# Installation Guide

502-048

# SMZ1 Hydronic Snow Melt Zone Controller – Four Zone

***Self-Contained Interoperable Controller Model UCP-1***

SUPERSEDES: New

EFFECTIVE: June 12, 2013

Plant ID: 001-4166

# SPECIFICATIONS

## Electrical Inputs

**Resolution:** 10-bit

**Slab 1/2/3/4 Temperature:** Precon Type III 10K thermistor

**Global or Zone Snow Melt:** Dry Contact, Nomally open

**Outdoor Air Temperature:** Precon Type III 10K thermistor

## Electrical Outputs

**Zone 1/2/3/4 Modulating Output:** 0-10 VDC

**Primary/Group 1/Group 2 Circulator, Zone 1/2/3/4 Out:** 24 VAC, 1A @ 50C, 0.5A @ 60C, limited by the Class 2 supply rating

## Power

**Requires:** 24VAC (20VAC to 28VAC), requires an external Class 2 supply

**Consumes:** 7.2W with no external loads, maximum limited by the class 2 supply rating

## Recommended Sensor Wire

**Maximum Length:** 500 feet (152 meters)

| Cable Type | Pairs | Details | Taco Catalog No. |
|---|---|---|---|
| 18AWG | 1 | Stranded Twisted Shielded Pair, Plenum | WIR-018 |

## Recommended LON Bus FTT-10A Network Wire

**Speed:** 78KBPS

**Max Volts:** 42.4 Volts DC

**Cabling:** Maximum node-to-node distance: 1312 feet (400 meters); Maximum total distance: 1640 feet (500 meters)

| Cable Type | Pairs | Details | Taco Catalog No. |
|---|---|---|---|
| Level 4 22AWG (0.65mm) | 1 | Unshielded, Plenum, U.L. Type CMP | WIR-022 |

## Mechanical

**Dimensions:** 5.55” (141mm) high, 6.54” (166 mm) wide, 1.75” deep (44 mm), ABS

**Controller Weight:** 0.70 pounds (0.32 kilograms)

**Shipping Weight:** 1.0 pounds (0.46 kilograms)

**Processor:** 3150 Neuron 10 MHz

**Flash:** 48 Kilobytes

**SRAM:** 8 Kilobytes

**Termination:** 0.197” (5.0 mm) Pluggable Terminal Blocks, 14-22 AWG

**Temperature:** 32 °F to 140 °F (0 °C to 60 °C)

**Humidity:** 0 to 90%, non-condensing

**UL Listed** for US and Canada, Energy Management Equipment PAZX and PAZX7

**FCC** Part 15 Class A compliant

## Equipment Location

Abide by all warnings regarding equipment location provided earlier in this document.

Optimally, the equipment should be installed within a secure enclosure.

The equipment must be installed indoors unless contained within a protective enclosure. The enclosure must maintain internal temperature and humidity within the ranges specified for this equipment.

The equipment must be installed within 500 feet of all input peripherals (smoke detectors, sensors, etc.) that will be connected to the equipment. It must be within 200 feet of any connected thermostats.

## Selecting a Power Source

This equipment requires a UL recognized external power source (not supplied) to operate. The controller power input requires a voltage of 24 Volts AC.

To calculate power source current requirements, add the power consumption of all peripheral devices to that of the controller.

The controller and triac output loads can use the same power source. If both are using the same power source, the loads must have EMF protection. This protection can be integral to the load, or installed in the 24 VAC wiring across the load’s coil.

To provide necessary RFI and transient protection, the controller’s ground (GND) pin (T40) must be connected to earth ground or the earth ground of the packaged unit’s enclosure ground. Failure to properly ground the controller may cause it to exceed FCC limits. Excessive noise could also produce inaccurate sensor data. The power source must be capable of operating with this connection to ground.

# INSTALLATION PRECAUTIONS

## General

**CAUTION:** This symbol is intended to alert the user to the presence of important installation and maintenance (servicing) instructions in the literature accompanying the equipment.

**CAUTION:** Risk of explosion if battery is replaced by an incorrect type. Contains lithium type battery; dispose of properly.

**WARNING:** Electrical shock hazard. Disconnect **ALL** power sources when installing or servicing this equipment to prevent electrical shock or equipment damage.

Make all wiring connections in accordance with these instructions and in accordance with pertinent national and local electrical codes. Use only copper conductors that are suitable for 167 °F (75 °C).



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## Static Electricity

Static charges produce voltages that can damage this equipment. Follow these static electricity precautions when handling this equipment.

- Work in a static free area.
- Touch a known, securely grounded object to discharge any charge you may have accumulated.
- Use a wrist strap when handling printed circuit boards. The strap must be secured to earth ground.

## FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference. This equipment can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to a power source different from that to which the receiver is connected.
- Consult the equipment supplier or an experienced radio/TV technician for help.

You are cautioned that any changes or modifications to this equipment not expressly approved in these instructions could void your authority to operate this equipment in the United States.

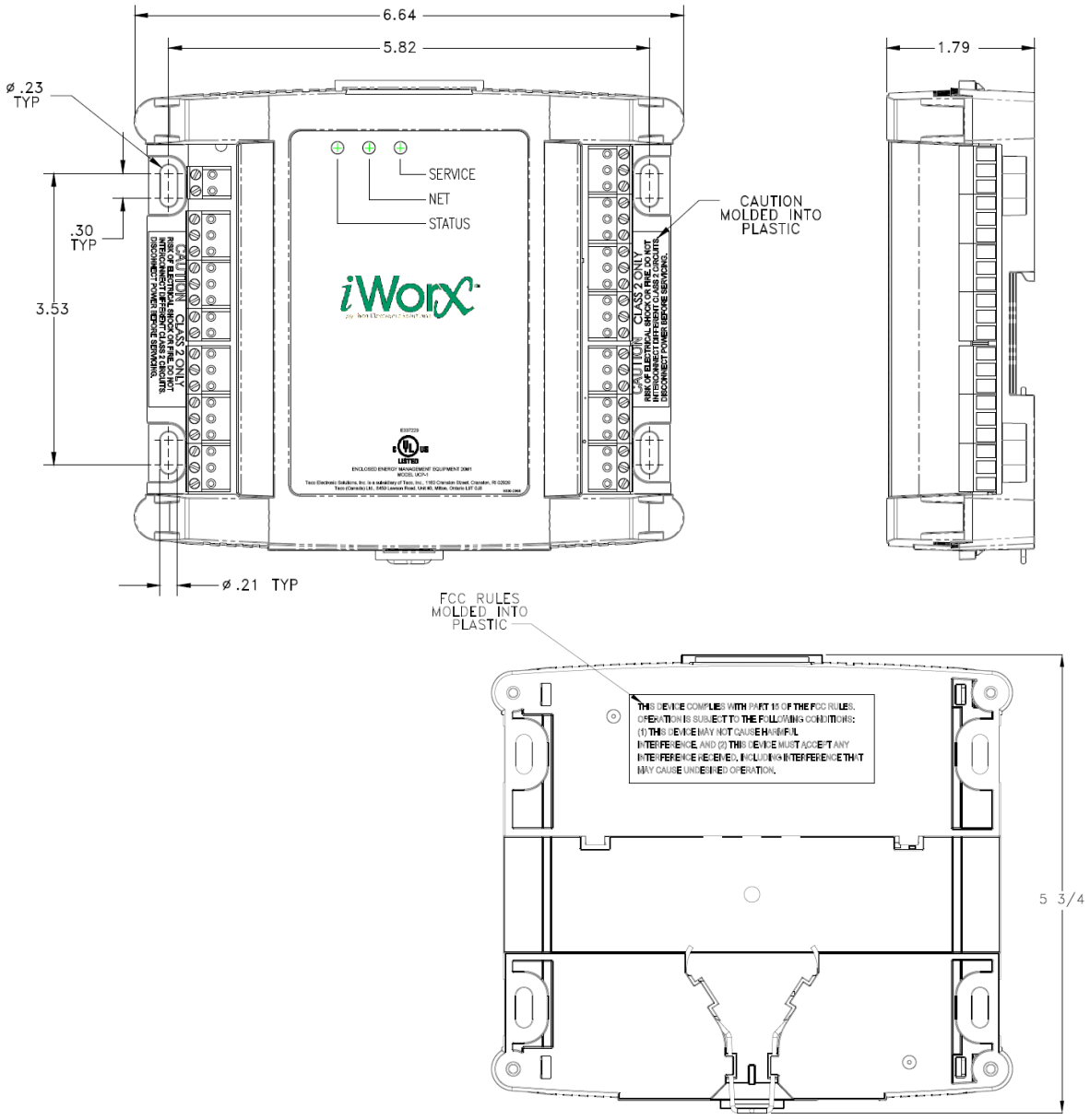
# INSTALLATION INSTRUCTIONS

**Warning:** Electrical shock hazard. To prevent electrical shock or equipment damage, disconnect **ALL** power sources to controllers and loads before installing or servicing this equipment or modifying any wiring.

## Mounting the Device

1. Select a mounting location. Enclosure mounting is recommended.
2. Hold the controller on the panel you wish to mount it on. With a marker or pencil mark the mounting locations on the panel.
3. Using a small drill bit pre-drill the mounting holes.
4. Using two #6 pan head screws, mount the controller to the panel.
5. Wire the controller (See Routing Cabling to the Device).

**Figure 1: Mounting Dimensions**




## Routing Cabling to the Device

Cabling used to connect the power source and cabling used to connect the FTT-10A network must remain separated within the control enclosure and wiring conduit.

## Grounding the Device

The ground terminal (T40) must be securely connected to earth ground. Failure to properly ground this equipment will result in improper operation. Improper grounding may also increase the risk of electrical shock and may increase the possibility of interference with radio/TV reception.



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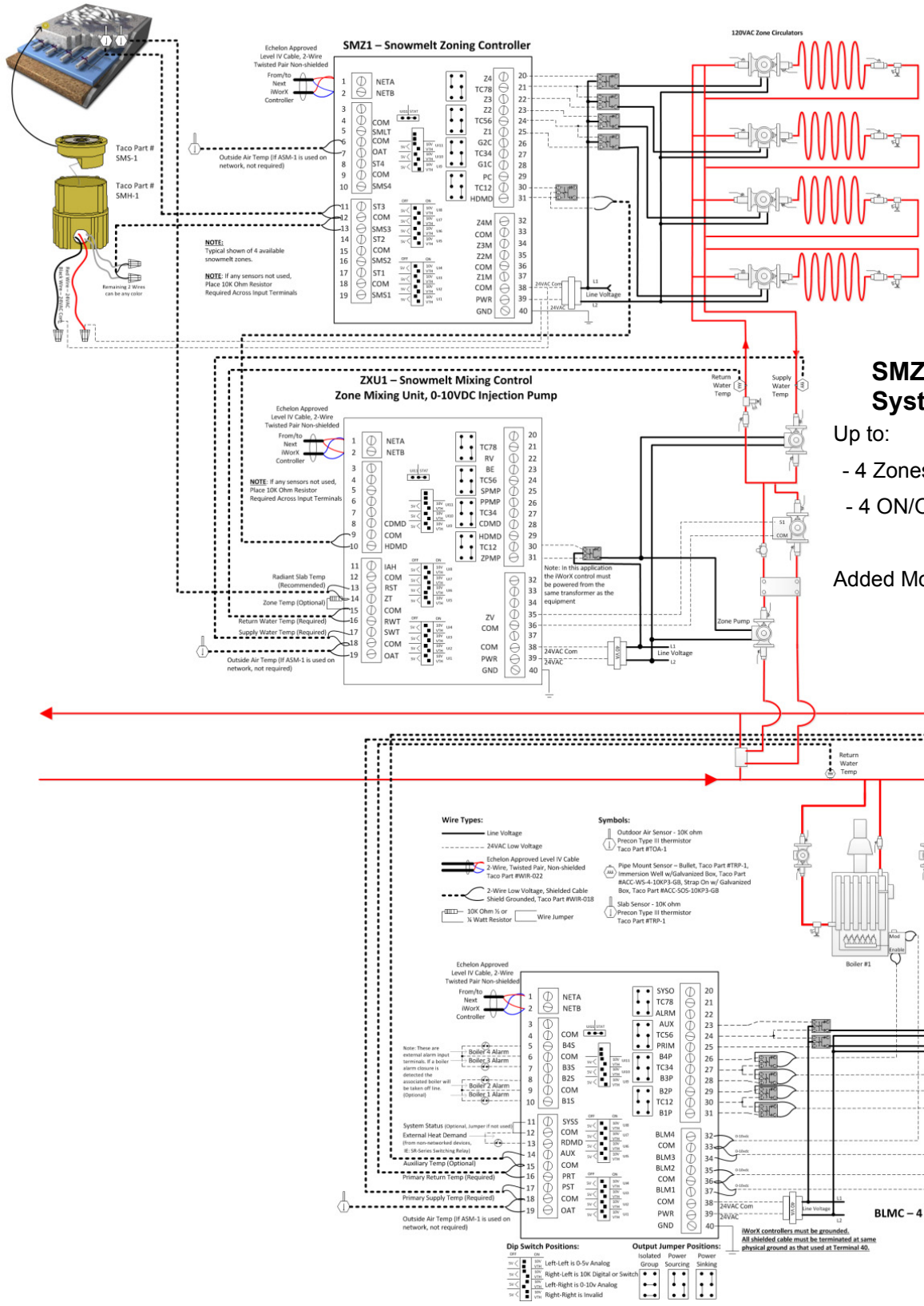
For best performance, connect the power supply common terminal (T38) to the same external point as the ground terminal (T40).

# WIRING INFORMATION

**WARNING**: Terminals 12, 15, 18 and 38 are connected internally on all SMZ1 controllers. Disconnect **ALL** power sources when installing or servicing this equipment to prevent electrical shock or equipment damage.




## SMZ-1: 4 Zone Snowmelt System

Up to:

- 4 Zones of Snowmelt
- 4 ON/OFF Zone Circulators

Added Module Required – ZXU1



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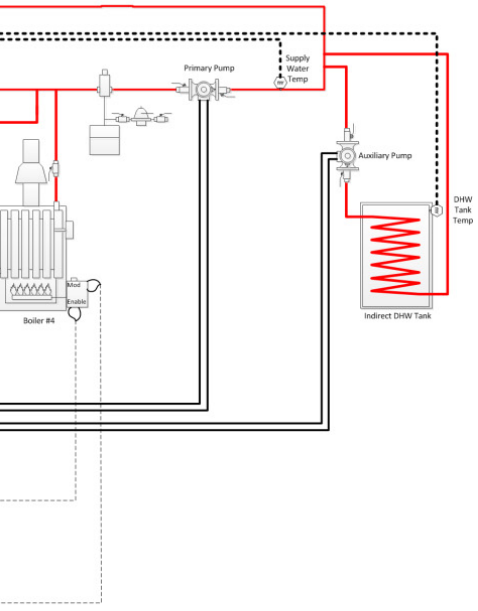
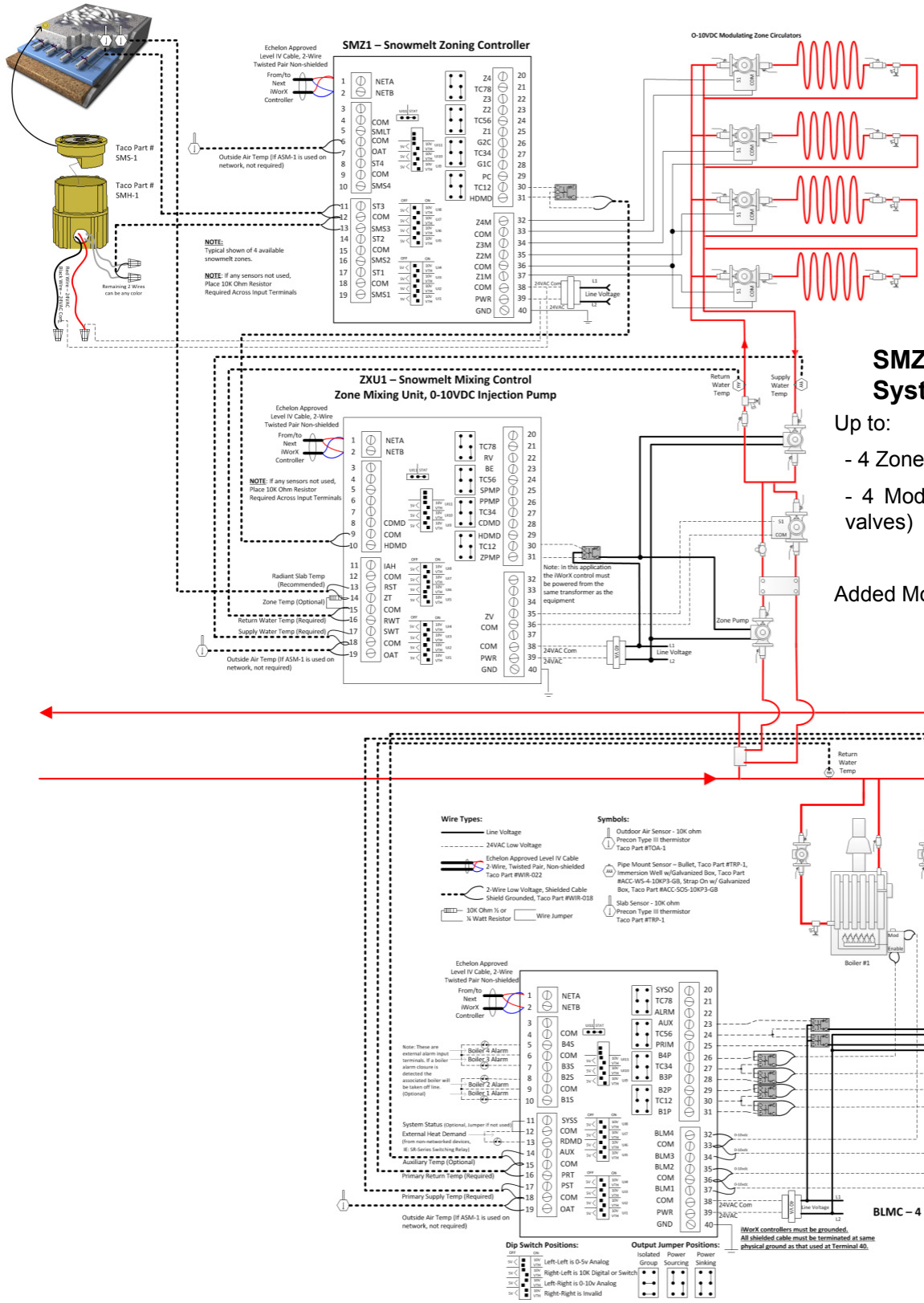



**Primary and Auxiliary(DHW) Pump Control**




## SMZ-1: 4 Zone Snowmelt System

Up to:

- 4 Zones of Snowmelt
- 4 Modulating Zone Circulators (or valves)

Added Module Required – ZXU1



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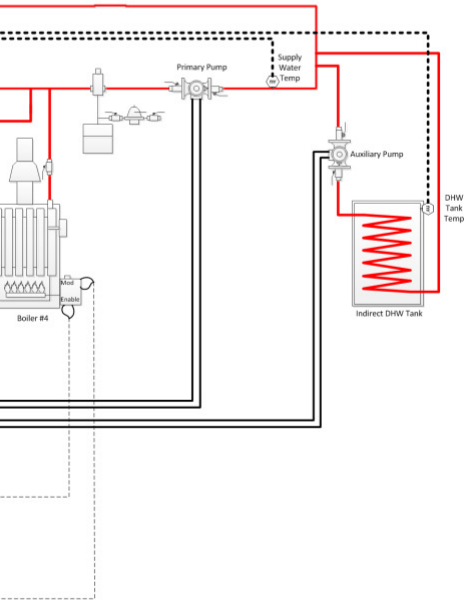



**Primary and Auxiliary(DHW) Pump Control**

# SMZ1 - 4 Zone Snowmelt Zone Controller

## Snowmelt Zone System

### Controls up to:

- 4 ea. 0-10 VDC Modulating or On/Off Zone Control Valves or Zone Circulators.

**Sensors Required:** 4 ea. Taco SMS-1 Snowmelt Sensors, TOA-1 Outside Air Temp Sensor.

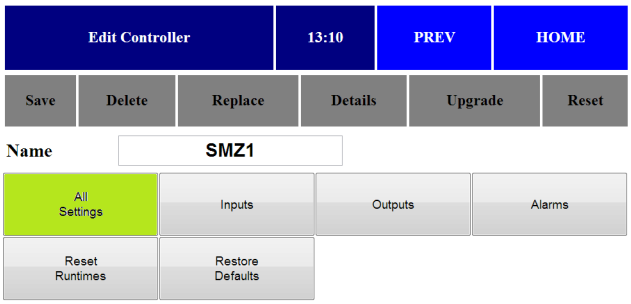
**Optional Controller Required:** ZXU1 injection mixing control if SMZ1 is not associated with dedicated snowmelt boiler system.

### Setup Instructions

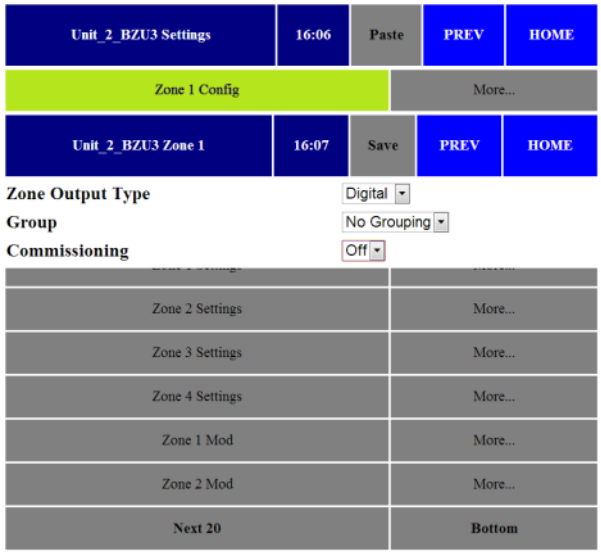
1. Press **Controllers** from main screen.


2. Select required SMZ from controller list and press appropriate controller.


3. Press **All Settings**.




4. Press **Zone 1 Config**.




5. The *Zone 1 Config* menu opens.
   a. Select **Zone Output Type**:
      - "Digital" = On/Off switched output.
      - "Analog" = 0-10VDC modulating output.
   b. Select **Group**. Grouping assigns a specific zone(s) to an associated Group Circ Output, either 1 or 2.
   c. **Commissioning** allows a Zone and its associated Group Circ (if applicable) to be forced on for testing and commissioning of system. Must be set to "OFF" for normal operation.
   d. Press **Save**.
6. Repeat Step 5 for **Zone Config** 2 through 4 as applicable to installation.



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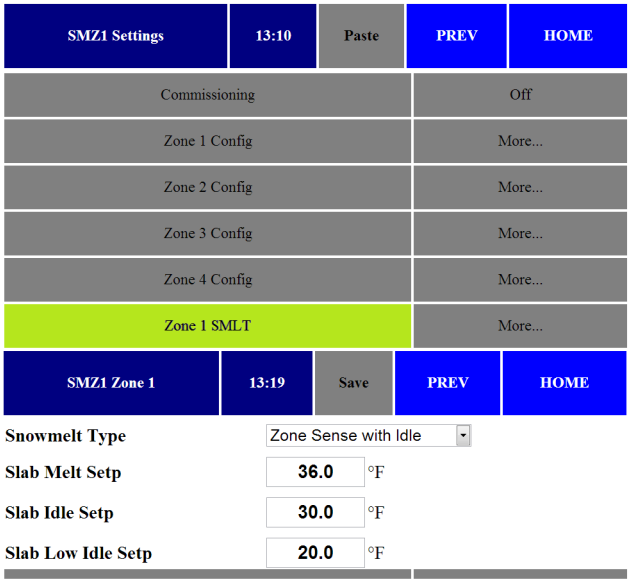
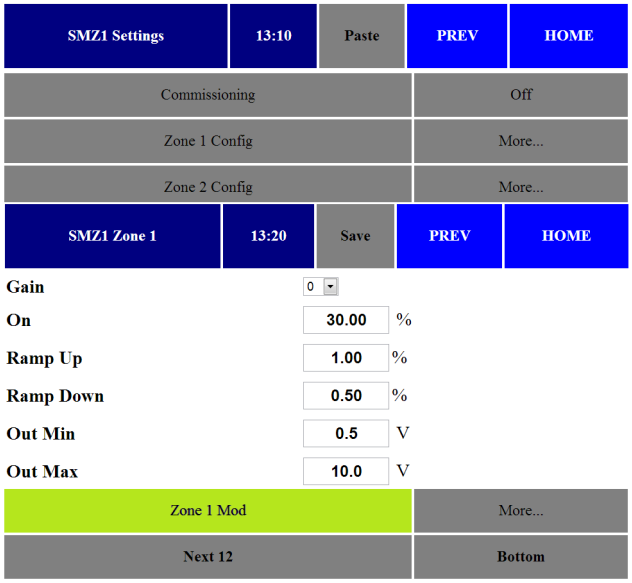
7. Press **Zone 1 SMLT**.




8. The *Zone 1 Settings* menu opens.
   a. Select **Snowmelt Type**:
      - "Disabled (Zone Not Used)"
      - "Global Sense without Idle"
      - "Global Sense with Idle"
      - "Zone Sensing without Idle"
      - "Zone Sensing with Idle"
   b. Specify **Slab Melt Setpt** in degrees.
   c. Specify **Slab Idle Setpt** in degrees.
   d. Specify **Slab Low Idle SetPt** in degrees.
   e. Press **Save**.
9. Repeat Step 8 for **Zone Settings** 2 through 4 as applicable to installation.

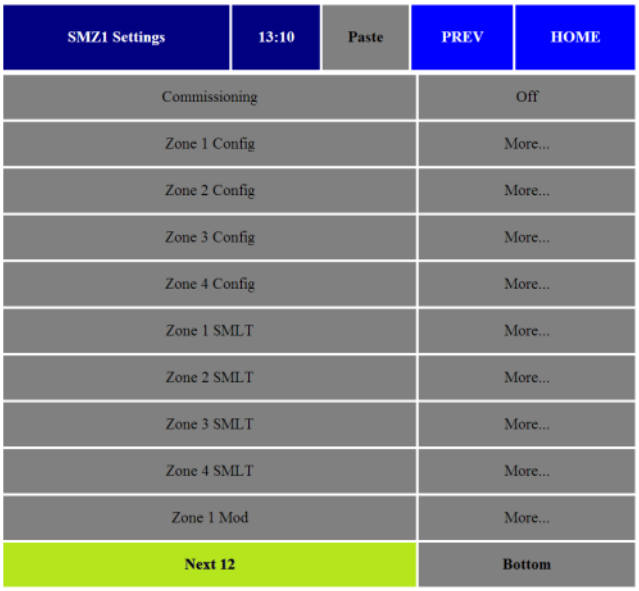
10. Press **Zone 1 Mod**.

    **NOTE:** Modulating Valve Settings only apply for applications using 0-10VDC Zone Modulating Valves or Circulators. Skip Steps 10 and 11 if On/Off outputs are used.

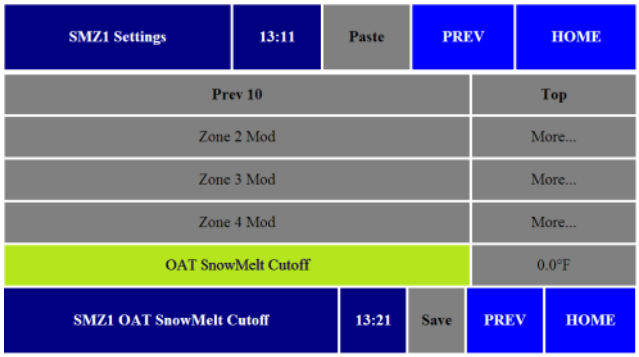


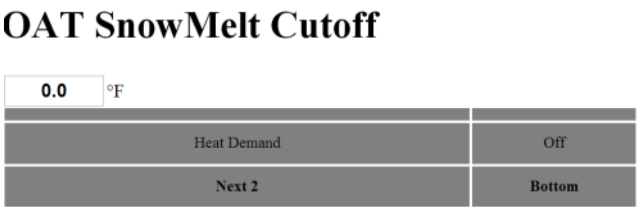

11. The *Zone 1 Mod* menu opens.
    a. Select **Gain** from -4 to +5. Adjust only when zone response is lagging or overreacting.
    b. Specify **On** %. Sets the initial output percent when the zone turns on.
    c. Specify **Ramp Up** %. Selects the % each step ramping up for zone call.
    d. Specify **Ramp Down** %. Selects the % each step ramping down from a zone call.
    e. Specify **Outp**ut **Min** in VDC. Usually 0 or 2VDC. (See Mod. Zone valve or Circulator Mfg. recommendations).
    f. Specify **Outp**ut **Max** in VDC. Usually 10VDC. (See Mod. Zone Valve or Circulator Mfg. recommendations).
    g. Press **Save**.
12. Repeat Step 11 for **Zone Mod** 2 through 4 as applicable to installation.

13. Press **Next 12**.



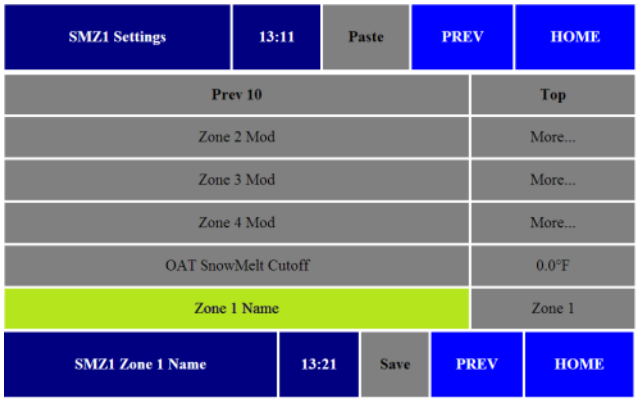

14. Press **OAT Snowmelt Cutoff**.



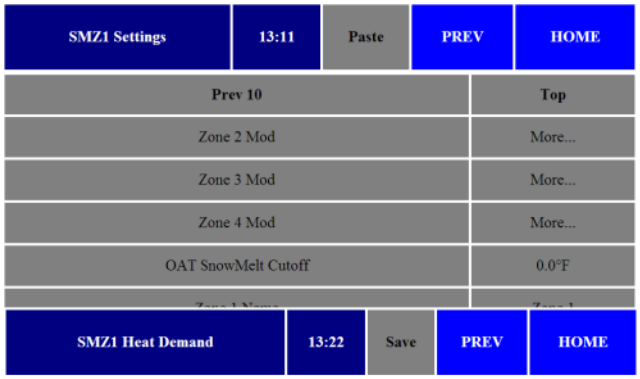

15. The *OAT Snowmelt Cutoff* menu opens.
    a. Specify the Outside Air Temperature below which snowmelting is disabled, in degrees.
    b. Press **Save**.

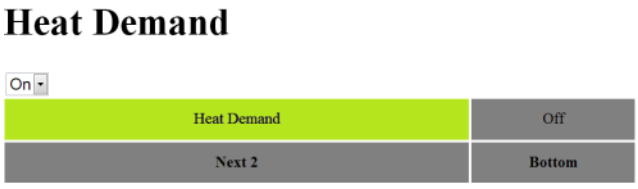
16. Press **Zone 1 Name**.





17. The *Zone 1 Name* menu opens.
    a. Enter a name for Zone 1.
    b. Press **Save**.
18. Repeat Step 17 for **Zone Name** 2 through 4 as applicable to installation.
19. Press **Heat Demand**.




20. The **Heat Demand** menu opens.
    a. If set to "On," the heat demand is communicated to the BLM as a demand for the reset temperature from the primary loop.
    b. Press **Save**.



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21. Press **Next 2**.


22. Press **Zone Demand**.



23. The *Zone Demand* menu opens.
    a. If set to "On," the max zone demand is communicated to the BLM as a subzone demand.
    b. Press **Save**.

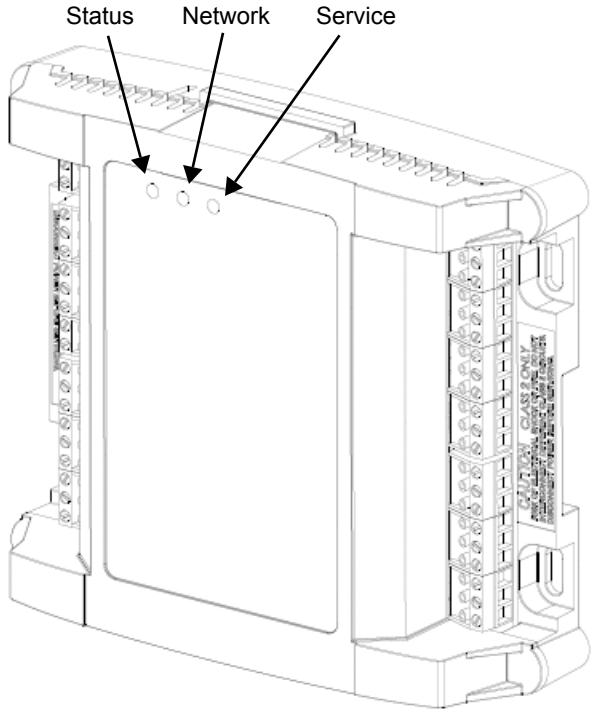
# TROUBLESHOOTING

## Diagnostic LEDs

The controller has 3 LED indicators. These indicators can aid in troubleshooting equipment operation problems. The following table lists the functions of the controller's LEDs in the order they appear from left to right on the unit.

| LED | Indication |
|---|---|
| Status | – Solid green when running and configured by an LCI (networking)<br>– Flashing green when running and NOT configured by an LCI (stand-alone)<br>– Solid red when a fault condition exists (control shut down)<br>– Blinking Red - the controller has a device failure<br>– Solid Amber - The controller has not received a LCI ping message in over 10 minutes and is part of a network. |
| Network | – Yellow while the controller is transmitting data onto the FTT-10A network<br>– Green when there is network activity<br>– Off when there is no network activity |
| Service | – Illuminated when the service pin is depressed or when a controller gets configured by the LCI. |

**Figure 2: SMZ1 Controller LEDs**



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## Troubleshooting Tips

| Problem | Solution |
|---|---|
| Controller is not running and Status LED is not illuminated. | No power to controller. Verify the voltage on the controller's power connector (24 VAC). |
| How do I reset the controller? | The controller can be reset by the LCI, or you can cycle power to the controller. Refer to the LCI documentation for more information on resetting the controller using the LCI. |
| A zone pilot relay will not come on even though the LCI indicates it is on. | Ensure that the controller and output pilot relay have been powered with 24 VAC and the output has been correctly wired to the coil of the pilot relay. Also ensure that the pilot relay has a 24 VAC coil. Ensure that the output jumpers are in the right position for this application (isolated group, power sourcing or power sinking). |
| The 10K thermistor reading is out of range. | The input is either shorted or open, or the dip switches are not set. Make sure the appropriate dip switch for this input is in the VTH "On" and 5V "Off" position. |
| Thermistor readings fluctuate rapidly, sometimes by several degrees. | The controller is not properly grounded. The controller's ground (GND) pin (T40) must be connected to earth ground.<br>Also ensure that the controller's digital inputs are dry contacts and that no voltage is being applied or switched to the inputs. |
| Controller is not running and Status LED is not illuminated. | No power to controller. Verify the voltage on the controller's power connector (24 VAC). |
| Why is my pump short cycling? | Ensure that the temperature inputs and controller are properly grounded and that the PI Gain is set properly. |
| What should I do with unused inputs? | The installer may want to place dummy 10K resistors across unused inputs to prevent confusion from aberrant readings. Any unused snow sense inputs should be left open and will read approximately 30 °F. |

### Getting Help

Components within an iWorx® controller, sensor, or power supply cannot be field repaired. If there is a problem with a unit, follow the steps below before contacting your local TES representative or TES technical service.

1. Make sure controllers, sensors, and power supplies are connected and communicating to desired devices.
2. Record precise hardware setup indicating the following:

   Version numbers of application software.

   Device and/or firmware version number.

   A complete description of difficulties encountered.

# REPRESENTATIONS AND WARRANTIES

This Document is subject to change from time to time at the sole discretion of Taco Electronic Solutions, Inc. All updates to the Document are available at www.taco-hvac.com. When installing this product, it is the reader's responsibility to ensure that the latest version of the Document is being used.

iWorx® products shall only be used for the applications identified in the product specifications and for no other purposes. For example, iWorx® products are not intended for use to support fire suppression systems, life support systems, critical care applications, commercial aviation, nuclear facilities or any other applications where product failure could lead to injury to person, loss of life, or catastrophic property damage and should not be used for such purposes.

Taco Electronic Solutions, Inc. will not be responsible for any product or part not installed or operated in conformity with the Document and instructions or which has been subject to accident, disaster, neglect, misuse, misapplication, inadequate operating environment, repair, attempted repair, modification or alteration, or other abuse. For further information, please refer to the last page of this Document for the company's Limited Warranty Statement, which is also issued with the product or available at www.taco-hvac.com.

# APPLICABLE DOCUMENTATION

| Part Number | Audience | Purpose |
|---|---|---|
| *iWorx® SMZ1 Application Guide*, Document No. 502-048 (this document) | – Application Engineers<br>– Wholesalers<br>– Contractors | Provides specific application information about the BLM series, including sequence of operation and configuration information. |
| *iWorx® LCI2 Application Guide*, Document No. 505-002 | – Application Engineers<br>– Installers<br>– Service Personnel<br>– Start-up Technicians<br>– End user | Provides instructions for setting up and using the iWorx® Local Control Interface. |
| *iWorX DXU3 Application Guide*, Document No. 505-004<br><br>*iWorX DXU4 Application Guide*, Document No. 505-005 | – Application Engineers<br>– Installers<br>– Service Personnel<br>– Start-up Technicians<br>– End user | Provides specific application information about the DXU series, including sequence of operation and configuration information. |
| *iWorX BLMC Application Guide*, Document No. 505-001 | – Application Engineers<br>– Installers<br>– Service Personnel<br>– Start-up Technicians<br>– End user | Provides specific application information about the BLMC series, including sequence of operation and configuration information. |
| *iWorX HPM1 Application Guide*, Document No. 505-004 | – Application Engineers<br>– Installers<br>– Service Personnel<br>– Start-up Technicians<br>– End user | Provides specific application information about the HPM series, including sequence of operation and configuration information. |
| *iWorX TS200 Series Installation Guide*, Document No. 502-016 | – Application Engineers<br>– Installers<br>– Service Personnel<br>– Start-up Technicians<br>– End user | Provides specific information about the TS200 series thermostats, including installation and usage instructions. |
| http://www.iWorxWizard.com | – Application Engineers<br>– Wholesalers<br>– Contractors | An on-line configuration and submittal package generator based on user input. Automatically generates bill of materials, sequence of operations, flow diagrams, wiring diagrams, points and specifications. |
| Additional Documentation | *LonWorks FTT-10A Free Topology Transceiver User's Guide,* published by Echelon Corporation. It provides specifications and user instructions for the FTT-10A Free Topology Transceiver. | |

**Notes:**



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## LIMITED WARRANTY STATEMENT

Taco Electronic Solutions, Inc. (TES) will repair or replace without charge (at the company's option) any product or part which is proven defective under normal use within one (1) year from the date of start-up or one (1) year and six (6) months from date of shipment (whichever occurs first).

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local TES stocking distributor or TES in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local TES stocking distributor or TES. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any TES product or part not installed or operated in conformity with TES instructions or which has been subject to accident, disaster, neglect, misuse, misapplication, inadequate operating environment, repair, attempted repair, modification or alteration, or other abuse, will not be covered by this warranty.

TES products are not intended for use to support fire suppression systems, life support systems, critical care applications, commercial aviation, nuclear facilities or any other applications where product failure could lead to injury to person, loss of life, or catastrophic property damage and should not be sold for such purposes.

If in doubt as to whether a particular product is suitable for use with a TES product or part, or for any application restrictions, consult the applicable TES instruction sheets or in the U.S. contact TES at 401-942-8000 and in Canada contact Taco (Canada) Limited at 905-564-9422.

TES reserves the right to provide replacement products and parts which are substantially similar in design and functionally equivalent to the defective product or part. TES reserves the right to make changes in details of design, construction, or arrangement of materials of its products without notification.

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