



# Installation Guide

502-007

## **ZXU1 Mixing Loop Control - Single Zone** ***Self-Contained Interoperable Controller Model UCP-1***

SUPERSEDES: October 28, 2010

EFFECTIVE: November 17, 2010

Plant ID: 001-3955

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## ZXU1

The iWorX® ZXU1 is a stand-alone microprocessor-based controller for one injection loop.

### Overview

The ZXU1 provides injection mixing for one loop. The loop has a Supply and a Return Temperature and can be configured separately. Outdoor Air Temperature, Radiant Slab Temperature and Zone Temperature are also provided.

A Boiler Enable and a Primary Pump signal are provided if the loop has a demand. Demand can come from several sources.

Demands can be configured and processed as a heating or cooling demand.

It is assumed that all the boiler operations are taken care of elsewhere, possibly coupled with a BLM controller.

The iWorX® controller is based on the LONWORKS® networking technology. The controller can be networked to a higher-level control system for monitoring and control applications.

### Features

- Heat/Cool control selectable
- Heat Demand and Cool Demand inputs are provided
- Temperature alarms
- Modulating mixing output with adjustable min and max settings from 0-10V
- Loop has a separate Supply Temperature, Return Temperature, Radiant Slab Temperature and Pump signal
- Advanced Outdoor Air drybulb calculation
- Room Temperature for zone control
- Snowmelt mode with extended features
- Heat Demand and Cool Demand outputs provided
- Standalone configuration
- Outdoor Air Temperature for standalone mode
- Boiler Enable signal and Primary Pump signal available
- Boiler Protection
- LONWORKS interface to building automation systems.
- Automatic configuration with the iWorX® Local Control Interface (LCI)

## 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](http://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.

The iWorX® ZXU1 shall only be used for the applications identified in the product specifications and for no other purposes. For example, the iWorX® ZXU1 is 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](http://www.taco-hvac.com).

## APPLICABLE DOCUMENTATION

| Description                                                                     | Audience                                                                                                                                                                                                                                                                                                                                              | Purpose                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>iWorX® ZXU1 Application Guide</i> , Document No. 505-007                     | <ul style="list-style-type: none"> <li>– Application Engineers</li> <li>– Installers</li> <li>– Service Personnel</li> <li>– Start-up Technicians</li> <li>– End user</li> </ul>                                                                                                                                                                      | Provides application information for setting up and using the iWorX® Local Control Interface, including sequence of operation.                                                                              |
| <i>iWorX® LCI2 Application Guide</i> , Document No. 505-002                     | <ul style="list-style-type: none"> <li>– Application Engineers</li> <li>– Installers</li> <li>– Service Personnel</li> <li>– Start-up Technicians</li> <li>– End user</li> </ul>                                                                                                                                                                      | Provides instructions for setting up and using the iWorX® Local Control Interface.                                                                                                                          |
| <i>iWorX® LCI2 Quick Start</i> , Document No. 502-002a                          | <ul style="list-style-type: none"> <li>– Application Engineers</li> <li>– Installers</li> <li>– Service Personnel</li> <li>– Start-up Technicians</li> <li>– End user</li> </ul>                                                                                                                                                                      | Provides instructions for setting up and using the iWorX® Local Control Interface.                                                                                                                          |
| <a href="http://iWorXWizard.taco-hvac.com">http://iWorXWizard.taco-hvac.com</a> | <ul style="list-style-type: none"> <li>– Application Engineers</li> <li>– Wholesalers</li> <li>– Contractors</li> </ul>                                                                                                                                                                                                                               | 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                                                        | <i>LonWorks FTT-10A Free Topology Transceiver User's Guide</i> , published by Echelon Corporation. It provides specifications and user instructions for the FTT-10A Free Topology Transceiver. See also: <a href="http://www.echelon.com/support/documentation/manuals/transceivers">www.echelon.com/support/documentation/manuals/transceivers</a> . |                                                                                                                                                                                                             |

## INSTALLATION GUIDE

### Precautions

#### General



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



**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.

### 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.

### Location

Avoid locations where corrosive fumes, excessive moisture, vibration or explosive vapors are present.

Avoid electrical noise interference. Do not install near large contactors, electrical machinery, or welding equipment.

This equipment is suitable for indoor or outdoor use. Preferably, or as required by National Electrical Code, the unit is intended to be installed within an electrical control enclosure. Operate where ambient temperatures do not exceed 140 °F (60 °C) or fall below 32 °F (0 °C) and relative humidity does not exceed 90%, non-condensing.

## 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.

## Before Installing

### About this Document

The instructions in this document are for the ZXU1 controller which supports one mixing loop in a hydronic system.

### Inspecting the Equipment

Inspect the shipping carton for damage. If damaged, notify the carrier immediately. Inspect the equipment for damage. Return damaged equipment to the supplier.

### What is Not Included with this Equipment

- A power source for the equipment electronics and peripheral devices.
- Tools necessary to install, troubleshoot and service the equipment.
- The screws to mount the device.
- Peripheral devices, such as sensors, actuators, etc.
- Cabling, cabling raceway, and fittings necessary to connect this equipment to the power source, FTT-10A network and peripheral devices.

### 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 (sensors, etc.) that will be connected to the equipment. It must be within 200 feet of any directly-connected thermostats.

### Selecting a Power Source

This equipment requires a UL recognized or CE marked (as appropriate) 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. The loads must have EMF protection. This protection can be integral to the load, or installed 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. Failure to properly ground the controller may cause it to exceed FCC & CE limits. Excessive noise could also produce inaccurate sensor data. The power source must be capable of operating with the connection to ground described in "Wiring Information" on page 7.

## INSTALLATION

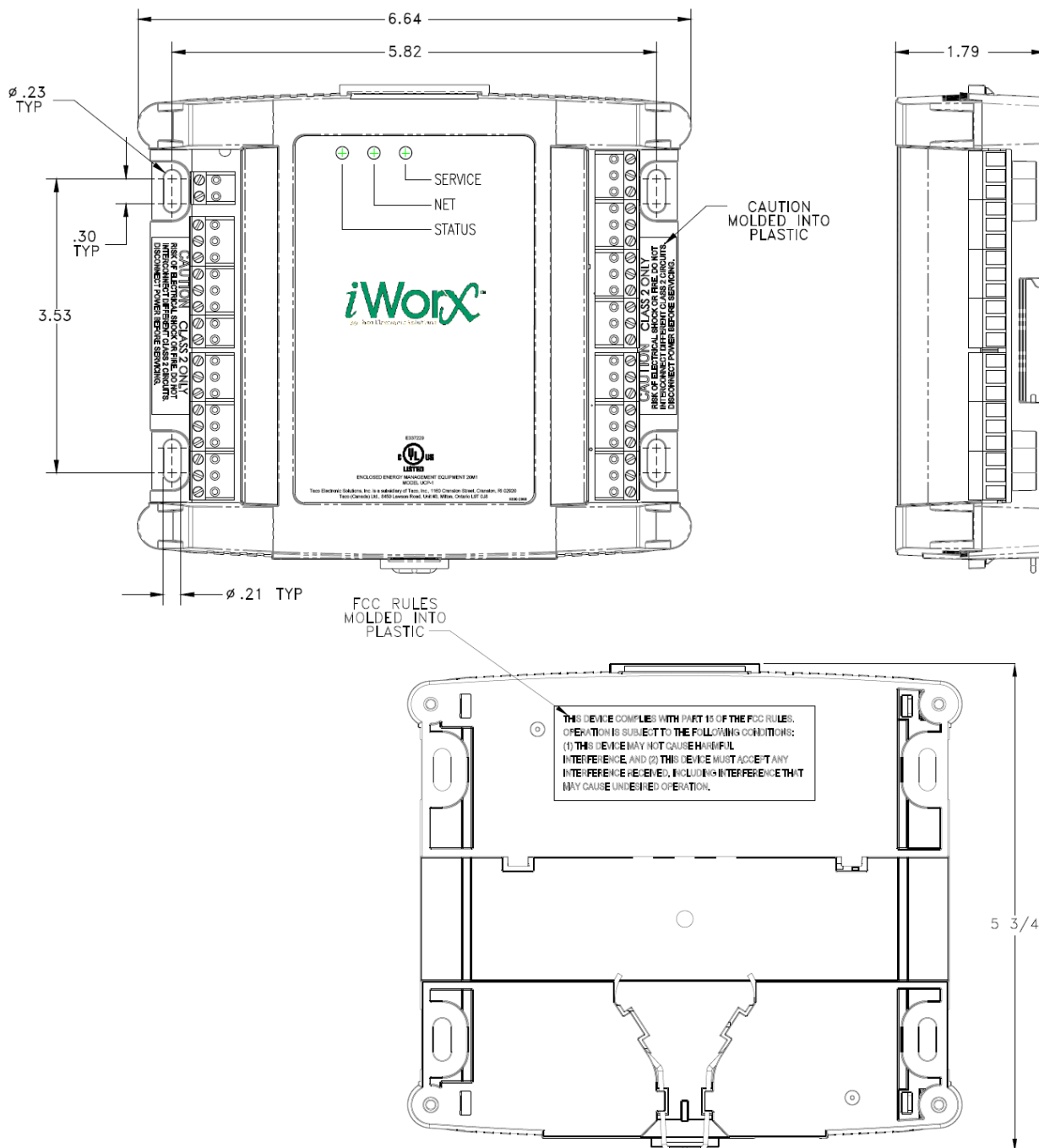


**Warning:** Electrical shock hazard. To prevent electrical shock or equipment damage, disconnect **ALL** power sources to controllers and loads before installing or servicing this equipment or modifying any wiring.

### 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



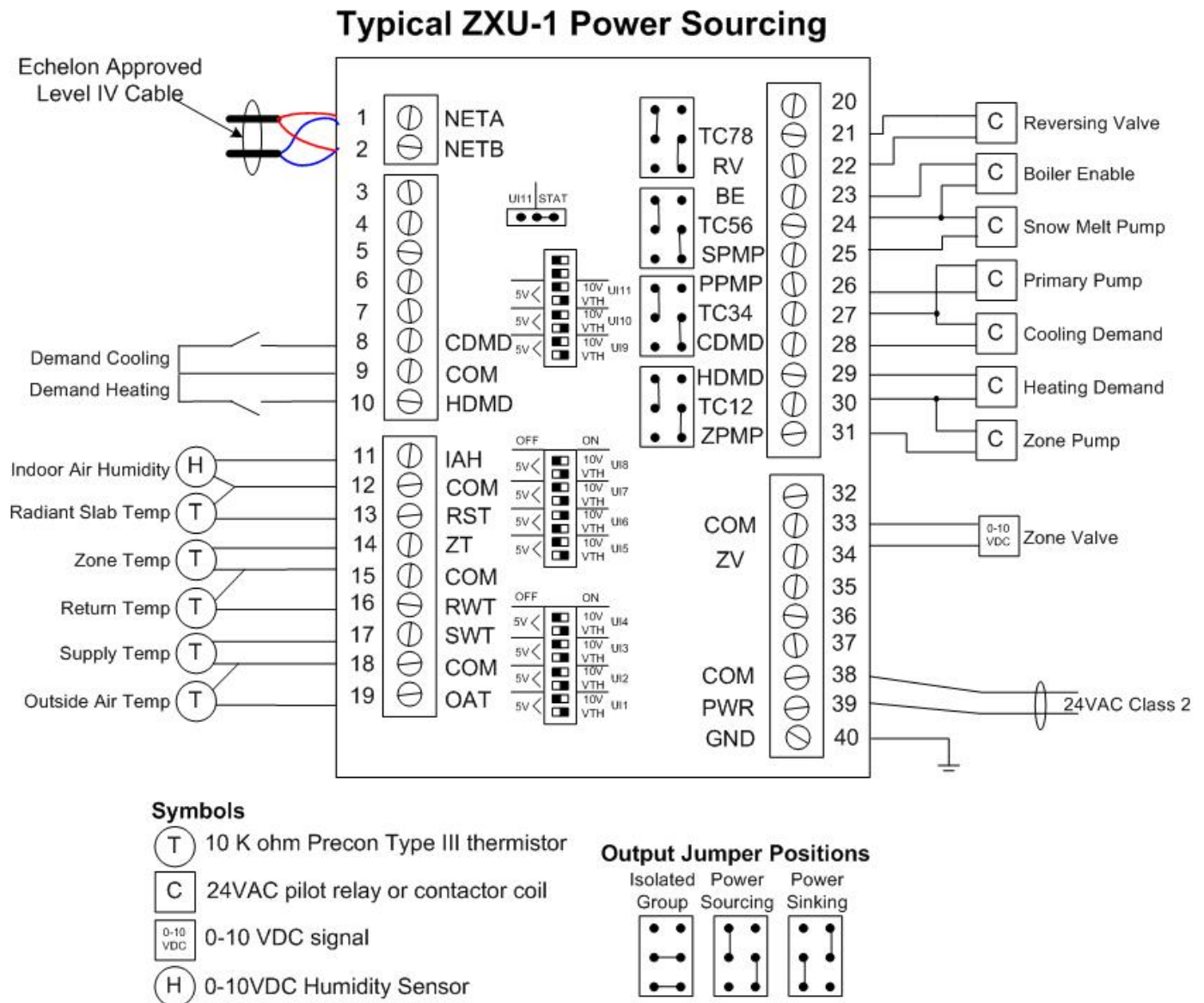
The ground terminal (T40) must be securely connected to earth ground. Failure to properly ground this equipment will result in improper operation. Improper grounding may also increase the risk of electrical shock and may increase the possibility of interference with radio/TV reception.



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

## WIRING INFORMATION

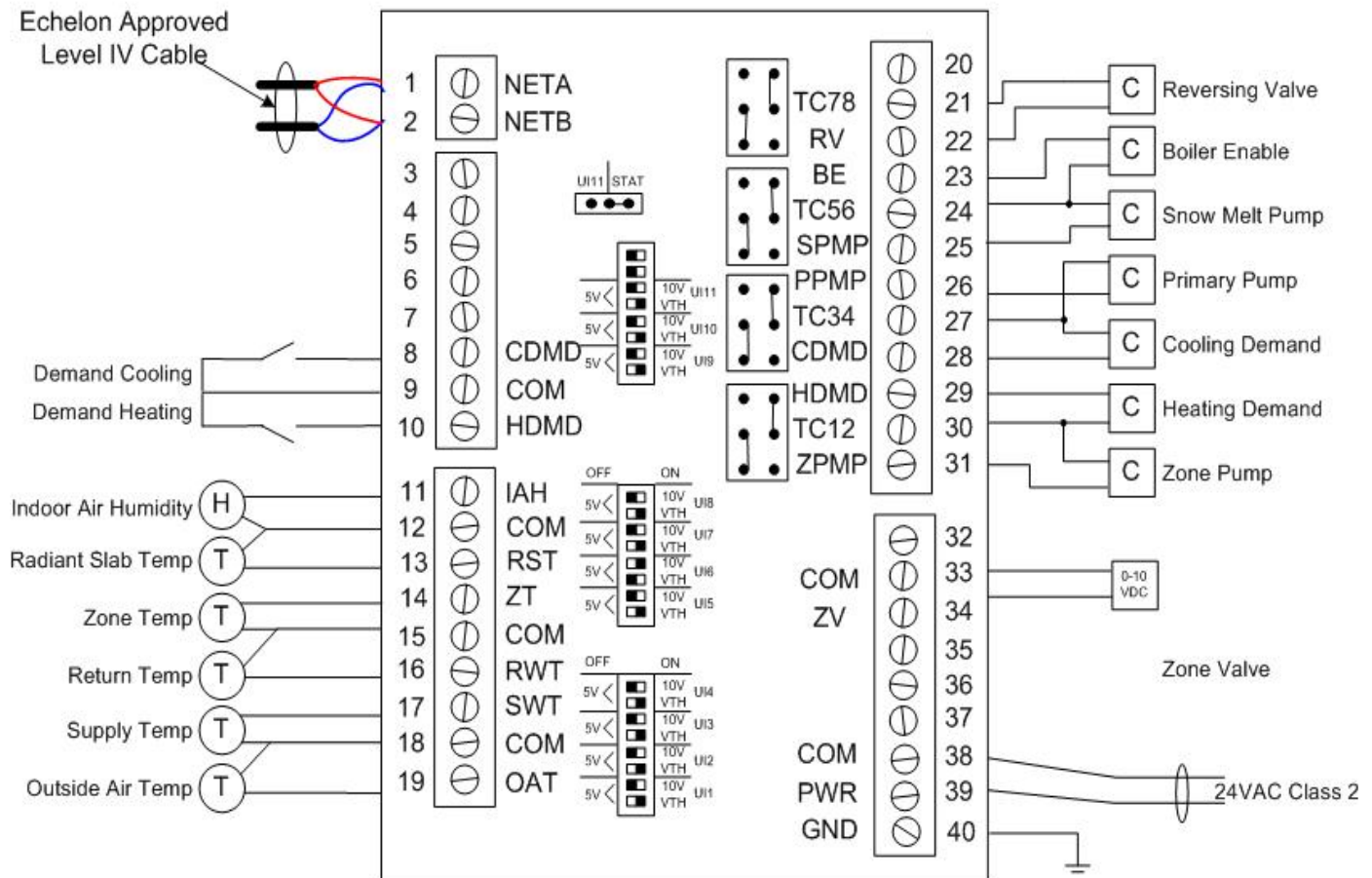
Figure 2: ZXU1 Power Sourcing



**Note:** Please be aware of the jumper positions. They must be set as shown in the drawing.

Figure 3: ZXU1 Power Sinking

### Typical ZXU-1 Power Sinking



#### Symbols

- (T) 10 K ohm Precon Type III thermistor
- (C) 24VAC pilot relay or contactor coil
- (0-10 VDC) 0-10 VDC signal
- (H) 0-10VDC Humidity Sensor

#### Output Jumper Positions

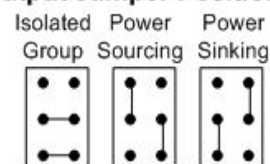
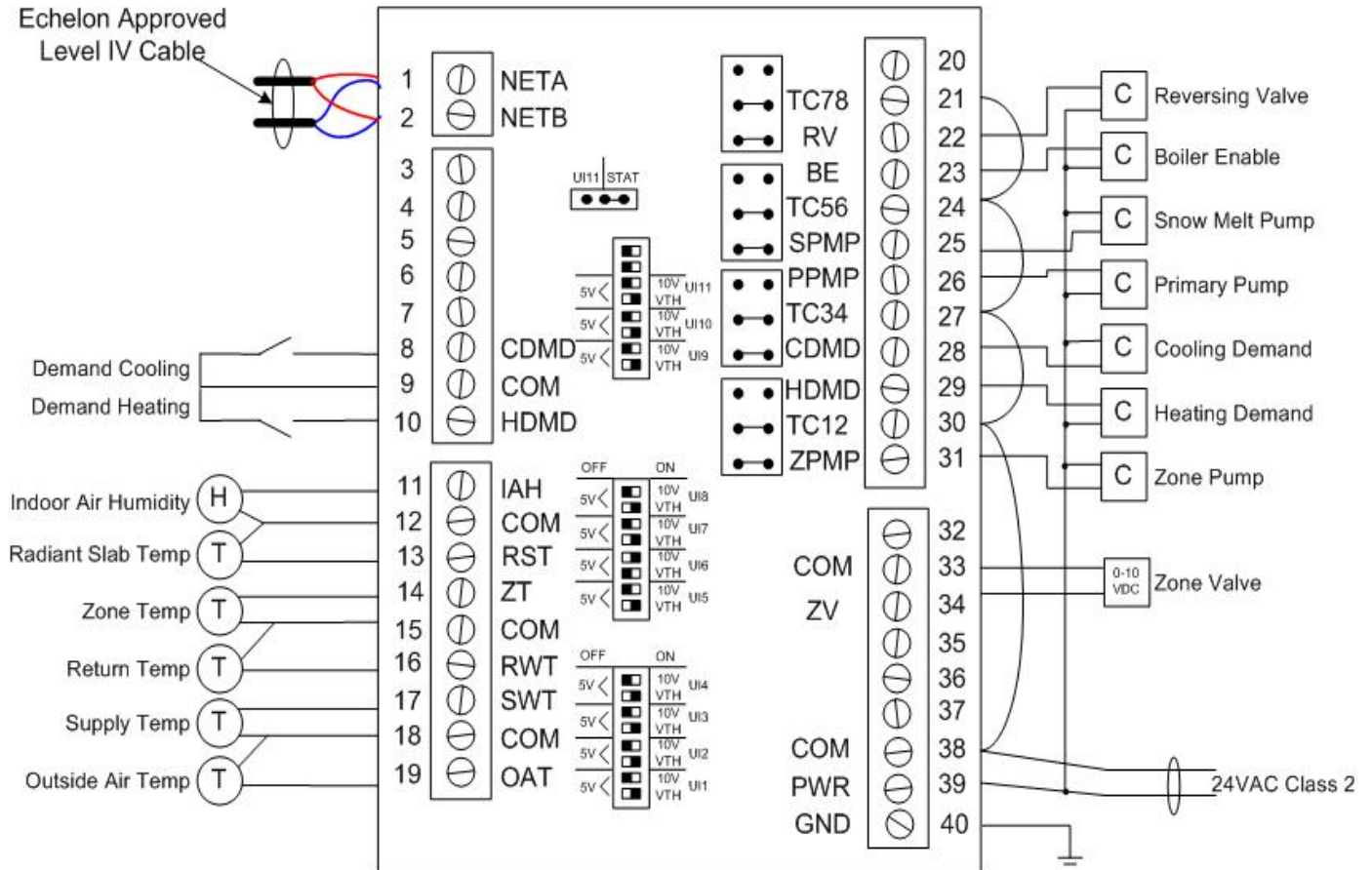


Figure 4: ZXU1 Power Isolated

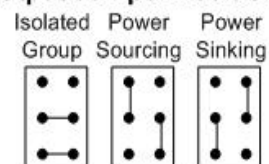
### Typical ZXU-1 Power Isolated



#### Symbols

- 10 K ohm Precon Type III thermistor
- 24VAC pilot relay or contactor coil
- 0-10 VDC signal
- 0-10VDC Humidity Sensor

#### Output Jumper Positions



## Connecting Input Devices

### Outside Air Temperature (OAT) (Optional)

To connect the Outside Air thermistor to the unit, attach one wire from the thermistor to OAT (T19) and the other wire to the adjacent common (T18). The thermistor used must be 10K Precon Type III. This Thermistor is optional and the position can be left open in networked applications, when the Outside Air Temperature is communicated through an ASM-2.

### Supply Temperature (SWT)

To connect the Loop Supply Water thermistor to the unit, attach one wire from the thermistor to ST (T17) and the other wire to the adjacent common (T18). The thermistor used must be 10K Precon Type III.

### Return Temperature (RWT) (Optional)

To connect the Loop Return Water thermistor to the unit, attach one wire from the thermistor to RT (T16) and the other wire to the adjacent common (T15). The thermistor used must be 10K Precon Type III. This Thermistor must be populated when running differential snowmelt sequences.

### Zone Temperature (ZT) (Optional)

To connect the Zone Air thermistor to the unit, attach one wire from the thermistor to ZT (T14) and the other wire to the adjacent common (T15). The thermistor used must be 10K Precon Type III.

### Radiant Slab Temperature (RST) (Optional)

To connect the Radiant Slab thermistor to the unit, attach one wire from the thermistor to RST (T13) and the other wire to the adjacent common (T12). The thermistor used must be 10K Precon Type III. This Thermistor must be populated in Outdoor Reset Slab - Mode and whenever the slab temperature is critical.

### Indoor Air Humidity (IAH) (Optional)

To connect the Indoor Air Humidity sensor to the unit, connect the positive wire from the sensor to IAH (T11) and the other wire to the adjacent common (T12). The sensor must be of the 0-10 Volt type.

### Heat Demand (HDMD)

To connect the Heat Demand switch to the digital input, attach one wire of the contact to HDMD (T10) and the other wire to the adjacent common (T9). This must be a dry contact normally open switch.

### Cool Demand (CDMD)

To connect the Cool Demand switch to the digital input, attach one wire of the contact to CDMD (T8) and the other wire to the adjacent common (T9). This must be a dry contact normally open switch.

## Connecting Output Devices

The outputs for the zone valves or pumps must be connected to 24 VAC pilot relays. For a power isolated example please See "ZXU1 Power Isolated" on page 9.

**Note** that in the isolated group wiring, the 24VAC common is jumpered to the triac commons!

### Zone Pump Output (ZPMP)

The output for the Zone Pump Output must be connected to a 24 VAC pilot relay. Zone Pump Output [PWR] (T31, T39).

### Heat Demand Output (HDMD)

The heat demand output must be connected to a 24 VAC pilot relay. Connect the Heat Demand to [PWR] (T29, T39).

### Cool Demand Output (CDMD)

The cool demand output must be connected to a 24 VAC pilot relay. Connect the Cool Demand to [PWR] (T28, T39).

### Primary Pump Output (PPMP)

The outputs for the Primary Pump Output must be connected to a 24 VAC pilot relay. Primary Pump Output [PWR] (T26, T39)

**Snow Melt Pump (SPMP)**

The output for the Snow Melt Pump must be connected to a 24 VAC pilot relay. Snow Melt Pump [PWR] (T25, T39)

**Boiler Enable Output (BE)**

The output for the Boiler Enable must be connected to a 24 VAC pilot relay. Boiler Enable [PWR] (T23, T39)

**Reversing Valve Output (RV)**

The reversing valve output must be connected to a 24 VAC pilot relay. Connect the Reversing Valve to [PWR] (T22, T39).

**Modulating Output (ZV)**

The modulated output can be set to 0-10 V through the control logic. Connect the positive wire from the actuator to ZV (T34) and the other wire to COM (T33). See Wiring Details for further information.

Note: In this wiring example when T39 is referenced it is the same as indicating 24VAC!

**Other Connections****Network (LON)**

Network wiring must be twisted pair. One network wire must be connected to terminal NETA (T1) and the other network wire must be connected to terminal NETB (T2). Polarity is not an issue since an FTT-10A network is used for communications.

**Power (PWR)**

Connect one output wire from a 24 VAC power supply to PWR (T39) and the other output wire from the power supply to the adjacent common terminal (T38).

**Ground (GND)**

Terminal GND (T40) must be 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 and TV reception.

# SPECIFICATIONS

## Electrical

### Inputs

- Cabling: twisted shielded pair, 18 AWG recommended 500 feet max. (152 meters)
- Resolution: 10 bit

### Indoor Air Humidity

- 0-10 Volt

### Outside Air Temperature, Supply Temperature, Return Temperature, Zone Temperature, Radiant Slab Temperature

- Precon Type III 10K thermistor

### Heat Demand, Cool Demand

- Dry Contact
- Normally Open

### Outputs

### Zone Pump, Heat Demand, Cool Demand, Primary Pump, Snow Melt Pump, Boiler Enable, Reversing Valve

- 24 VAC
- 1A @ 50C, 0.5A @ 60C, limited by the Class 2 supply rating

### Modulating Output

- 0-10 Volt
- 2K Ohm minimum load
- 8 bit resolution

### Recommended Sensor Wire

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

### FTT-10A Network

- Speed: 78KBPS
- 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          |

For detailed specifications, refer to the *FTT-10A Free-Topology Transceiver User's Guide* published by Echelon Corporation ([www.echelon.com/support/documentation/manuals/transceivers](http://www.echelon.com/support/documentation/manuals/transceivers)).

### Power

#### Power Requirements

- 24VAC (20VAC to 28VAC), requires an external Class 2 supply

#### Power Consumption

- 7.2W with no external loads, maximum limited by the Class 2 supply rating

## Mechanical

### Housing

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

### **Weight**

- Controller Weight: 0.70 pounds (0.32 kilograms)
- Shipping Weight: 1.0 pounds (0.46 kilograms)

### **Electronics**

- Processor: 3150 Neuron 10 MHz
- Flash: 48 Kilobytes
- SRAM: 8 Kilobytes
- Termination: 0.197" (5.0 mm) Pluggable Terminal Blocks, 14-22 AWG

### **Environmental**

- Temperature: 32 °F to 140 °F (0 °C to 60 °C)
- Humidity: 0 to 90%, non-condensing

### **Agency Listings**

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

### **Agency Compliances**

- FCC Part 15 Class A

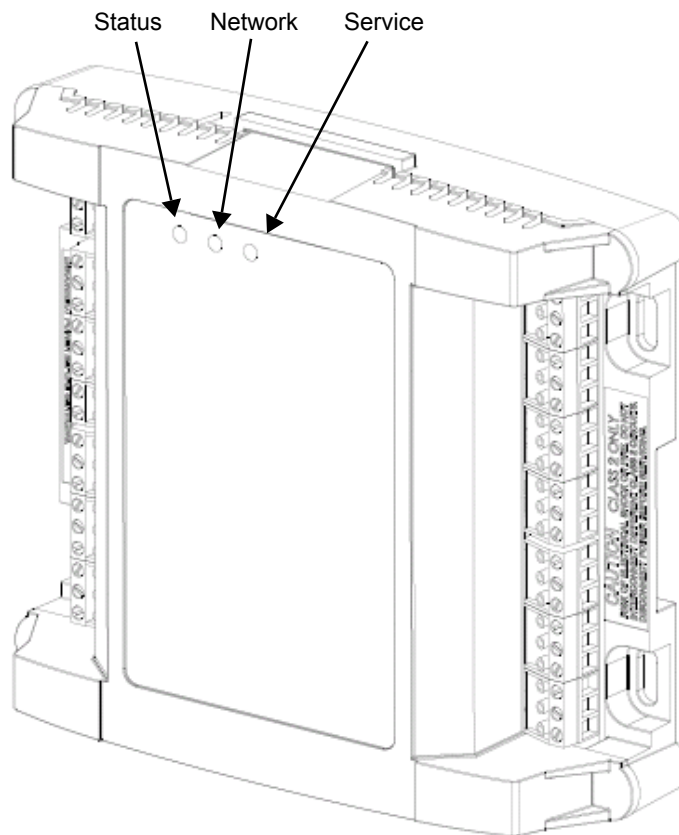
# TROUBLESHOOTING

## 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  | <ul style="list-style-type: none"> <li>– Solid green when running and configured by an LCI (networking)</li> <li>– Flashing green when running and NOT configured by an LCI (stand-alone)</li> <li>– Solid red when a fault condition exists (control shut down)</li> <li>– Blinking Red - the controller has a device failure</li> <li>– Solid Amber - The controller has not received a LCI ping message in over 10 minutes and is part of a network.</li> </ul> |
| Network | <ul style="list-style-type: none"> <li>– Yellow while the controller is transmitting data onto the FTT-10A network</li> <li>– Green when there is network activity</li> <li>– Off when there is no network activity</li> </ul>                                                                                                                                                                                                                                     |
| Service | <ul style="list-style-type: none"> <li>– Illuminated when the service pin is depressed or when a controller gets configured by the LCI.</li> </ul>                                                                                                                                                                                                                                                                                                                 |

**Figure 5: ZXU1 Controller LEDs**



## Troubleshooting Tips

This section describes common issues and how to resolve them.

| 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.                                                                                                                                                                          |
| The Mixing Valve will not open.                                                                                       | There are several reasons the mixing valve will not open, and all should be checked. <ul style="list-style-type: none"> <li>– Is there a valid Heating or Cooling demand?</li> <li>– Is the controller in an occupied mode and is the temp below or above the Unoccupied Setpoints?</li> <li>– Is the RWT below the Boiler Protection setting?</li> </ul> |
| The pilot relays 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.                                                                                                                                               |
| The 10K thermistor reading is at its maximum or minimum.                                                              | The input is either shorted or open.                                                                                                                                                                                                                                                                                                                      |
| The Boiler is not being enabled when there is a demand.                                                               | Has the ZXU1 been associated to the BLM series controller?<br>Is the controller in WWSD?<br>If using the Heating Demand output to enable a non-networked heat source ensure it is properly wired to the heat sources demand input.                                                                                                                        |
| The Chiller is not being enabled when there is a demand.                                                              | Has the Cooling Demand output been properly wired to the cooling source?<br>Ensure the wiring is correct.                                                                                                                                                                                                                                                 |
| Why is my RWT sensor tracking that of the associated BLM series controller?                                           | If associated to a BLM series controller the ZXU1 will use the RWT sensor of the BLM.                                                                                                                                                                                                                                                                     |
| Do I need to populate the OAT sensor when associating to a BLM series controller or if I have an ASM2 on the network. | No, the ZXU1 will use the OAT value of the associated BLM or networked ASM2 controller.                                                                                                                                                                                                                                                                   |

## Getting Help

Components within iWorX® ZXU1 controller cannot be field repaired. If there is a problem with a controller, follow the steps below before contacting your local TES representative or TES technical service.

1. Make sure controllers are connected and communicating to desired devices.
2. Record precise hardware setup indicating the following:
  - Version numbers of applications software.
  - Controller firmware version number.
  - A complete description of difficulties encountered.

### Notes:

## 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.

**TES OFFERS THIS WARRANTY IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY WARRANTY IMPLIED BY LAW INCLUDING**

**WARRANTIES OF MERCHANTABILITY OR FITNESS IS IN EFFECT ONLY FOR THE DURATION OF THE EXPRESS WARRANTY SET FORTH IN THE FIRST PARAGRAPH ABOVE.**

**THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR STATUTORY, OR ANY OTHER WARRANTY OBLIGATION ON THE PART OF TES.**

**TES WILL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS OR ANY INCIDENTAL COSTS OF REMOVING OR REPLACING DEFECTIVE PRODUCTS.**

This warranty gives the purchaser specific rights, and the purchaser may have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts or on the exclusion of incidental or consequential damages, so these limitations or exclusions may not apply to you.

## CONTROLS MADE EASY®

**Taco Electronic Solutions, Inc.**, 1160 Cranston Street, Cranston, RI 02920  
Telephone: (401) 942-8000 FAX: (401) 942-2360.

**Taco (Canada), Ltd.**, 8450 Lawson Road, Unit #3, Milton, Ontario L9T 0J8.  
Telephone: 905/564-9422. FAX: 905/564-9436.

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