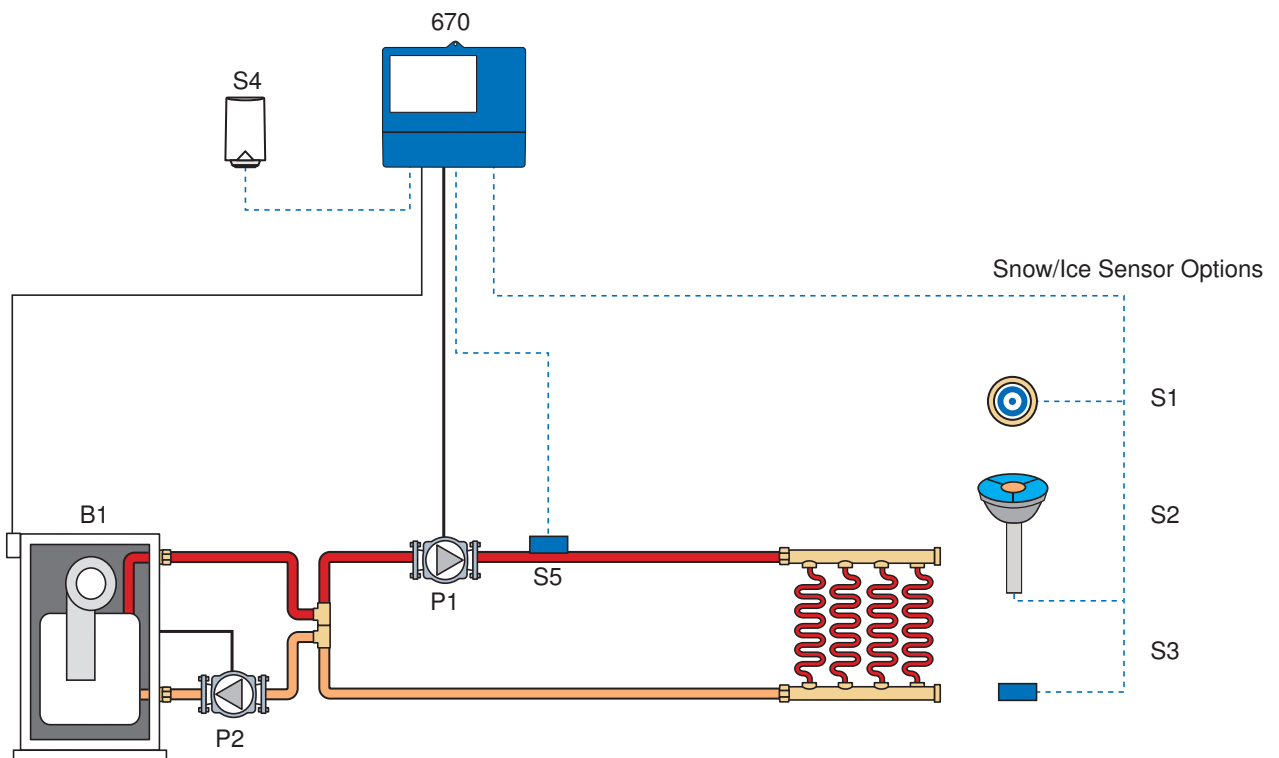
Sensor options		Operation methods			
Sensor	Sensor Model(s)	Auto Start/ Auto Stop	Auto Start/ Timed Stop	Manual Start/ Timed Stop	Slab Temperature Control
S1	Automatic Snow/Ice Sensor 090 or 094	•	–	•	•
S2	Aerial Snow Sensor 095	–	•	•	–
S3	Slab Sensor 072 or 073	–	–	•	•
S2+S3	Aerial Snow Sensor 095 and Slab Sensor 072/073	–	•	•	•

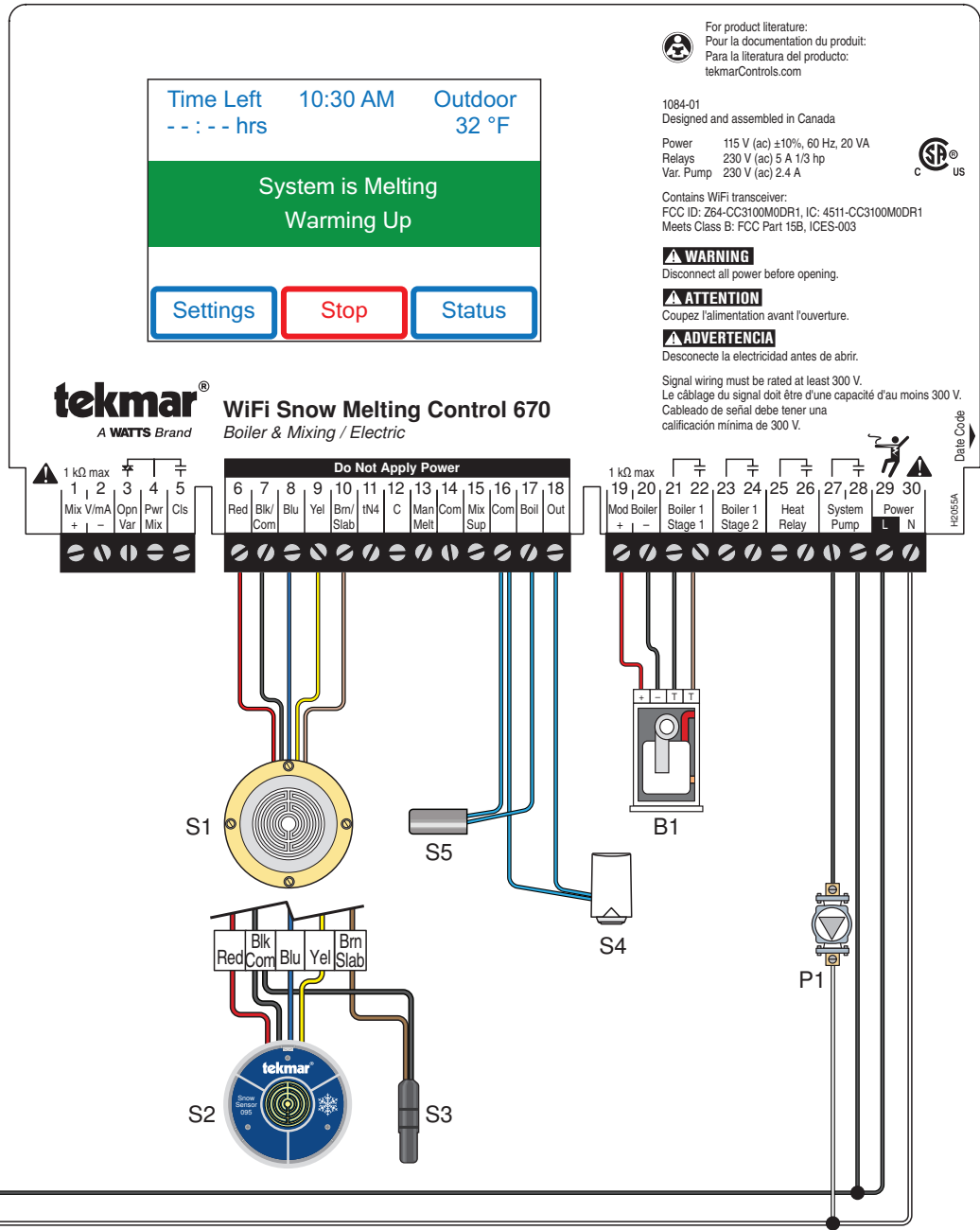
Legend

- B1 = Modulating Boiler
- P1 = System Pump
- P2 = Boiler Pump
- S1 = Snow/Ice Sensor 090 or 094
- S2 = Snow Sensor 095
- S3 = Slab Sensor 072 or 073
- S4 = Outdoor Sensor 070
- S5 = Boiler Supply Sensor 082

Application Settings

Setting Name	Value
Application Mode	Boiler





Description

The WiFi Snow Melting Control 670 operates a boiler and a mixing valve that is dedicated for the snow melting system. The boiler is piped in primary-secondary to the system to allow constant flow rates through the low-mass boiler. The entire system is filled with glycol to prevent freezing.

- The system and boiler pumps operate continuously when heating the slab during melting/idling/storm operation.
- The mixing valve position is adjusted to 100% open unless providing boiler return protection.
- The slab temperature is controlled by modulating the boiler firing rate or cycling the boiler on and off.
- The slab target is determined by the melting/idling/storm setpoint and by the measured outdoor air temperature.
- Optional slab protection limits the temperature differential between the boiler supply and slab.

The system operation is dependent on sensor selection, as listed in the table below.

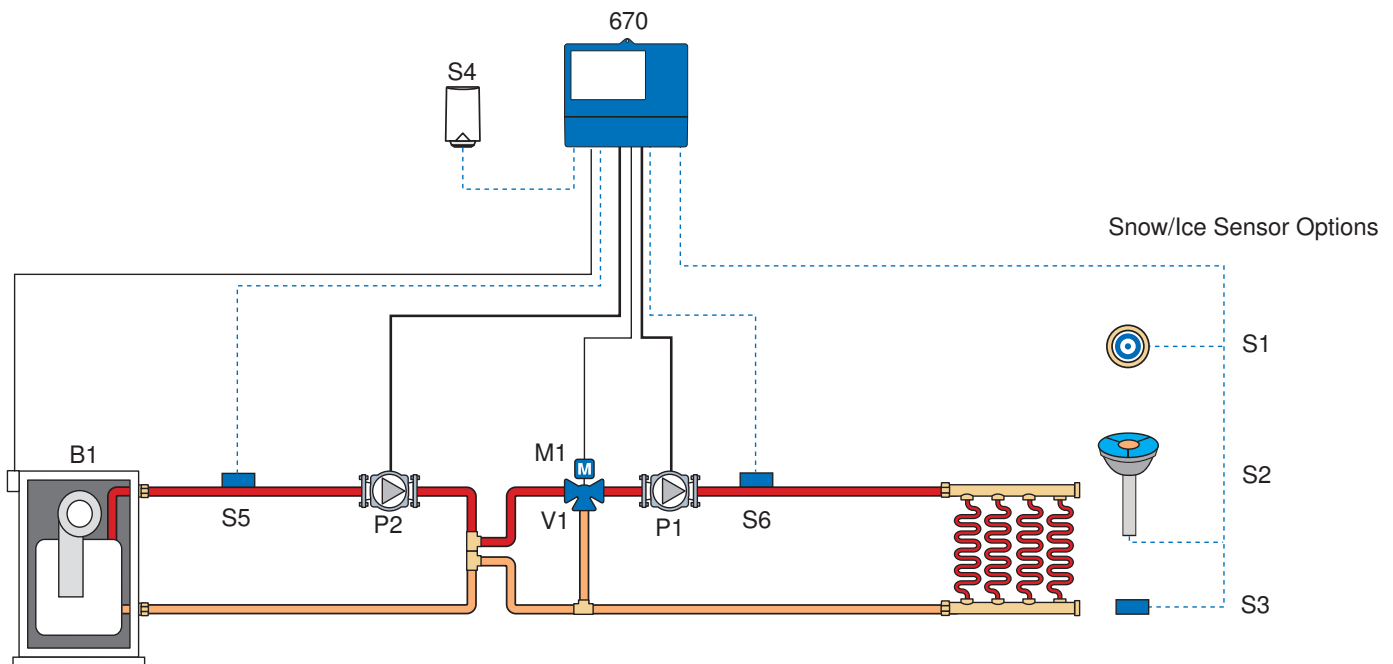
Sensor options		Operation methods			
Sensor	Sensor Model(s)	Auto Start/ Auto Stop	Auto Start/ Timed Stop	Manual Start/ Timed Stop	Slab Temperature Control
S1	Automatic Snow/Ice Sensor 090 or 094	•	–	•	•
S2	Aerial Snow Sensor 095	–	•	•	–
S3	Slab Sensor 072 or 073	–	–	•	•
S2+S3	Aerial Snow Sensor 095 and Slab Sensor 072/073	–	•	•	•

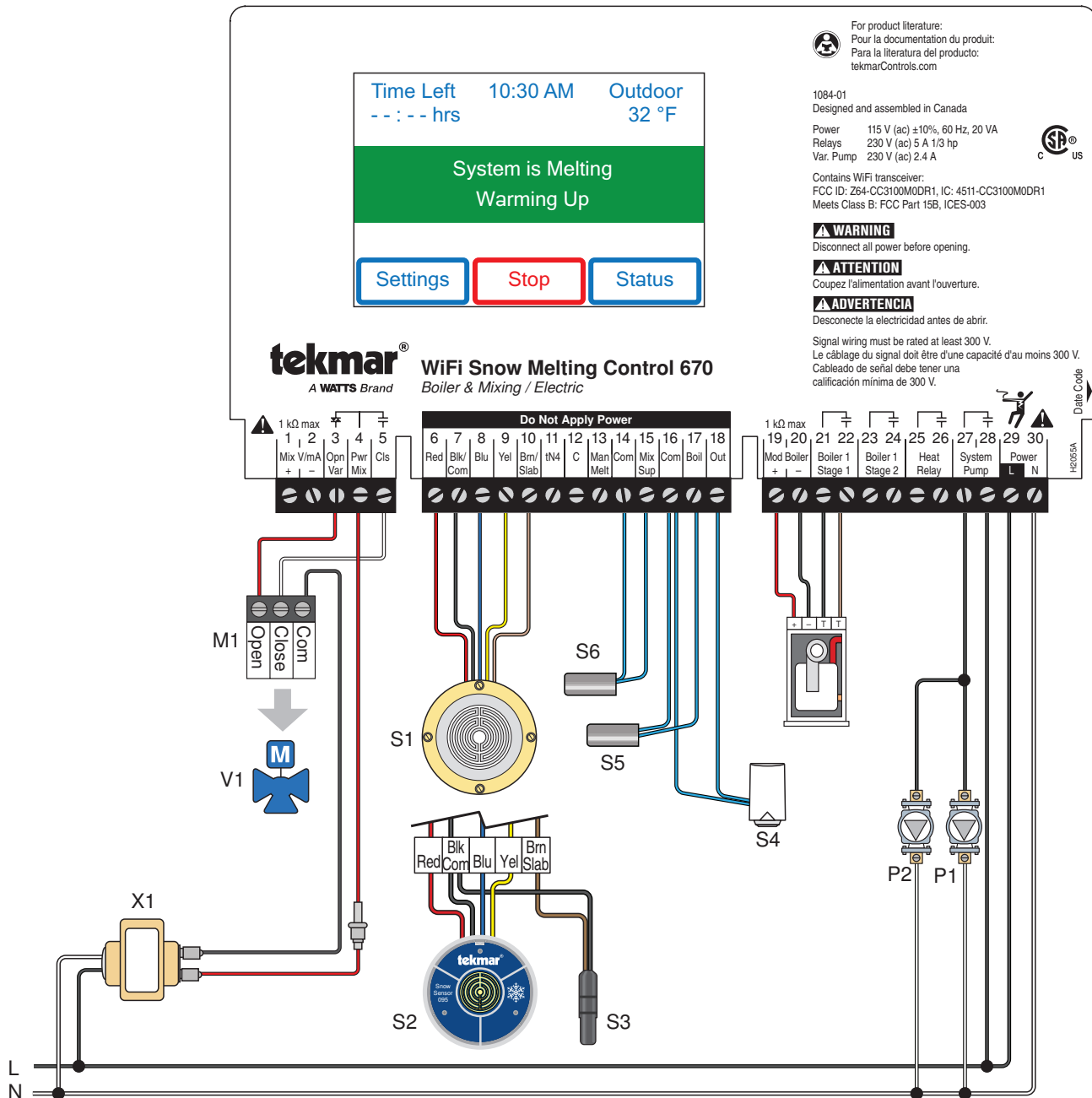
Legend

- B1 = Modulating Boiler
- M1 = Actuating Motor 741
- P1 = System Pump
- P2 = Boiler Pump
- S1 = Snow/Ice Sensor 090 or 094
- S2 = Snow Sensor 095
- S3 = Slab Sensor 072 or 073
- S4 = Outdoor Sensor 070
- S5 = Boiler Supply Sensor 082
- S6 = Mix Supply Sensor 082
- X1 = Transformer 009
- V1 = 3-Way Mixing Valve 710 through 714

Application Settings

Setting Name	Value
Application Mode	Boiler+Mix





Description

The WiFi Snow Melting Control 670 operates a snow melting zone warmed from a heat source that is shared with other loads in a building. A heat exchanger isolates the glycol-filled snow melting system loop from the water-filled main heating system.

- The system pump operates continuously when heating the slab during melting/idling/storm operation.
- The slab temperature is controlled by cycling the heat exchanger pump and the boiler enable on and off.
- The slab target is determined by the melting/idling/storm setpoint and by the measured outdoor air temperature.
- A normally-closed aquastat protects the heat exchanger from freezing by shutting off power to the system pump.

The system operation is dependent on sensor selection, as listed in the table below.

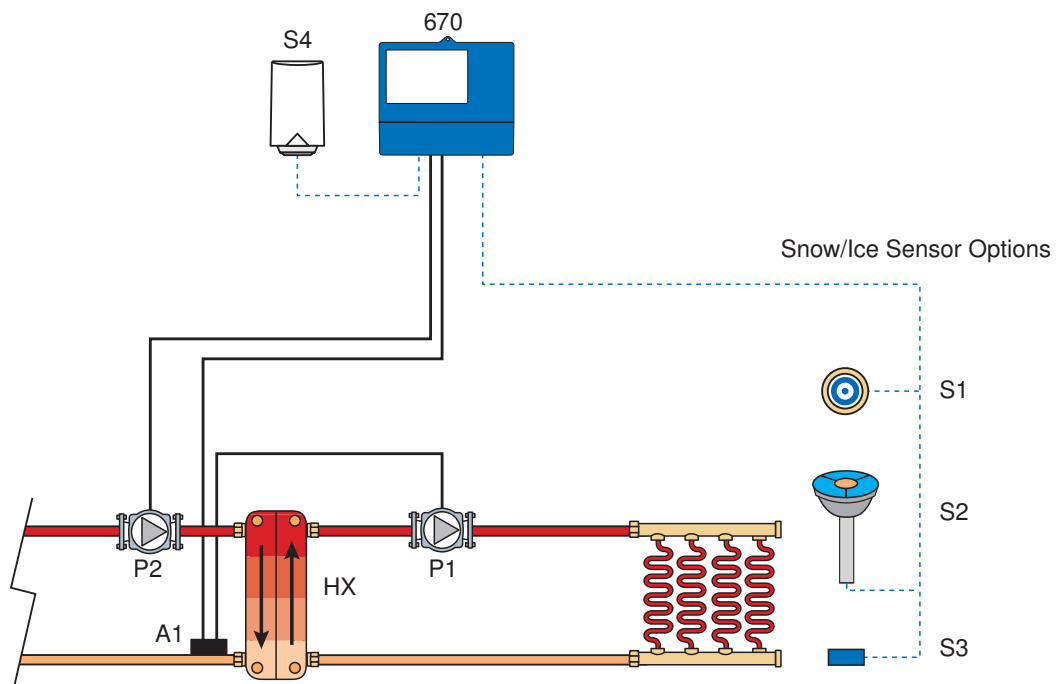
Sensor options		Operation methods			
Sensor	Sensor Model(s)	Auto Start/ Auto Stop	Auto Start/ Timed Stop	Manual Start/ Timed Stop	Slab Temperature Control
S1	Automatic Snow/Ice Sensor 090 or 094	•	–	•	•
S2	Aerial Snow Sensor 095	–	•	•	–
S3	Slab Sensor 072 or 073	–	–	•	•
S2+S3	Aerial Snow Sensor 095 and Slab Sensor 072/073	–	•	•	•

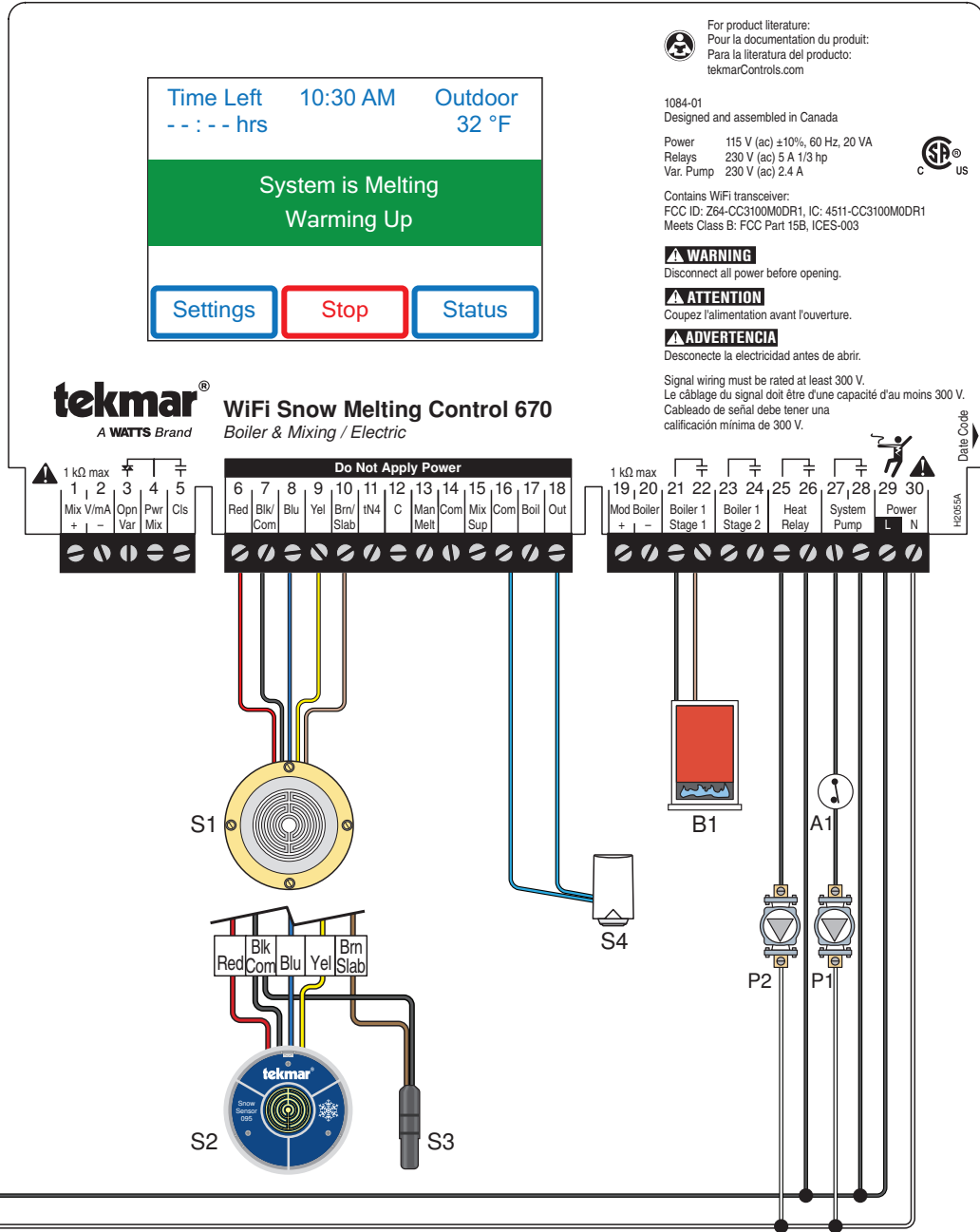
Legend

- A1 = Normally Closed Freeze Protection Aquastat
- B1 = Boiler Enable
- HX = Heat Exchanger
- P1 = System Pump
- P2 = On/Off Heat Exchanger Pump
- S1 = Snow/Ice Sensor 090 or 094
- S2 = Snow Sensor 095
- S3 = Slab Sensor 072 or 073
- S4 = Outdoor Sensor 070

Application Settings

Setting Name	Value
Application Mode	PWM Zone
Boiler Type	Enable





Description

The WiFi Snow Melting Control 670 operates a snow melting zone warmed from a heat source that is shared with other loads in a building. The system uses a mixing valve to regulate the water temperature and a heat exchanger isolates the glycol-filled snow melting system loop from the water-filled main heating system. The 670 is paired with a Snow Melting Control 654 to provide Tandem Snow/Ice Detection using a Snow/Ice Sensor 090 or 094. Tandem sensors double the detection area to provide increased reliability and redundancy in case of sensor failure.

- The system pump operates continuously when heating the slab during melting/idling/storm operation.
- The slab temperature is controlled by adjusting the mixing valve position.
- When the mixing valve is open, the heat exchanger pump and the boiler enable are on.
- The slab target is determined by the melting/idling/storm setpoint and by the measured outdoor air temperature.
- A normally-closed aquastat protects the heat exchanger from freezing by shutting off power to the system pump.
- Either snow/ice sensor will start the melting operation if snow or ice is detected. Both sensors must be dry in order to stop melting.

Legend

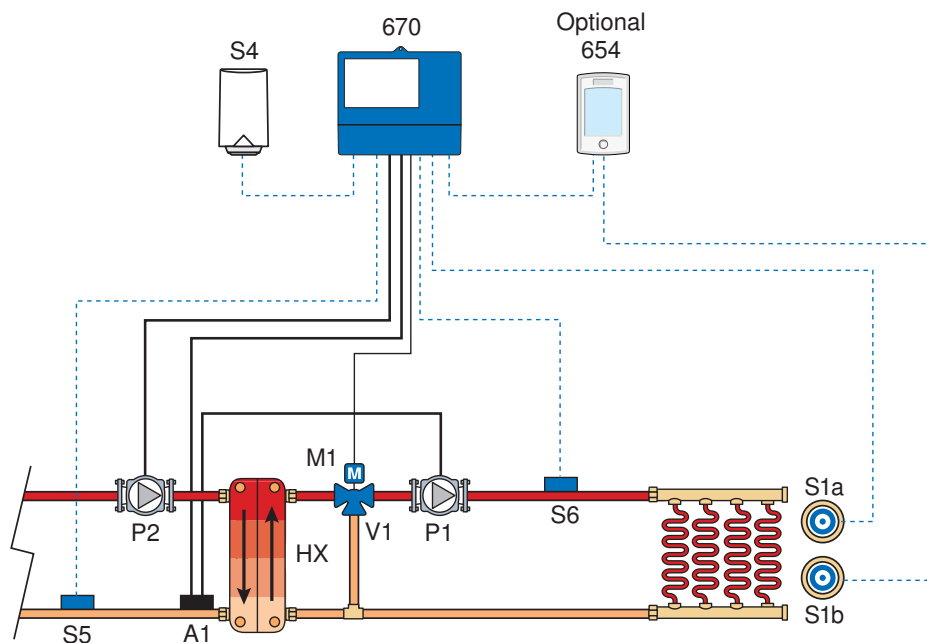
- A1 = Normally Closed Freeze Protection Aquastat
- B1 = Boiler Enable
- HX = Heat Exchanger
- M1 = Actuating Motor 741
- P1 = System Pump
- P2 = Heat Exchanger Pump
- S1a, S1b = Snow/Ice Sensor 090 or 094
- S4 = Outdoor Sensor 070
- S5 = Boiler Return Sensor 082
- S6 = Mix Supply Sensor 082
- V1 = 3-Way Mixing Valve 710 through 714
- X1 = Transformer 009

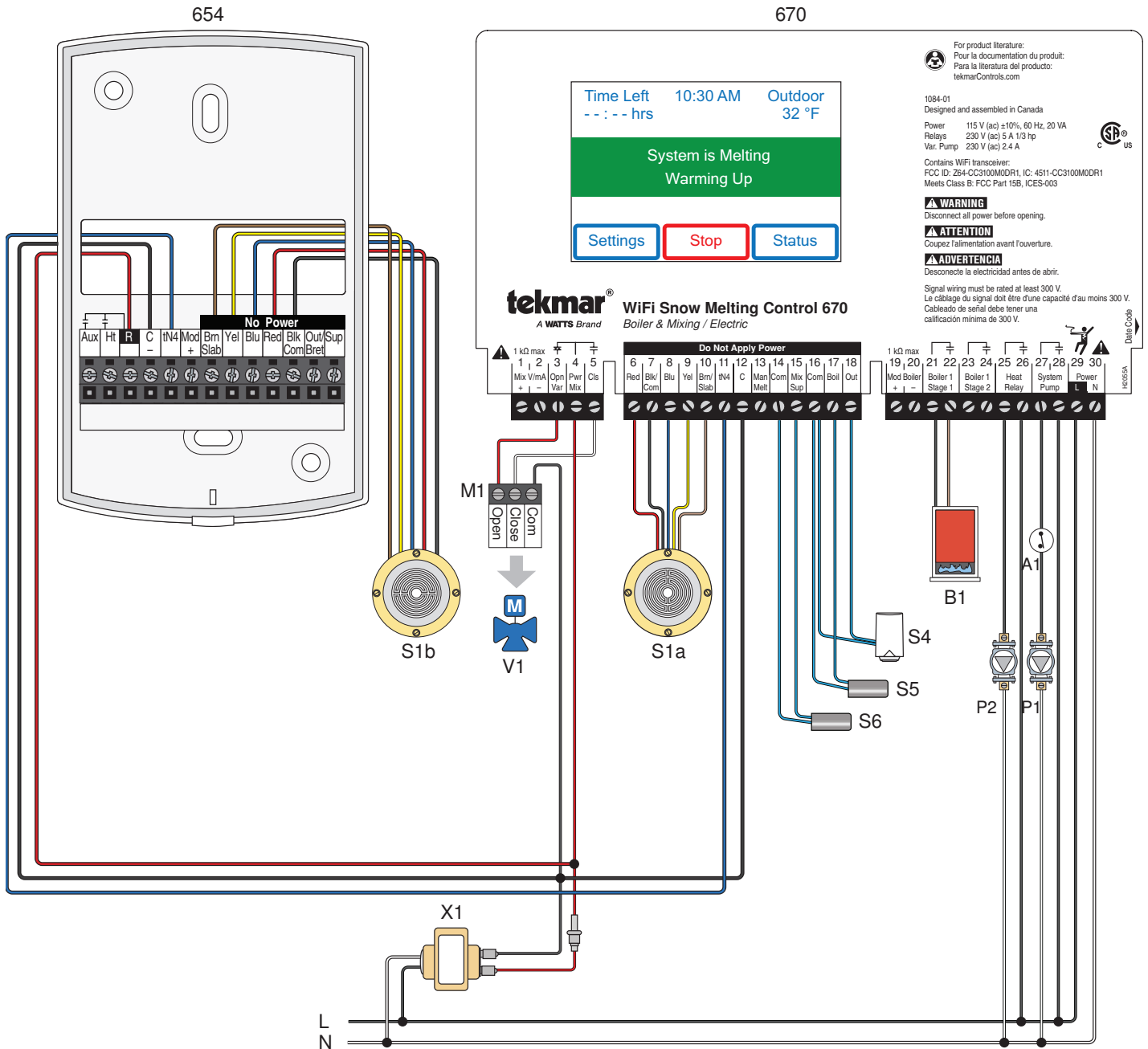
670 Application Settings

Setting Name	Value
Application Mode	Mixing
Mixing Type	Floating
Boiler Type	Enable

Optional 654 Application Settings

Setting Name	Value
Application Mode	090





Description

The WiFi Snow Melting Control 670 operates a snow melting zone warmed from a heat source that is shared with other loads in a building. The system uses a variable speed injection pump to regulate the water temperature and a heat exchanger isolates the glycol-filled snow melting system loop from the water-filled main heating system.

- The system pump operates continuously when heating the slab during melting/idling/storm operation.
- The slab temperature is controlled by adjusting the speed of the variable speed injection pump.
- When the variable speed injection pump is on, the heat exchanger pump and the boiler enable are on.
- The slab target is determined by the melting/idling/storm setpoint and by the measured outdoor air temperature.
- A normally-closed aquastat protects the heat exchanger from freezing by shutting off power to the system pump.

The system operation is dependent on sensor selection, as listed in the table below.

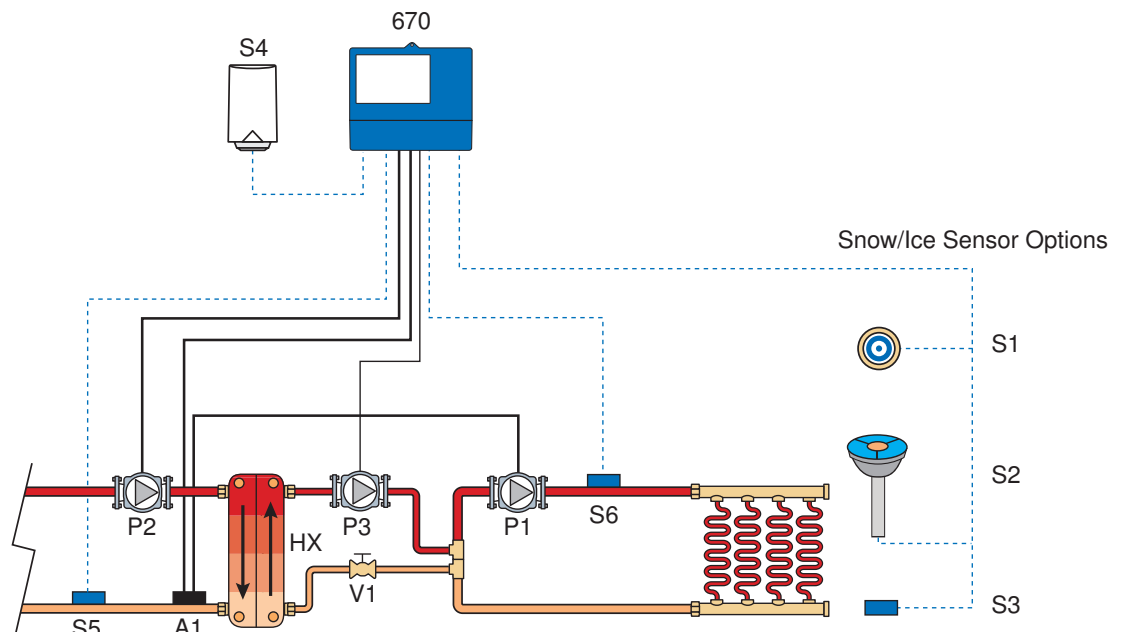
Sensor options		Operation methods			
Sensor	Sensor Model(s)	Auto Start/ Auto Stop	Auto Start/ Timed Stop	Manual Start/ Timed Stop	Slab Temperature Control
S1	Automatic Snow/Ice Sensor 090 or 094	•	–	•	•
S2	Aerial Snow Sensor 095	–	•	•	–
S3	Slab Sensor 072 or 073	–	–	•	•
S2+S3	Aerial Snow Sensor 095 and Slab Sensor 072/073	–	•	•	•

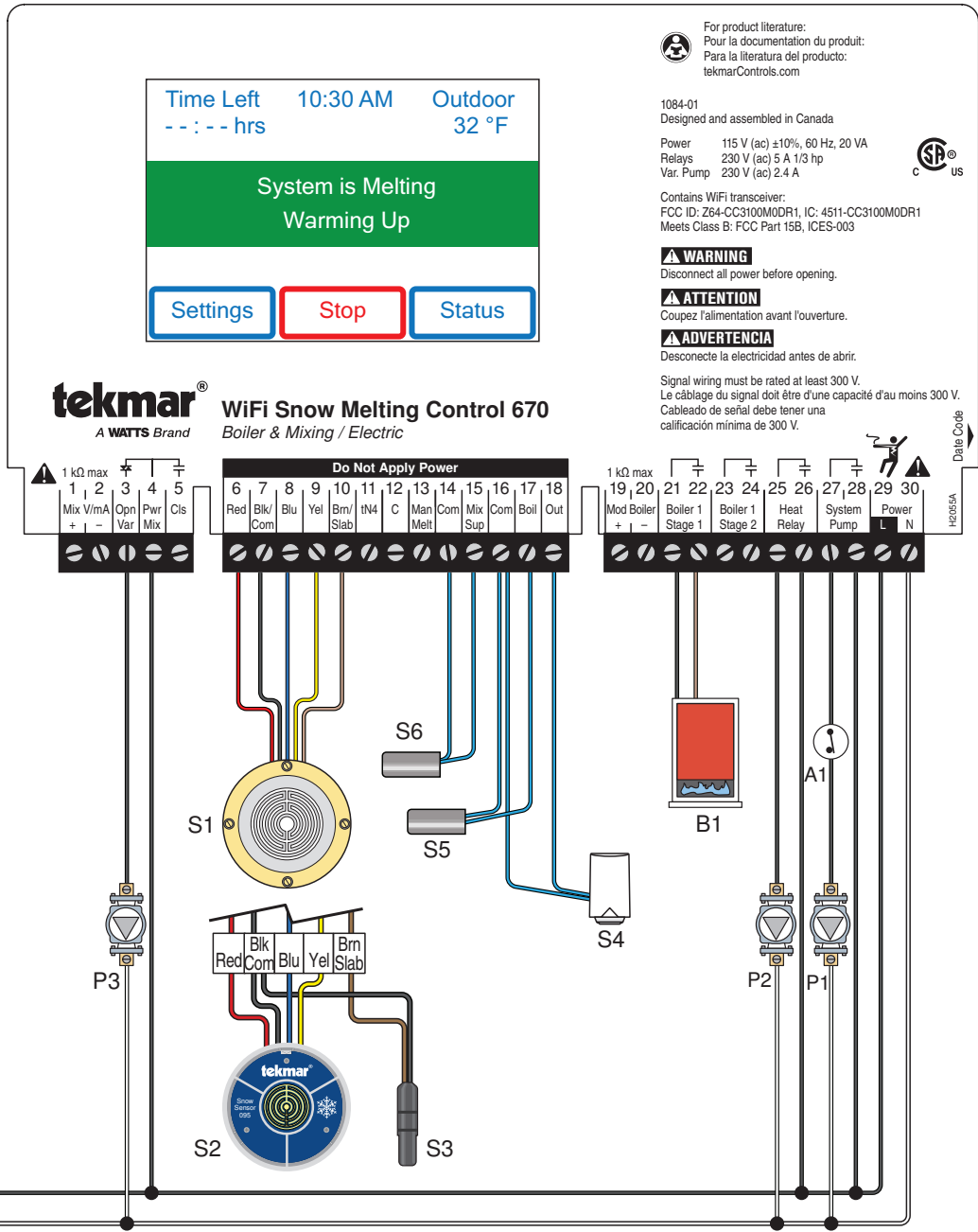
Legend

- A1 = Normally Closed Freeze Protection Aquastat
- B1 = Boiler Enable
- HX = Heat Exchanger
- P1 = System Pump
- P2 = Heat Exchanger Pump
- P3 = Variable Speed Injection Mixing Pump
- S1 = Snow/Ice Sensor 090 or 094
- S2 = Snow Sensor 095
- S3 = Slab Sensor 072 or 073
- S4 = Outdoor Sensor 070
- S5 = Boiler Return Sensor 082
- S6 = Mix Supply Sensor 082
- V1 = Globe Valve

Application Settings

Setting Name	Value
Application Mode	Mixing
Mixing Type	Injection
Boiler Type	Enable





Description

The WiFi Snow Melting Control 670 operates a modulating steam valve and a steam-to-water heat exchanger to heat a glycol-filled snow melting system.

- The system pump operates continuously when heating the slab during melting/idling/storm operation.
- The slab temperature is controlled by adjusting the modulating steam valve position.
- The boiler relay is closed while the modulating steam valve is open. This provides a signal to fire the steam boiler.
- The slab target is determined by the melting/idling/storm setpoint and by the measured outdoor air temperature.

The system operation is dependent on sensor selection, as listed in the table below.

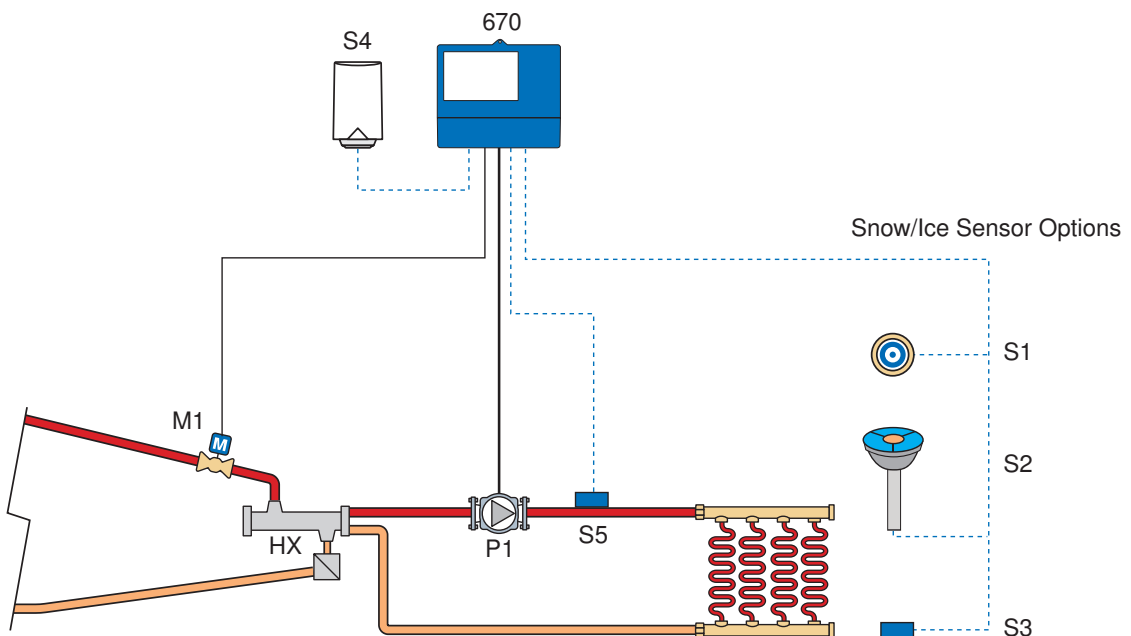
Sensor options		Operation methods			
Sensor	Sensor Model(s)	Auto Start/ Auto Stop	Auto Start/ Timed Stop	Manual Start/ Timed Stop	Slab Temperature Control
S1	Automatic Snow/Ice Sensor 090 or 094	•	–	•	•
S2	Aerial Snow Sensor 095	–	•	•	–
S3	Slab Sensor 072 or 073	–	–	•	•
S2+S3	Aerial Snow Sensor 095 and Slab Sensor 072/073	–	•	•	•

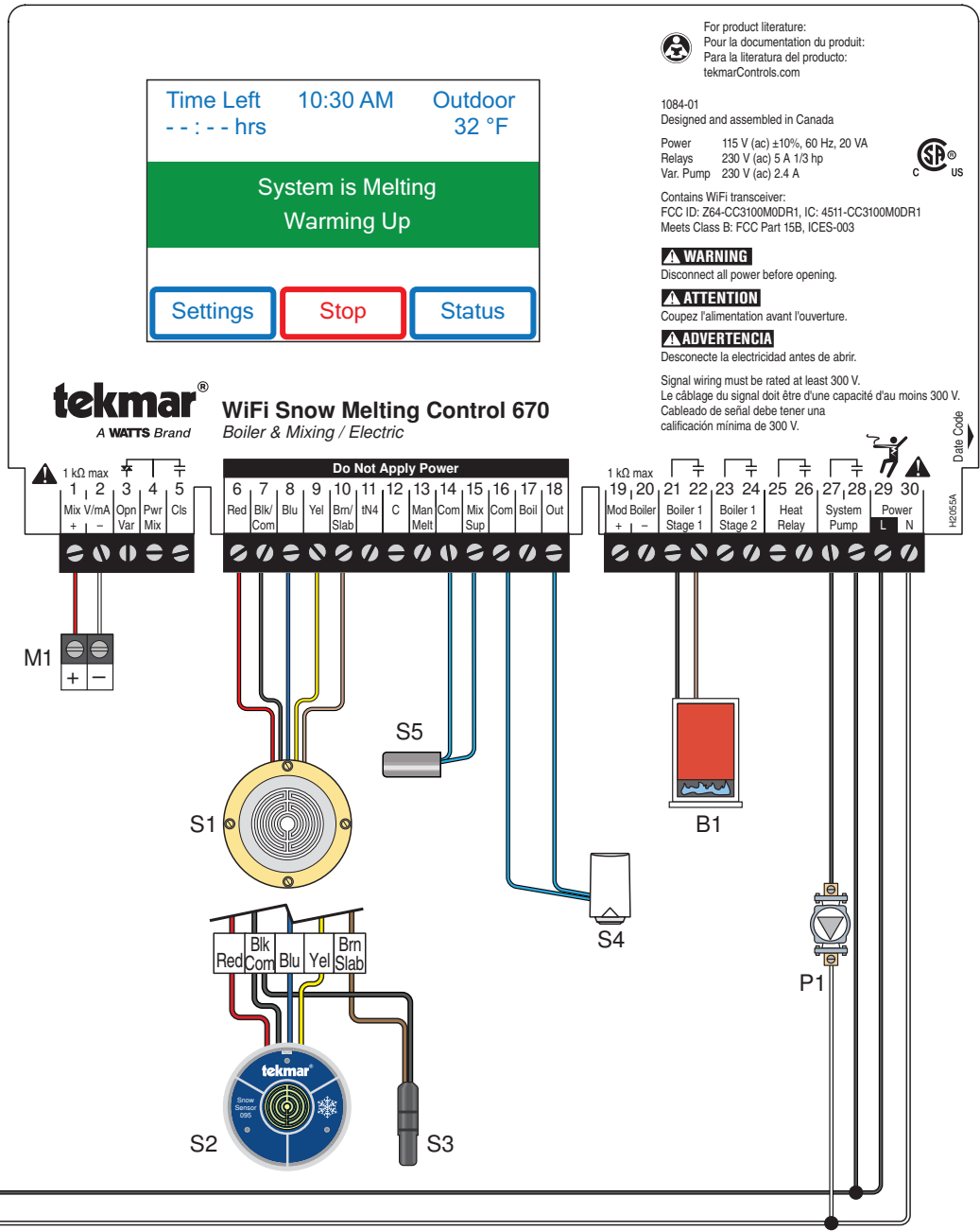
Legend

- B1 = Boiler Enable
- HX = Steam-to-Glycol Heat Exchanger
- M1 = Modulating Steam Valve
- P1 = System Pump
- S1 = Snow/Ice Sensor 090 or 094
- S2 = Snow Sensor 095
- S3 = Slab Sensor 072 or 073
- S4 = Outdoor Sensor 070
- S5 = Mix Supply Sensor 082

Application Settings

Setting Name	Value
Application Mode	Mixing
Mixing Type	0-10 V or 4-20 mA
Boiler Type	Enable





Description

The WiFi Snow Melting Control 670 operates an electric cable snow melting system.

- The electric contactor is cycled on and off based on the slab load.

The system operation is dependent on sensor selection, as listed in the table below.

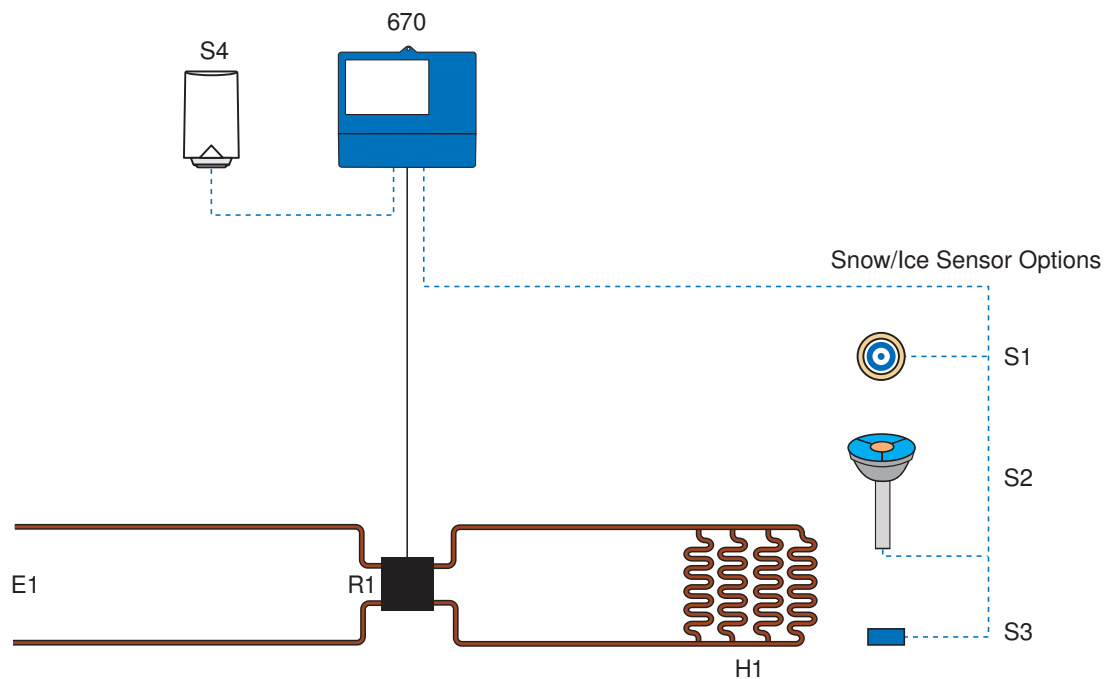
Sensor options		Operation methods			
Sensor	Sensor Model(s)	Auto Start/ Auto Stop	Auto Start/ Timed Stop	Manual Start/ Timed Stop	Slab Temperature Control
S1	Automatic Snow/Ice Sensor 090 or 094	•	–	•	•
S2	Aerial Snow Sensor 095	–	•	•	–
S3	Slab Sensor 072 or 073	–	–	•	•
S2+S3	Aerial Snow Sensor 095 and Slab Sensor 072/073	–	•	•	•

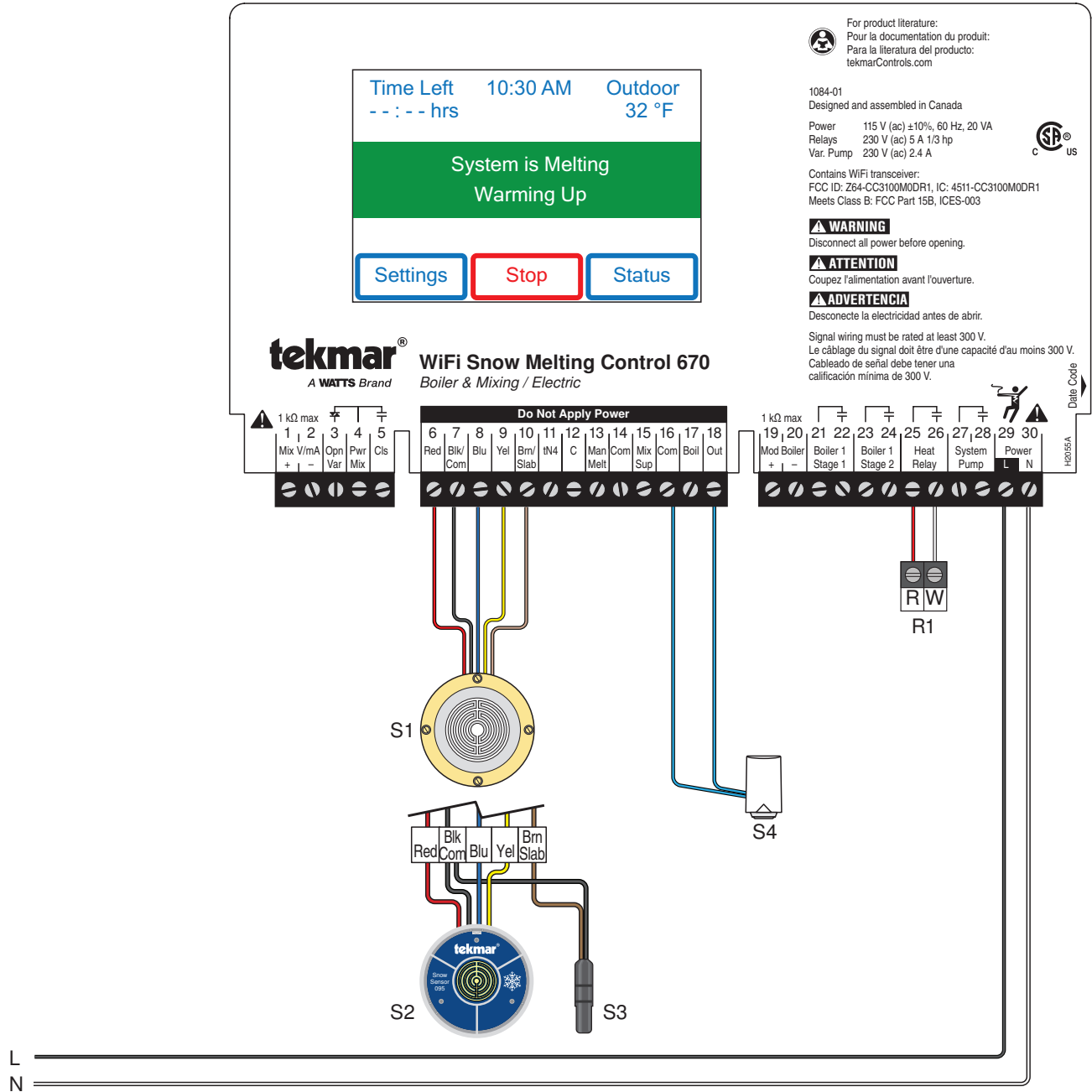
Legend

- E1 = 115 or 230 V (ac) Electric Power Supply
- H1 = Electric Heating Cable
- R1 = Electric Relay Contactor
- S1 = Snow/Ice Sensor 090 or 094
- S2 = Snow Sensor 095
- S3 = Slab Sensor 072 or 073
- S4 = Outdoor Sensor 070

Application Settings

Setting Name	Value
Application Mode	Electric





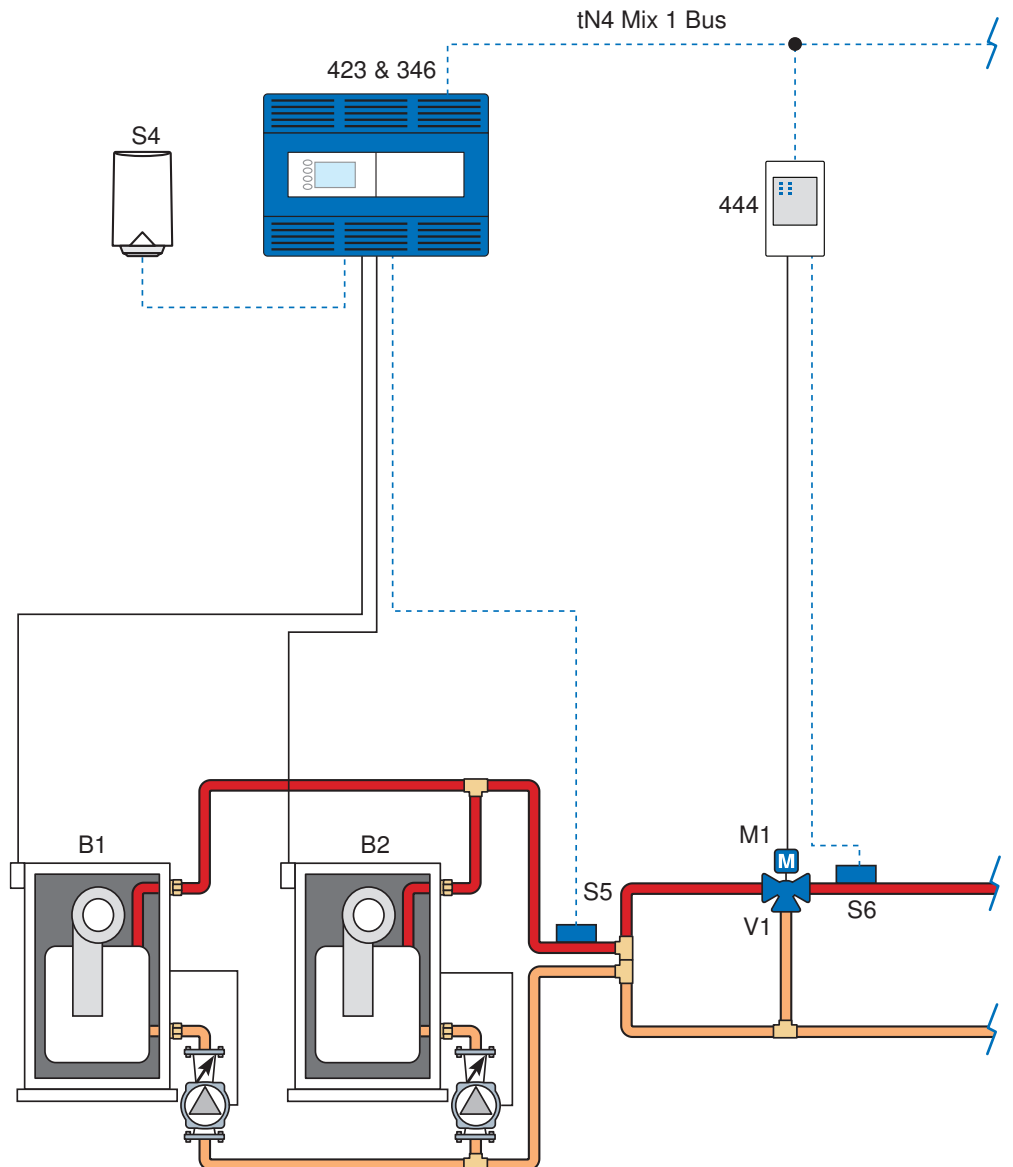
Description

The system has two snow melting zones heated by two boilers. The water temperature is regulated by a shared mixing valve for the two snow melting zones. The boilers and mixing valve are operated by a Universal Reset Module 423, Power Manager 346 and Mixing Expansion Module 444. Each snow melting zone is operated by a WiFi Snow Melting Control 670.

- The slab target is determined by the melting/idling/storm setpoint and by the measured outdoor air temperature.
- The zone pump cycles on/off when heating the slab during melting/idling/storm operation.
- When the zone is heated, the 670 communicates to the 423 and 444 to operate the mixing valve and fire the boilers.
- The 423 and 444 close the mixing valve to provide boiler return protection when the boiler supply temperature falls below the 423 boiler minimum setting.

The system operation is dependent on sensor selection, as listed in the table below.

Sensor options		Operation methods			
Sensor	Sensor Model(s)	Auto Start/ Auto Stop	Auto Start/ Timed Stop	Manual Start/ Timed Stop	Slab Temperature Control
S1	Automatic Snow/Ice Sensor 090 or 094	•	–	•	•
S2	Aerial Snow Sensor 095	–	•	•	–
S3	Slab Sensor 072 or 073	–	–	•	•
S2+S3	Aerial Snow Sensor 095 and Slab Sensor 072/073	–	•	•	•

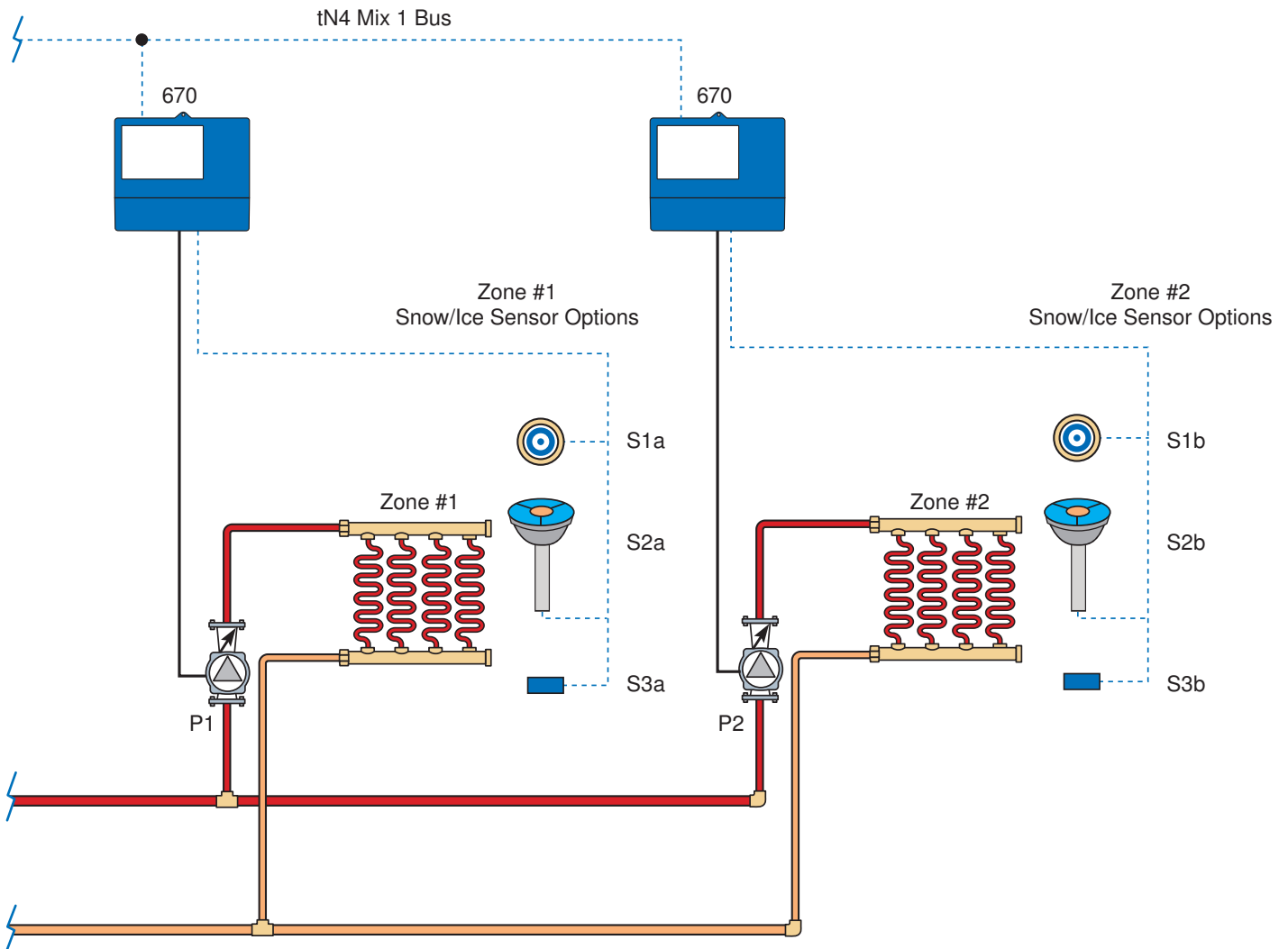


670 Application Settings

Setting Name	Value
Application Mode	PWM Zone
Outdoor Sensor	tekmarNet
Boiler Type	Control

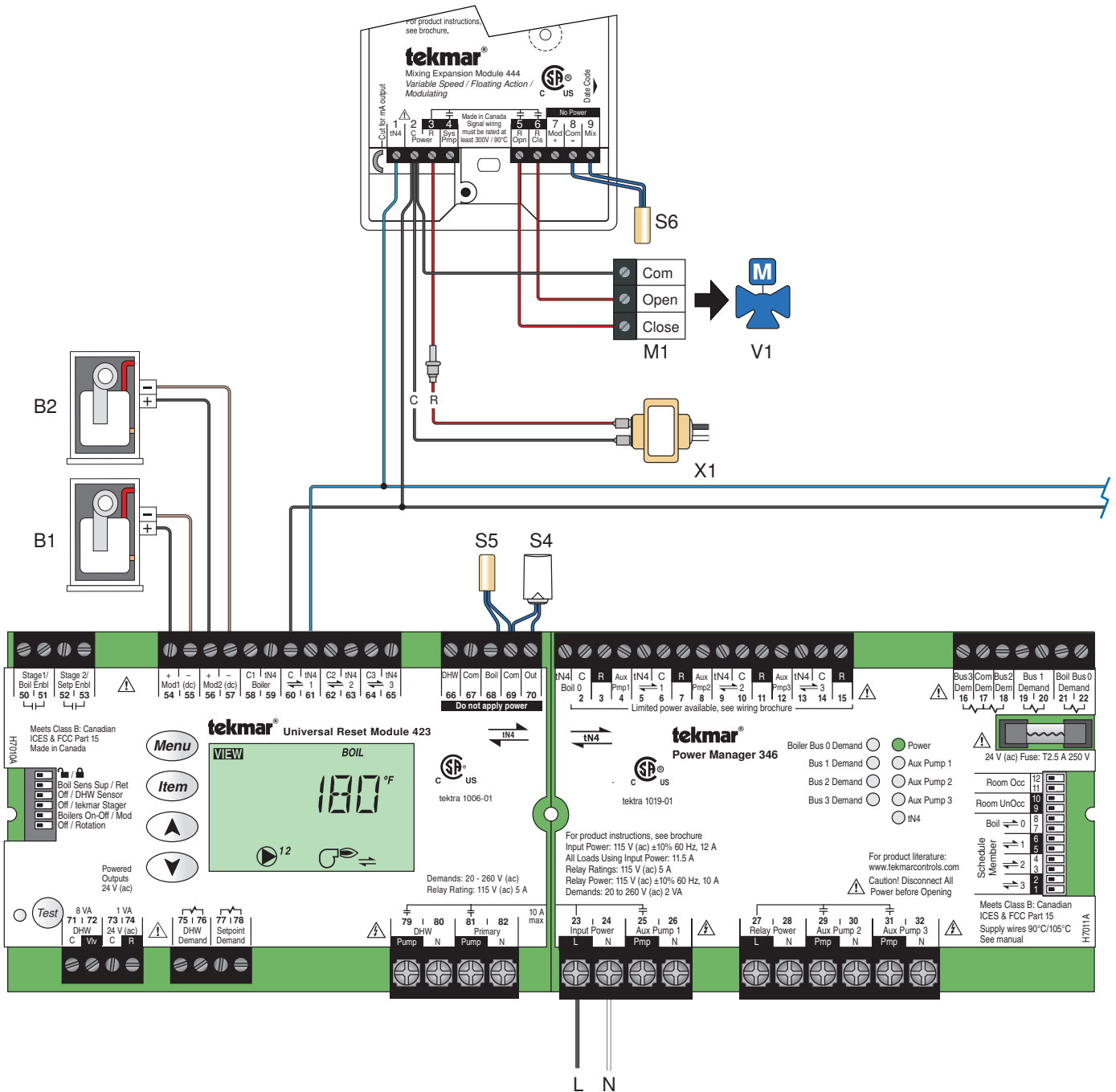
Legend

- B1, B2 = Modulating Boilers
- M1 = Actuator Motor 741
- P1 = Zone 1 Pump
- P2 = Zone 2 Pump
- S1a = Zone 1 Snow/Ice Sensor 090 or 094
- S1b = Zone 2 Snow/Ice Sensor 090 or 094
- S2a = Zone 1 Snow Sensor 095
- S2b = Zone 2 Snow Sensor 095
- S3a = Zone 1 Slab Sensor 072 or 073
- S3b = Zone 2 Slab Sensor 072 or 073
- S4 = Outdoor Sensor 070
- S5 = 423 Boiler Supply Sensor 082
- S6 = 444 Mix Supply Sensor 082
- V1 = 3-Way Mixing Valve 710 through 714
- X1 = Transformer 009



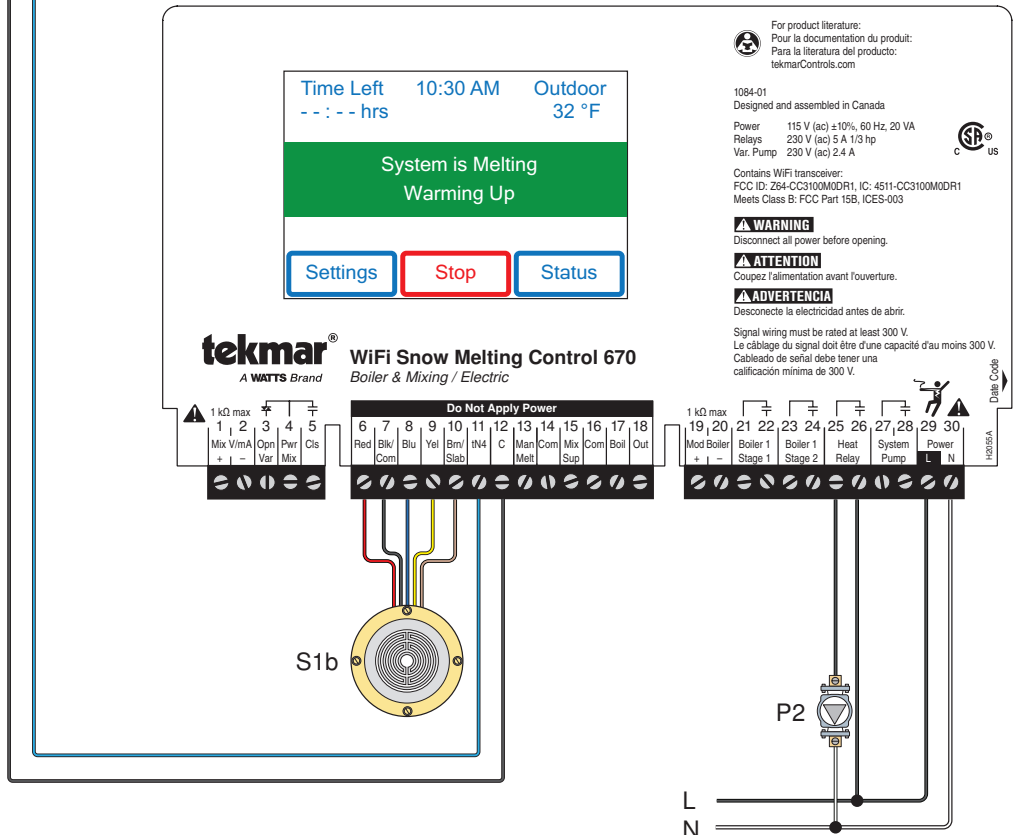
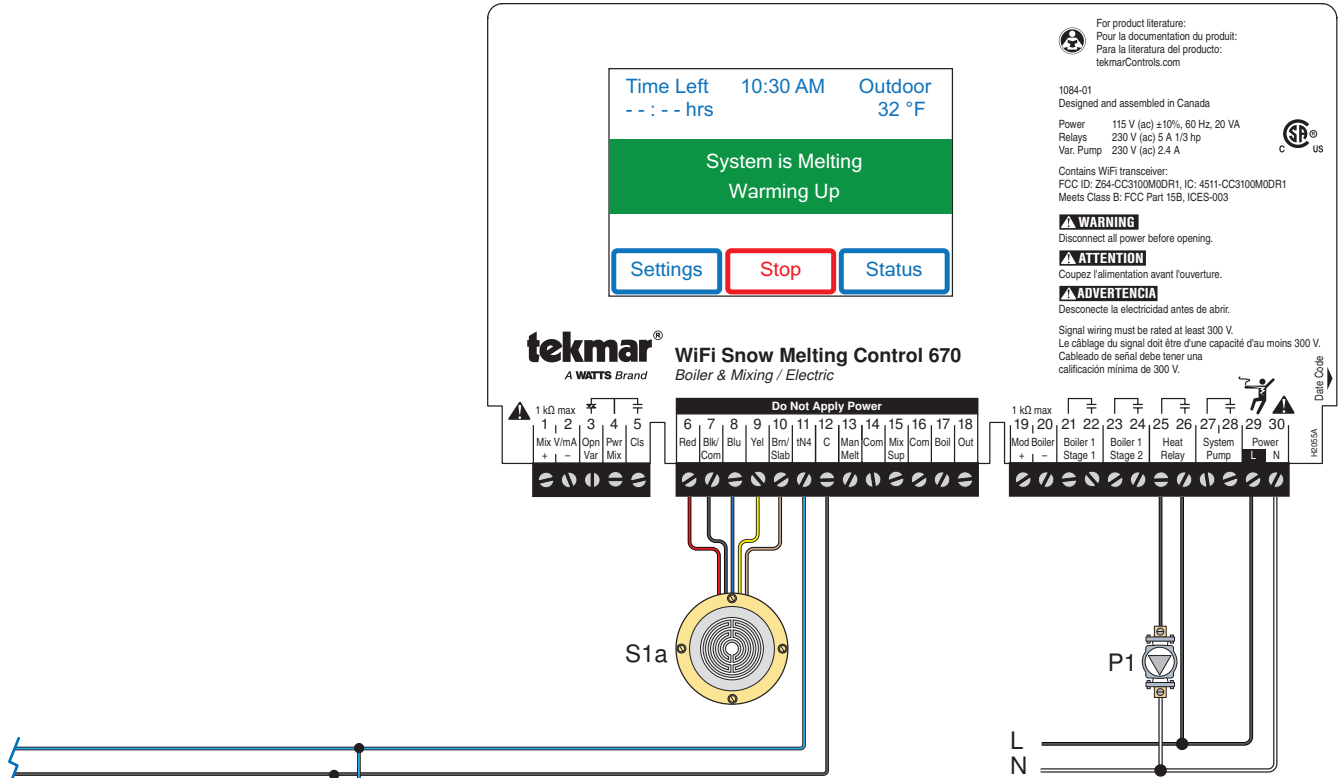
Legend

- B1, B2 = Modulating Boilers
- M1 = Actuator Motor 741
- P1 = Zone 1 Pump
- P2 = Zone 2 Pump
- S1a = Zone 1 Snow/Ice Sensor 090 or 094
- S1b = Zone 2 Snow/Ice Sensor 090 or 094
- S2a = Zone 1 Snow Sensor 095
- S2b = Zone 2 Snow Sensor 095
- S3a = Zone 1 Slab Sensor 072 or 073
- S3b = Zone 2 Slab Sensor 072 or 073
- S4 = Outdoor Sensor 070
- S5 = 423 Boiler Supply Sensor 082
- S6 = 444 Mix Supply Sensor 082
- V1 = 3-Way Mixing Valve 710 through 714
- X1 = Transformer 009



670 Application Settings

Setting Name	Value
Application Mode	PWM Zone
Outdoor Sensor	tekmarNet
Boiler Type	Control



Specifications

The following are the recommended specifications for the WiFi Snow Melting Control 670.

- The control shall communicate with the Internet Cloud to provide remote starting, stopping and monitoring through an Android or Apple iOS mobile application or through a web browser.
- The control shall have the ability to use a snow/ice sensor in order to automatically detect snow or ice and begin operation of the system. The system shall continue to run until the sensor is dry or the control is manually stopped.
- The control shall communicate with an Internet weather service to determine the local snow fall forecast and automatically pre-heat the slab for an adjustable timed duration.
- The control shall have the ability to be manually started with an adjustable running time that counts down and automatically stops the system.
- The control shall not operate the system to provide heat to the snow melting zones when it enters into either a Warm Weather Shut Down (WWSD) or a Cold Weather Cut Off (CWCO) mode.
- The system water temperature shall be based on the outdoor temperature and feedback from sensors located in the snow melting slabs.
- The control shall have the option to mix the supply water temperature using a mixing valve with a floating action, 0-10 V (dc) or a 4-20 mA actuator motor, or using a variable-speed injection mixing pump.
- The control shall have an adjustable minimum return water temperature setting to help prevent condensation of flue gases and subsequent corrosion and blockage of the boiler's heat exchanger and chimney.
- The control shall have the ability to limit the amount of cool water being returned to the boiler through the mixing device in order to prevent low boiler operating temperatures and flue gas condensation.
- The control shall have the ability to directly control the supply temperature of a modulating boiler, a one or two-stage boiler, or to send a boiler enable signal to another boiler operating control to allow for a staging control to be connected.
- The control shall have the option of an automatic differential calculation for the operation of one or two boiler stages in order to prevent short cycling.
- The control shall use proportional, integral and derivative (PID) logic when modulating or staging boiler stages.
- The control shall have the option to limit the heat up rate of the slab to help prevent cracking the concrete.
- The control shall have two separate lockable access levels to limit the number of adjustments available to various users.
- The control shall have a manual override that allows each output to be manually turned on or off.
- The control shall continuously monitor its temperature sensors and provide an error message upon a control or sensor failure.
- The control shall record and display boiler and pump running hours and minimum and maximum temperatures depending on the access level that has been selected.
- During extended periods of inactivity, the pumps and valves that are operated by the control shall be periodically exercised to prevent seizure during long idle periods.

▲ CAUTION

This Application Brochure is not intended to provide full installation instructions and safety information. In order to avoid property damage or injury, please refer to the complete installation manual and product safety information provided with the product.



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All specifications are subject to change without notice

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