



## Installation / Operation Manual

# TEC-3622 Thermostat Zone Controller (Full Color LCD Touchscreen)

## TEC3000 Series Networked and Wireless Proportional Fan Coil and Individual Zone Thermostat Controllers with Dehumidification Capability

Part No. 24-11353-00028, Rev. C  
Issued May 2019

### Quick Start Guide

TEC3322-1x-xxx, TEC3323-1x-xxx, TEC3622-1x-xxx, TEC3623-1x-xxx, TEC3022-1x-xxx, TEC3023-1x-xxx

Refer to the [QuickLIT website](#) for the most up-to-date version of this document.

### North American emissions compliance

#### United States

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and 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 receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

#### Canada

This Class (B) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (B) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### Installation

#### Parts included

- One TEC3000 Series Thermostat Controller with integral mounting base
- One installation instructions sheet

#### Location considerations

For networked models, locate the TEC3000 Series Thermostat Controller:

- On a partitioning wall, approximately 5 ft (1.5 m) above the floor in a location of average temperature, allowing for vertical air circulation to the TEC
- Away from direct sunlight, radiant heat, outside walls, outside doors, air discharge grills, stairwells, and from behind doors
- Away from steam or water pipes, warm air stacks, unconditioned areas (not heated or cooled), or sources of electrical interference
- In a clear path between the integrated passive infrared (PIR) occupancy sensor (if equipped) and the space being monitored



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For wireless models, also locate the thermostat controller:

- Outside of a recessed area, metal enclosure, or shelving unit
- On the same building level as the other wireless devices on the same personal area network (PAN)
- At least 2 in. (51 mm) away from any metal obstruction
- In the direct line of sight to other wireless devices on the same PAN. Signal transmission is best if the path between the TEC3000 and other wireless devices is direct as possible. Line of sight is desirable but not required. See Table 1 for recommended and maximum distances.
- Away from metal and large solid obstructions (including equipment rooms and elevator shafts and concrete or brick walls) between the TEC3000 and the ZFR Pro Router/Repeater or ZFR Pro Coordinator Radio
- Within range of two or more wireless devices on the same PAN. Redundancy in the layout provides the best reliability in wireless installations
- At least 20 ft (6 m) from a microwave oven

For integrated passive infrared (PIR) models, be sure that the thermostat controller is located centrally, where occupant movement is frequent. Ensure that the unit is not blocked by a plastic tamper resistant enclosure (such as the GRD10A-608). The plastic enclosure blocks the occupancy sensing capability.

The use of insulating foam pads is required for installations where wiring passes through the wall to the thermostat.

For wireless models, the effective transmission range and distance for indoor applications vary because of wireless signal absorption and reflection due to metal obstructions, walls or floors, and furniture found in typical building interiors.

**Table 1: Indoor line-of-sight transmission ranges**

Range type	Transmission distance	
	WNC Coordinator Radio, ZFR Pro Repeater	TEC3000 Wireless Thermostat Controller
Recommended	50 ft (15.2 m)	50 ft (15.2 m)
Line of sight, maximum	250 ft (76.2 m)	100 ft (30 m)

**Notes:**

- Allow for sufficient clearance to insert a USB drive into the USB port
- For more details on using ZFR Pro Series communication devices, refer to the *WNC1800/ZFR182x Pro Series Wireless Field Bus System Technical Bulletin (LIT-12012356)*.

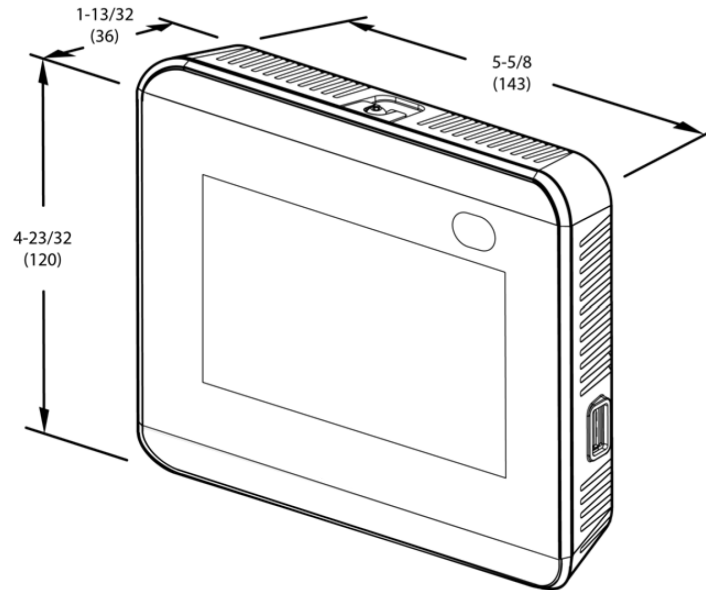
**IMPORTANT:** Only connect memory devices to the USB port. Do not use it for charging external devices.



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Figure 1: Thermostat controller shown without occupancy sensor, dimensions, in. (mm)



#### Installing the thermostat controller

1. Use a 1/16 in. (1.5 mm) Allen wrench or Johnson Controls® T-4000-119 Allen-Head Adjustment Tool (order separately) to remove the security screw if it is installed on the top of the thermostat controller cover as illustrated in Figure 2.
2. Pull the top edge of the cover and open the thermostat controller as illustrated in Figure 2.

**IMPORTANT:** The cover is not secured on the bottom. Be careful not to drop the cover.

**IMPORTANT:** If you are installing more than one thermostat controller, keep track of which cover attaches to which base. The controller version and the base version must match to ensure proper operation.

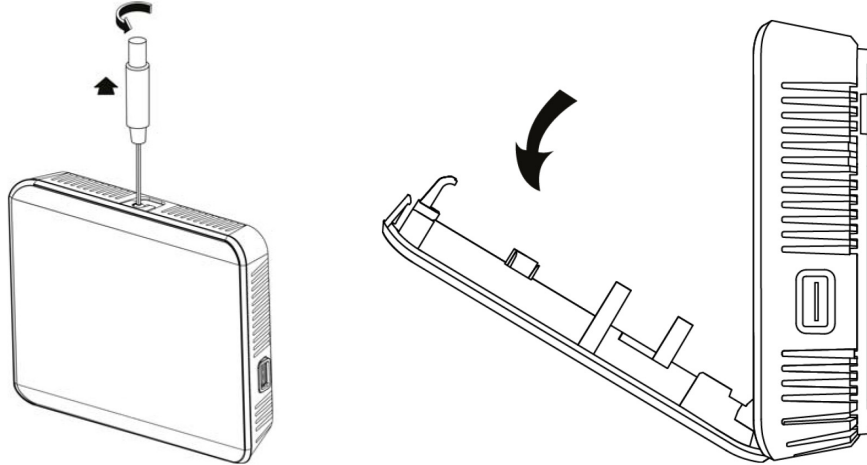
**IMPORTANT:** Use proper Electrostatic Discharge (ESD) precautions during installation and servicing to avoid damage to the electronic circuits of the thermostat controller.



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Figure 2: Removing the security screw from the thermostat controller cover (shown without occupancy sensor) (left) and removing the thermostat controller cover (right)



3. Align the thermostat controller mounting base on the wall with the security screw on the top and use the base as a template to mark the two mounting hole locations. See Figure 3.

**Notes:**

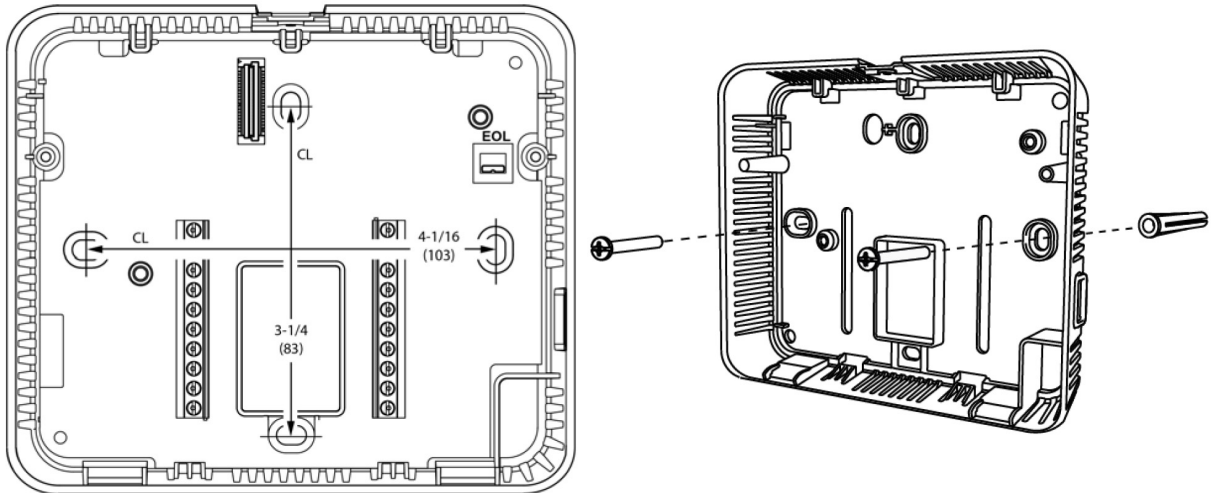
- If you need to install the thermostat controller on an electrical junction box, use 2-1/2 x 4 in. (63 x 101 mm) square boxes with mud ring covers and avoid smaller 1-1/2 x 4 in. (38 x 101 mm) square or 3 x 2 in. (76 x 51 mm) boxes. This procedure ensures that you have enough space for cabling, if needed.
  - For surface-mounted applications, use durable mounting hardware, such as wall anchors, that cannot be easily pulled out of the mounting surface.
4. Pull approximately 6 in. (152 mm) of wire from the wall and insert the wire through the center hole in the thermostat controller mounting base. See Figure 3.
  5. Secure the mounting base to the wall surface using two mounting screws (user supplied) as illustrated in Figure 3.

**Note:** Be careful not to overtighten the mounting screws.

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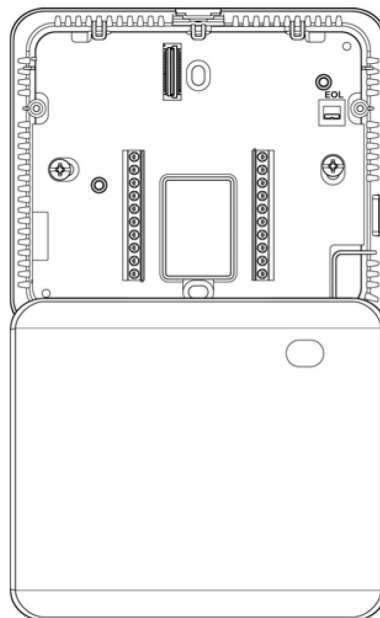
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**Figure 3: Mounting hole locations, dimensions, in. (mm) (left) and securing the thermostat controller mounting base to the wall (right)**



**Note:** When the unit is mounted on the wall, you can hang the front cover on the end of the back cover as illustrated in Figure 4.

**Figure 4: Hanging the thermostat controller front cover**





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### Wiring

When an existing thermostat controller is replaced, remove and label the wires to identify the terminal functions.

#### **CAUTION**

##### **Risk of Electric Shock.**

Disconnect the power supply before making electrical connections to avoid electric shock.

#### **ATTENTION**

##### **Risque de décharge électrique.**

Débrancher l'alimentation avant de réaliser tout raccordement électrique afin d'éviter tout risque de décharge électrique.

#### **NOTICE**

##### **Risk of Property Damage.**

Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

#### **NOTICE**

##### **Risque de dégâts matériels.**

Ne pas mettre le système sous tension avant d'avoir vérifié tous les raccords de câblage. Des fils formant un court-circuit ou connectés de façon incorrecte risquent d'endommager irrémédiablement l'équipement.

**IMPORTANT:** Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the electrical ratings of the TEC3000 Series Thermostat Controller.

**IMPORTANT:** Use proper ESD precautions during installation and servicing to avoid damage to the electronic circuits of the thermostat controller.

To wire the thermostat controller:

1. Strip the ends of each wire 1/4 in. (6 mm) and connect them to the appropriate screw terminals as indicated in Table 2.

**Note:** For more details on wiring the MS/TP Communications Bus, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

2. Attach the communication wires to the terminal block.

**Note:** If multiple wires are inserted into the terminals, be sure to properly twist the wires together before inserting them into the terminal connectors.

3. Carefully push any excess wire back into the wall.

**Note:** Seal the hole in the wall with fireproof material to prevent drafts from affecting the ambient temperature readings.

4. For networked models, set the bus end-of-line (EOL) termination switch to the desired location.



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The bus EOL termination switch allows you to designate the thermostat controller as the end of the Field Controller (FC) Bus and N2 Bus. The default position is OFF. If the thermostat controller is at the end of a daisy chain of devices on the FC Bus and N2 Bus, set the EOL switch to the ON position. See Figure 3.

5. Reattach the thermostat controller cover to the mounting base (bottom side first).

**IMPORTANT:** Make sure you reattach the cover that corresponds to its correct base. The CPU board number needs to match the base board number. Otherwise, an operation error occurs after you reattach a cover and base that do not belong together.

6. Use a 1/16 in. (1.5 mm) Allen wrench or Johnson Controls T-4000-119 Allen-Head Adjustment Tool (order separately) to reinstall the security screw on the top of the thermostat controller cover. See Figure 2 for security screw placement.
7. Remove the protective plastic cover sheet from the display.

**IMPORTANT:** If the display is dirty, **gently** wipe it clean with isopropyl alcohol or ethyl alcohol. Do not scrub hard as to avoid damaging the surface. Do not use other cleaners such as water, ketones, and aromatic solvents, since they may damage the polarizer.

**Notes:**

- For VAV and two-pipe systems, connect the valve to the heating output.
- Only one transformer is required for each TEC.
- Power to the AUX contact comes from the reheat coil.



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**Table 2: Terminal identification (See Figure 5 for wiring diagrams)**

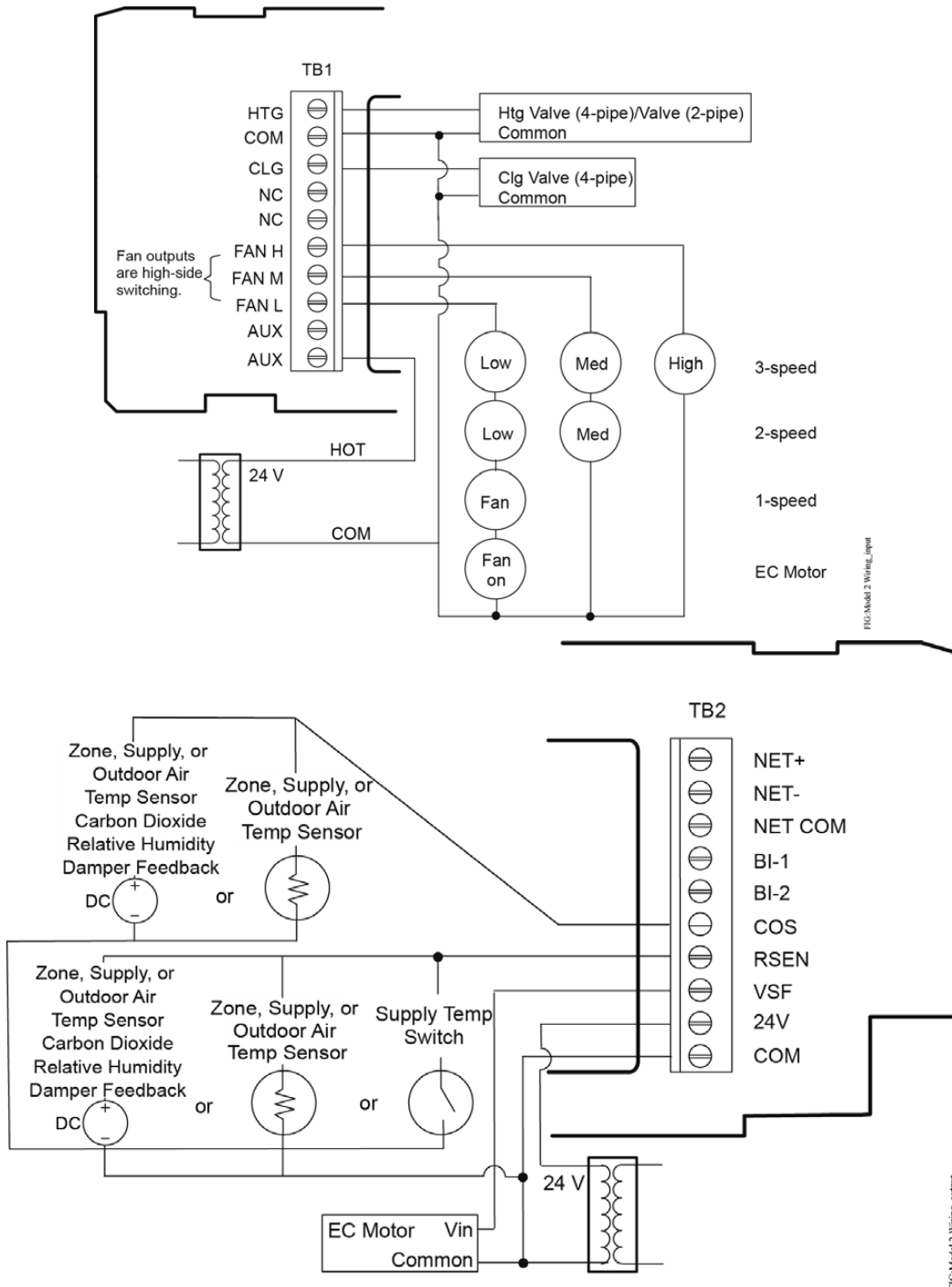
Terminal label	Function		
	TEC3022, TEC3023, Proportional FC/VAV	TEC3322, TEC3323, Proportional FC/VAV	TEC3622, TEC3623 Proportional FC/VAV
<b>24 V</b>	24 VAC hot from transformer		
<b>FAN H</b>	Fan high		
<b>FAN M</b>	Fan medium		
<b>FAN L</b>	Fan low and fan on		
<b>AUX</b>	Auxiliary binary output		
<b>AUX</b>	Auxiliary power		
<b>COM<sup>1</sup></b>	24 VAC common from transformer		
<b>CLG</b>	Cooling command (configurable 0 to 10 V range)		
<b>NC</b>	No connection		
<b>NC</b>	No connection		
<b>HTG</b>	Heating command (configurable 0 to 10 V range)		
<b>RSEN</b>	Configurable analog input 1		
<b>COS</b>	Configurable analog input 2/Changeover binary switch		
<b>COM<sup>1</sup></b>	Common		
<b>VSF</b>	Variable speed fan command (configurable 0 to 10 V range)		
<b>BI-2</b>	Configurable binary input 2		
<b>BI-1</b>	Configurable binary input 1		
<b>NET+</b>	N/A	Not connected	Field bus+ /N2+
<b>NET-</b>	N/A	Not connected	Field bus- /N2-
<b>NET COM</b>	N/A	Not connected	Isolated common for field bus

1. For the networked models, the common terminals, which do not include NET COM, are internally connected and can be used for all inputs and outputs. For the wireless models, the common terminals are connected and can be used for all inputs, outputs, and 24 VAC power.

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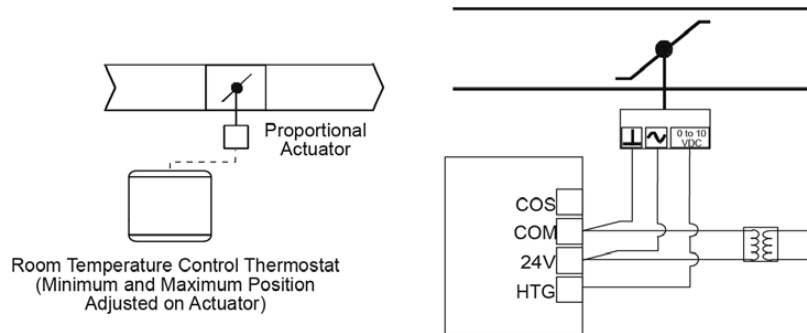
**Figure 5: Proportional wiring diagram (See Table 2 for terminal identification)**



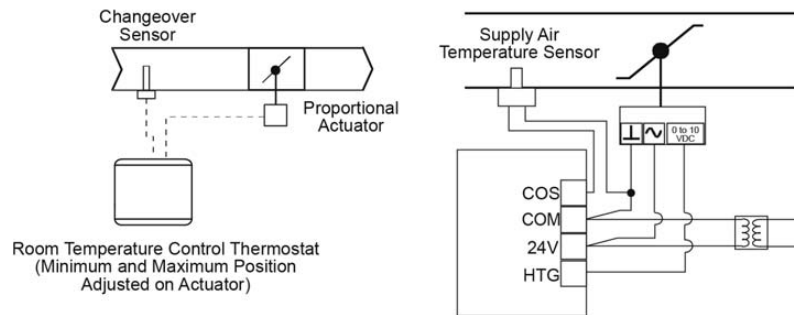
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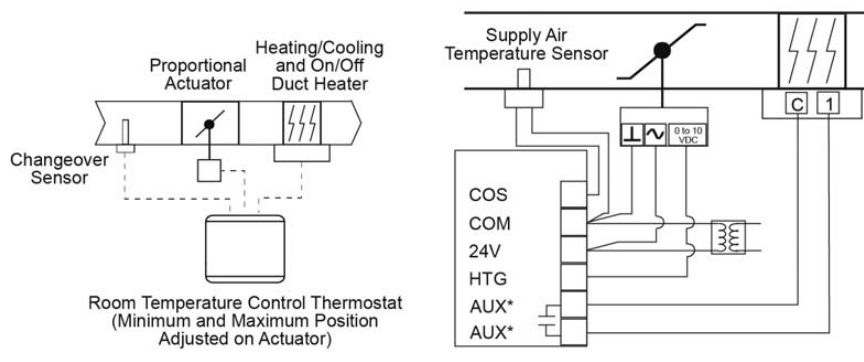
**Figure 6: Proportional 0 to 10 VDC control (pressure-dependent VAV)**



**Figure 7: Proportional 0 to 10 VDC control (pressure-dependent VAV with changeover sensor/switch)**



**Figure 8: Proportional 0 to 10 VDC control (pressure-dependent VAV with changeover sensor/switch and reheat)**

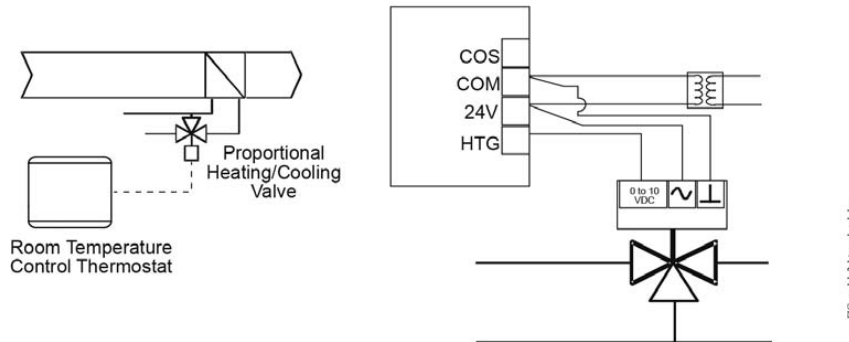


\*The Reheat Installed parameter must be set to True.

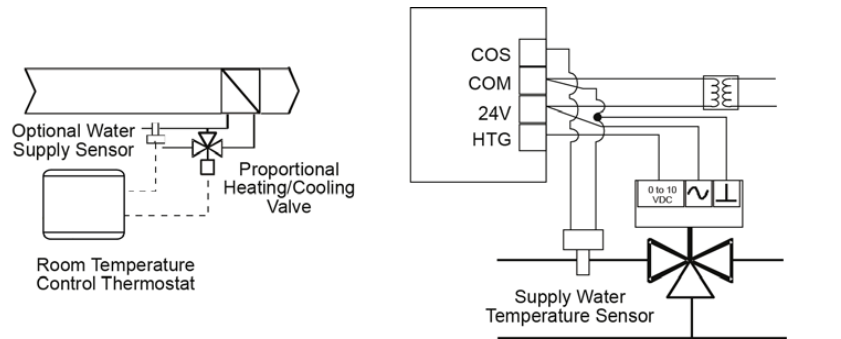
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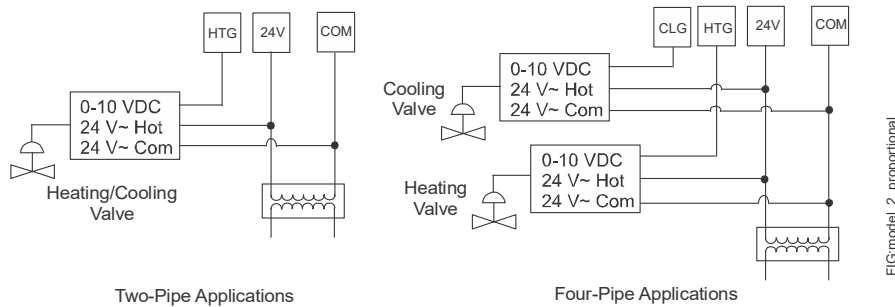
**Figure 9: Floating control two-pipe heating and cooling hydronic valve control fan coil application**



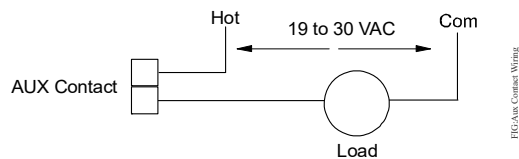
**Figure 10: Floating control two-pipe heating and cooling hydronic valve control with changeover fan coil application**



**Figure 11: Proportional 0 to 10 VDC control (two-pipe and four-pipe fan coil applications)**



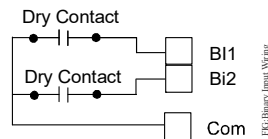
**Figure 12: AUX contact wiring**



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Figure 13: Binary input wiring



### Setup and adjustments

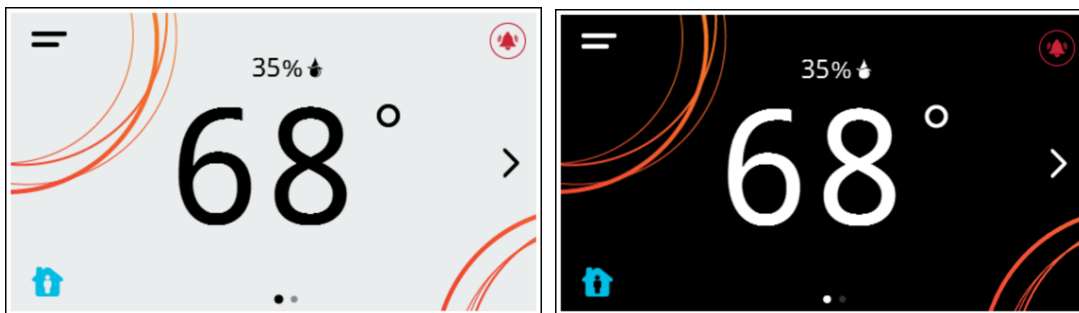
**IMPORTANT:** Table 6 provides a full list of TEC3000 menu settings. Refer to *TEC3000 Series Networked and Wireless Proportional Fan Coil and Individual Zone Thermostat Controllers with Dehumidification Capability Installation Instructions (LIT-12013162)* for step-by-step instructions on how to access and adjust the more commonly used menus.

### Overview

Figure 14 shows the thermostat controller home screen in both the light and dark themes. You can customize it to show or hide various elements from the occupant. See Table 3 for a listing of the touchscreen icons. When screen customization is used in conjunction with a passcode, the building owner can control which options the occupant can access and adjust.

**IMPORTANT:** If lockout levels are used, some icons are hidden. Table 4 provides details of these levels.

Figure 14: Thermostat controller home screen (shown with light and dark themes)



To switch between the modern, classic, light, and dark themes:

1. Press the **Menu** icon.
2. Press **Settings**.
3. Press **Display Settings**.
4. Press **Change Color Theme**.
5. Select one of the four options available.

Multiple pages are available on the display. The page that is currently being viewed is emphasized with a filled dot. The other available page is displayed as an empty dot.

In the modern theme, the cooling, or blue, and heating, or orange, circles show whether the cooling or heating mode is active.

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Figure 15: Thermostat controller home screen in cooling mode (left) and heating mode (right)



### Customizing the home screen

Customizing the Home screen settings include:

- Brightness
- Enable Backlight
- Units
- Time
- Time Zone
- Time Format
- Date
- Date Format

You can also show or hide these items on the Home screen:

- Fan Button
- Temperature
- Humidity
- Off Button
- Hold Button
- Setpoint
- Alarms
- Occupancy Status
- Unit Status
- Date/Time



To customize the Home screen:

1. Press the **Menu** icon.
2. Press **Display Settings**.
3. Enable or disable elements of the home screen as appropriate for the building owner and occupants.
4. Set the passcode on the thermostat controller to prevent the occupants from changing settings that they should not have access to change.

### Touchscreen icons

Table 3 describes the touchscreen icons on the home screen. Press and release a touchscreen icon to activate the TEC. Additional touchscreen icons appear based on the menu, and those icons are also described in Table 3.










Table 3: Touchscreen icons (Part 1 of 4)

Icon and icon name	Description
 <b>Menu</b>	Displays the configuration screens where various settings may be adjusted.
 <b>Alarm</b>	Indicates that the thermostat controller has triggered an alarm.

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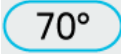









Table 3: Touchscreen icons (Part 2 of 4)

Icon and icon name	Description
 <p style="text-align: center;"><b>Unit Power</b> On    Standby</p>	<p>Powers the thermostat controller on or off.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>This icon disables all equipment control but does not physically power down the unit.</li> <li>On the modern home screen, if the Unit Power icon is in standby mode, the temperature and humidity are also displayed in standby mode to indicate that control off or standby mode is active.</li> </ul>
 <p style="text-align: center;"><b>Humidity</b> On    Standby</p>	<p>Indicates the humidity reading.</p>
 <p style="text-align: center;"><b>Degree</b> On    Standby</p>	<p>Indicates that the unit is set to degrees.</p>
 <p style="text-align: center;"><b>Network Communication (for Networked Models)</b> Network communication    No Signal</p>	<p>Network Communication icon indicates that the thermostat controller detected a supervisory controller and both are online.</p> <p>No icon indicates that the thermostat controller did not detect a supervisory controller.</p>
 <p style="text-align: center;"><b>Radio Signal (For Wireless Models)</b> No Signal    Low Signal    Medium Signal    High Signal</p>	<p>Indicates the strength of the radio signal.</p>
 <p style="text-align: center;"><b>Arrow Up    Arrow Down</b></p>	<p>Increases or decreases the cooling value on the home screen.</p>
 <p style="text-align: center;"><b>Arrow Up    Arrow Down</b></p>	<p>Increases or decreases the heating value on the home screen.</p>
 <p style="text-align: center;"><b>Cooling Hold</b></p>	<p>Indicates that cooling hold mode is enabled. Hold mode is disabled by pressing the button.</p>
 <p style="text-align: center;"><b>Heating Hold</b></p>	<p>Indicates that heating hold mode is enabled. Hold mode is disabled by pressing the button.</p>

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Table 3: Touchscreen icons (Part 3 of 4)

Icon and icon name	Description
 <b>Cooling Setpoint</b>	Displays the current cooling setpoint. Indicates that Hold mode is disabled. To enable Hold mode, press the button.
 <b>Heating Setpoint</b>	Displays the current heating setpoint. Indicates that Hold mode is disabled. To enable Hold mode, press the button.
 <b>Setpoint Temperature</b>	Displays the current setpoint temperature. Indicates that the <b>Show Hold</b> button is set to <b>No</b> .
 <b>Heating Mode</b>	Indicates that heating mode is selected.
 <b>Cooling Mode</b>	Indicates that cooling mode is selected.
 <b>Auto Mode</b>	Indicates that Auto mode is selected.
 <b>Fan Overrides for Single-speed Fans</b> On      Auto      Quiet	Adjusts the fan override between On, Auto, and Quiet for single-speed fans.
 <b>Fan Overrides for Variable-speed Fans</b> On      Auto      Quiet	Adjusts the fan override between On, Auto, and Quiet for variable-speed fans.
 <b>Fan Overrides for Multi-speed Fans</b> Low    Medium    High    Auto    Quiet	Adjusts the fan override between Low, Medium, High, Auto, and Quiet for multi-speed fans.
 <b>Occupancy Status</b> Unoccupied    Occupied    Temporarily Occupied    Standby    Override-Occupied    Override-Unoccupied	Adjusts the occupancy between Unoccupied, Occupied, Temporarily Occupied, Standby, Occupancy Override, Unoccupancy Override.

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**Table 3: Touchscreen icons (Part 4 of 4)**

Icon and icon name	Description
 <b>Back</b>	Moves the display to the previous screen.
 <b>Forward</b>	Moves the display to the next screen.
 <b>Home</b>	Returns the display to the main home screen.
 <b>Save</b>	Saves the current configuration and parameter settings.
 <b>Delete</b>	Deletes the scheduled event.
 <b>Clear</b>	Clears the password entry on the keypad screen.
 <b>Exclamation point</b>	Indicates that an error has occurred.

### **User lockout**

You can select from three different levels of access at the local display to manage functionality through the supervisory controller. This lockout is independent of any display or passcode settings. The existing temporary occupancy capability is unaffected by this feature. User lockout hides the icons that are not operable. The lockout levels are described in Table 4.

**Table 4: User lockout levels**

Lockout level	Capability
<b>State 0</b>	Allows full access to Home Screen Display Adjustments and icons (default).
<b>State 1</b>	Hides the <b>Menu</b> icon.
<b>State 2</b>	Only allows the screen to trigger temporary occupancy. Menu, Unit Power, the Up and Down arrows, and Run/Hold are hidden.

### **Using the USB port**

The USB port allows you to quickly and easily load firmware upgrades, back up the current settings, and restore settings to the TEC3000 by using a USB drive. The TEC3000 can recognize eight configuration files or firmware package files. The USB drive format must be FAT or FAT32. The drive cannot be NTFS format or USB 3.0. If you are upgrading firmware or copying configuration files, you need the passcode if one has been set up. Do not remove the USB drive until the firmware upgrade is complete. The TEC3000 may restart and go offline to the NAE after a firmware upgrade. The upgrade takes approximately three minutes.



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### **Configuring the thermostat controller**

Use the Menu icon on the home screen to access and change the basic operating parameters of the thermostat controller. During normal operation, press the **Menu** icon once to access the following parameters:

- Fault Status
- Setpoints
- Schedule
- Display Settings
- Setup
- Trend
- Status
- Update

### **Installer configuration menu**

The thermostat controller comes from the factory with default settings for all configuration parameters. Before any outputs turn on, the controller must be configured for the equipment connected. You need to start from the home screen to perform any of the following tasks.

#### **Screen reset**

The current screen returns to the home screen and turns off if the current screen is not touched for 3 minutes. Touch the screen to turn it on again. To disable the screensaving option, press **Display Settings** and set **Enable Display Timeout** to **No**.

#### **Selecting the unit type**

There are three unit types. They are:

- Four-pipe—This unit type has both heating and cooling coils plus a supply fan. This configuration can also be used on configurations that are heating or cooling only.
- Two-pipe—This unit type has a single set of pipes that can serve hot or chilled water plus a supply fan. The Supply Temp Type allows for the connection of an analog sensor or an aquastat to a binary input. Based on the water temperature or aquastat state, the unit controls heating or cooling.
- VAV—This unit type is designed for a pressure-dependent zone damper and the supply fan outputs are disabled. The TEC senses the supply air temperature coming from the unit. The Supply Temp Type setting allows for the connection of an analog sensor or binary duct thermostat. Based on the air temperature or duct thermostat state, the zone damper controls for heating or cooling. The TEC does not control the unit delivering the air. The logic needs to be part of another controller.

By default, the thermostat controller is configured for four-pipe fan coil mode.

#### **Configuring the supply fan - fan coil only**

On fan coil units (two-pipe or four-pipe), three different types of supply fans are supported. These are single-speed fans, multi-speed fans (up to three discrete speeds), and VSF using a 0 to 10 V control signal and an optional binary on/off command. Note that fan control is not available when in VAV mode.

For multi-speed fan control, you can adjust the point when the medium or high speed turns on. The fan speed is based on the load of the cooling/heating device, and is a percentage between 0 and 100. By default, the Med Speed On Cmd is 33% and the High Speed On Cmd is 66%. When only two fan speeds are used, you must set the High Speed On Cmd to 100% to disable the third speed.

For VSF control, the output is configurable for any range between 0 V and 10 V. The parameters are Start Voltage, Full Speed Voltage, and Minimum Command. Start Voltage is the voltage output at which the fan begins running, and Full Speed Voltage is the voltage output at which the fan reaches full speed. Minimum Command is the percentage of the range between the Start Voltage and the Full Speed Voltage. The fan does not go below the minimum command when the fan is turned on. By default, the Start Voltage is 2 V, the Full Speed Voltage is 10 V, and the Minimum Command is 20%.

When the variable speed fan is off, the FAN binary output is off and the voltage at the VSF output is 0 V. When the fan turns on, the FAN binary output turns on and the voltage at the VSF output begins controlling the fan. When the VSF is configured for reverse acting mode, when the Start Voltage is above Full Speed Voltage, the VSF output is set to 10 V or the Start Voltage minus 1 V, whichever value is the lesser, when the fan is turned off.



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### **Setting the Control mode**

The Control Mode informs the controller to run in Cooling only, Heating only, or Automatic mode, based on the temperature in the zone relative to the heating and cooling setpoints. Control Mode does not override equipment lockouts or changeover.

### **Setting the Fan mode - fan coil only**

The Fan Mode informs the controller how to handle the fan. There are two options for fan configuration: a Fan Mode available to the installer through the menu system, and a fan override available as an option to the end user from the Fan icon on the home screen. See [Customizing the home screen](#) for information on enabling and disabling end-user controls. The Fan Mode available to the installer is dependent on the fan type. The following options are provided for single- and variable-speed fans:

- On—Fan is continuously on
- Auto—Fan cycles on demand with the controller entering cooling, heating, or dehumidification modes
- Smart—Fan cycles on demand with the controller entering cooling or heating modes during unoccupied periods but is continuously running during occupied and standby periods

The following Fan Mode options are provided for multi-speed fans:

- Low—Fan is continuously on low
- Medium—Fan is continuously on medium
- High—Fan is continuously on high
- Auto—Fan cycles on demand with the controller entering cooling, heating, or dehumidification modes
- Smart—Fan cycles on demand with the controller entering cooling or heating modes during unoccupied periods but is continuously running during occupied and standby periods

The Fan Override icon on the home screen is dependent on the fan type. The following options are provided for single- and variable-speed fans:

- On—Overrides the fan to be continuously on
- Auto—Follows the behavior set as Fan Mode
- Quiet—Follows the behavior set as Fan Mode, but prevents the fan from ever going above minimum speed. The Quiet option has no effect on equipment with single-speed fans.

The following Fan Override options are provided for multi-speed fans:

- Low—Fan is continuously on low
- Medium—Fan is continuously on medium
- High—Fan is continuously on high
- Auto—Follows the behavior set as Fan Mode
- Quiet—Follows the behavior set as Fan Mode, but prevents the fan from ever going above minimum speed

### **Configuring the zone space or equipment size**

With non-binary outputs, the TEC3000 is configured by default to have a slower temperature response for larger zones with normal-sized equipment. In installations with small zones and oversized equipment, set the Equipment Size parameter to Oversized.

### **Changeover**

Pressure-Dependent VAV systems and two-pipe fan coils require changeover detection in order to switch seasonal operation between heating and cooling modes. The TEC supports the following methods for changeover: automatic changeover using an analog sensor (thermistor), automatic changeover using a binary switch, or remote changeover from a BAS and manual changeover.



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For automatic changeover, a supply temperature sensor or switch must be connected to the Changeover Sensor (COS) input of the TEC. Changeover Mode must be set to Auto, and Supply Temp Type must be set for Analog Sensor, Cooling N.C. (cooling when switch is closed), or Heating N.C. (heating when switch is closed). When an analog sensor is used, the changeover setpoint can be adjusted. The changeover logic applies a 10-degree Fahrenheit differential to the setpoint. The system switches to cooling mode when the temperature drops below the changeover setpoint and remains in cooling mode until the measured temperature has risen 10 degrees above the changeover setpoint.

You need to ensure that the Supply Temp type is set to Analog Sensor. The Changeover Mode is also exposed to the BAS through the CGOVR-MODE and can be commanded from the BAS.

On two-pipe or VAV systems without an automatic changeover, or on four-pipe systems, you can use RSEN or COS as a monitor-only point for reading an analog sensor. By setting the controller in four-pipe mode, or selecting Heating or Cooling for Changeover Mode, the controller defaults to monitor-only mode for RSEN or COS and exposes the value to the network as the supply temperature.

### **Dehumidification control - fan coil only**

The TEC3000 controller support dehumidification control on fan coil devices under three configurations:

- Four-pipe fan coil
- Four-pipe fan coil with reheat
- Two-pipe fan coil (with changeover in cooling mode) with reheat

For optimal dehumidification performance, a 4-pipe unit with floating/incremental or 0 to 10 V control and a multi-speed or variable-speed fan is recommended.

Dehumidification operates when the zone humidity increases above the zone humidity setpoint and the controller is in the Idle or Cooling state. Dehumidification does not operate during heating and stops if the zone temperature drops below the heating setpoint. When dehumidification is active, the cooling device controls to the humidity setpoint, and the heating device reheats the zone in order to keep the temperature at the cooling setpoint. While in the dehumidification mode, a multi-speed or variable-speed fan runs at the lowest possible speed to maximize condensation and moisture removal across the cooling coil.

### **Temperature setpoints**

The thermostat controller provides a flexible setpoint configuration to give power to the building owner while being easy to use by the occupant. In addition to a simple up/down offset adjustment on the home screen for the occupant, there are six temperature setpoints on the TEC. The six temperature setpoints are Cooling and Heating setpoints for Occupied, Unoccupied, and Standby modes.

**Note:** The TEC enforces a 2-degree deadband between heating and cooling setpoints. If a setpoint violates this standard (for example, cooling setpoint is set to 70 with a heating setpoint already set to 70), the opposing setpoint is modified to comply with this deadband (in the previous example, the heating setpoint would automatically change to 68).



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The four modes of setpoint operation are described in Table 5.

**Table 5: Setpoint operation**

Mode of setpoint operation	Details
<b>Occ Setpoint Select = Setpoint Offset and Heat Cool Setpoint Mode = Individual Setpoints</b>	This is the default mode and the original mode of operation that the TEC was released with (the next three modes are new). In this mode, the TEC has a heating setpoint and a cooling setpoint. There is a common Setpoint Offset (warmer/cooler adjust) that is applied to each setpoint simultaneously. The range of setpoint adjustment is two-fold: <ul style="list-style-type: none"> <li>• There are large constant ranges bounding the individual heating and cooling setpoints.</li> <li>• There is also a smaller configurable range limit set to the Setpoint Offset point (<b>Control Setup &gt; General &gt; Max Setpoint Offset</b>).</li> </ul>
<b>Occ Setpoint Select = Min and Max Setpoints and Heat Cool Setpoint Mode = Individual Setpoints</b>	In this mode, the TEC has a heating setpoint and a cooling setpoint. Each setpoint has a configurable range ( <b>Setpoints &gt; Min Cooling Setpoint, Max Cooling Setpoint, Min Heating Setpoint, and Max Heating Setpoint</b> ). The configurable range values are bounded by the larger constant bounds used in Setpoint Offset mode and are constrained in the following manner: Min must be below Max and Heating must be below Cooling, so in order from least to greatest, the values are: Min Heating Setpoint, Max Heating Setpoint, Min Cooling Setpoint, and Max Cooling Setpoint.
<b>Occ Setpoint Select = Setpoint Offset and Heat Cool Setpoint Mode = Common Setpoint</b>	In this mode, the TEC has one setpoint, Common Setpoint, for heating and cooling. There is also a common Setpoint Offset (warmer/cooler adjust) that is only applied to Common Setpoint. Otherwise, this setting works the same as when Occ Setpoint Select = Setpoint Offset and Heat Cool Setpoint Mode = Individual Setpoints.
<b>Occ Setpoint Select = Min and Max Setpoints and Heat Cool Setpoint Mode = Common Setpoint</b>	In this mode, the TEC has one setpoint, Common Setpoint, for heating and cooling. There is a configurable range for Common Setpoint, Min Setpoint, and Max Setpoint.

### Scheduling (for all models)

The occupancy schedule comes from either the weekly scheduler built into the TEC or as an input from the BAS. The Schedule Source must be selected to tell the controller where to read the occupancy source from.

### Setting the local schedule

A weekly occupancy schedule with up to four occupancy events for each day can be set locally on the TEC and operate independently of a supervisor. See [Scheduling \(for all models\)](#) to ensure the schedule source is set to Local.

**IMPORTANT:** Internally, the TEC3000 uses a BACnet schedule where daily schedules are independent of the previous and next days. The default occupancy of the TEC3000 from the factory is set to Occupied. As a result, a daily event at 12:00 AM must be scheduled if you do not want the controller to transition to Occupied Mode at midnight.

### Overriding the occupancy mode

The TEC supports a manual override of all other schedule sources (for example, Schedule, Occupancy BI, and temporary occupancy).

### Enabling optimal start

The TEC supports an advanced optimal start algorithm. The algorithm works in conjunction with a local schedule to pre-heat or pre-cool the zone before scheduled occupancy periods begin, in order to bring the zone to the desired occupied setpoint when the scheduled occupancy period begins. Occupant comfort is ensured while automatically minimizing energy usage. This algorithm creates a model of the zone being controlled and automatically determines when to start the equipment before the scheduled transition to Occupied. The start time automatically adjusts daily to minimize the time between reaching setpoint and entering Occupied state.

**Note:** Optimal Start does not work when the schedule source is set to External.



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### **Enabling the motion sensor (TEC3x23 Models)**

By default on models with integral motion sensing capability, the motion sensor is enabled with a default timeout of 15 minutes from the last detection of motion in the zone. On models without an integrated sensor, the default timeout is still 15 minutes, but it only is applied when one of the two configurable binary inputs is set to be a motion sensor (see [Configurable Binary Inputs](#) for information on configuring the binary inputs). To disable motion sensing capabilities, set the Motion Sensor Timeout to 0 minutes.

### **Menus and submenus**

In the following table, the \* indicates that the menus depend on your configuration.

**Table 6: Menus and submenus (Part 1 of 5)**

Level 1	Level 2 (LCD screen name)
<b>Setpoints</b>	Occupied Cooling
	Occupied Heating
	Unoccupied Cooling
	Unoccupied Heating
	Standby Cooling
	Standby Heating
	Dehumidification*
	Occ Setpoint Select
	Heat Cool Setpoint Mode
	Max Heating Setpoint*
	Min Heating Setpoint*
	Max Cooling Setpoint*
	Min Cooling Setpoint*
	Max Setpoint*
Min Setpoint*	
<b>Scheduling</b>	<b>Schedule Options</b>
	Set Schedule
	Optimal Start Enable
	Temp Occ Duration
	Motion Sensor Timeout
	Manual Occupancy Mode
	Schedule Source
<b>Display Settings</b>	Passcode Enabled
	Passcode*
	Brightness Setting
	Enable Backlight Timeout



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**Table 6: Menus and submenus (Part 2 of 5)**

Level 1	Level 2 (LCD screen name)
Display Settings (Cont)	Units
	Time
	Time Zone
	Set Time Format
	Date
	Set Date Format
	Language
	Show Fan Button on Home
	Show Temp on Home
	Show Humidity on Home
	Show Off Button on Home
	Show Hold Button
	Show Setpoint on Home
	Show Alarms on Home
	Show Occ Status
Show Unit Status	
Show Date/Time	
Setup	<b>General Control Setup</b>
	Control Mode
	Unit Enable
	Fan Mode*
	Max Setpoint Offset
	Fan On Delay*
	Fan Off Delay*
	Frost Protection
	Dehum Enable*
	Aux Mode
	Load Shed Rate Limit
	Load Shed Adjust
	Fan Alarm Delay
	Fan Alarm Action*
	Fan Alarm Reset*
	Fan Runtime Limit
	Fan Runtime Reset*
	Supply Air Temperature Alarm Offset
	Supply Air Temperature Alarm Delay*
	Unocc Low Speed Fan
	<b>Inputs</b>
	BI1 Config
	BI2 Config
Supply Temp Sensor*	



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**Table 6: Menus and submenus (Part 3 of 5)**

Level 1	Level 2 (LCD screen name)
Setup (Cont)	Supply Temp Offset*
	Zone Temp Sensor*
	Zone Temp Offset
	Humidity Offset
	Reset Sensors
	Zone Temp Alarm Enabled (for TEC networked models)
	Zone Temp Low Limit (for TEC networked models)
	Zone Temp High Limit (for TEC networked models)
	<b>Tuning</b>
	Temp Control Setup
	Reset PID Tuning
	Deadband*
	Auto Economizer Tuning
	Heat Prop Band*
	Heat Integral Time*
	Heat Process Range*
	Heat Saturation Time*
	Heat Time Constant*
	Heat Process Dead Time*
	Heat Period*
	Cool Prop Band*
	Cool Integral Time*
	Cool Process Range*
	Cool Saturation Time*
	Cool Time Constant*
	Cool Process Dead Time*
	Cool Period*
	Econ Prop Band*
	Econ Integral Time*
	Econ Process Range*
	Econ Saturation Time*
	Econ Time Constant*
	Econ Process Dead Time*
	Econ Period*
	Equipment Size
	<b>Network Setup</b>
	FC Comm Mode
	BACnet Instance ID*
	N2 Address* (for networked models)
	BACnet Address*
MSTP Baud Rate* (for networked models)	



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**Table 6: Menus and submenus (Part 4 of 5)**

Level 1	Level 2 (LCD screen name)
<b>Setup (Cont)</b>	BACnet Encoding Type
	BACnet/MSTP Communication Mode
	Pan ID (for wireless models)
<b>Equipment Setup</b>	<b>General</b>
	Unit Type
	Valve Open Voltage
	Valve Closed Voltage
	Unoccupied Off Delay
	<b>Supply Fan</b>
	Supply Fan Type*
	Start Voltage*
	Full Speed Voltage*
<b>Equipment Setup (Cont)</b>	Minimum Command*
	Medium Speed On Cmd*
	High Speed On Cmd*
	<b>Reheat</b>
	Reheat Installed
	Reheat Min Damper Pos*
	Reheat Fan Required*
	<b>Changeover</b>
	Changeover Mode*
	Supply Temp Type*
	Changeover Setpoint*
	Supply Temp Sensor*
	Supply Temp Offset*
	<b>Trend</b>
EFF-SETPOINT	
EFF-ZNH	
B1 Status	
B2 Status	
EFF-OAT	
EFF-SAT	
FANSPD-S	
HTG-O	
CLG-O	
<b>System Status</b>	
	Unit Status
	Supply Air Temperature
	Changeover State
	Zone Temp Source



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**Table 6: Menus and submenus (Part 5 of 5)**

Level 1	Level 2 (LCD screen name)
<b>Control Status</b>	Cooling % Command
	Heating % Command
	Reheat % Command
	Cool Stage 1
	Heat Stage 1
	Reheat Stage 1
	Fan % Command
	Fan
<b>Controller Info</b>	Model Name
	Software Version
	Unit Name
	Device Name
	Device Description
<b>Commissioning</b>	Supply Air Temperature
	Heat Command
	Cool Command
	Supply Fan
	Aux
<b>Update</b>	View Version
	Load Firmware
	Restore*
	Backup*
<b>Network Status (for wireless models)</b>	Radio Code Version
	Radio PAN ID
	Active Channel
	Signal Strength
	Connection Status
	Network State
	IEEE Address
	Short Address



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### Troubleshooting

Table 7: Fault list (Part 1 of 3)

Faults	Probable causes	Solutions
<b>Remote Zone Temp Fail</b>	The External Zone Temperature sensor has been disconnected or has failed.	<ol style="list-style-type: none"> <li>1. Check the wiring of the sensor.</li> <li>2. If intentionally disconnected, reset sensors through the menu.</li> <li>3. If the problem persists, order replacement units and return the affected devices to Johnson Controls under the RMA program.</li> </ol>
<b>Supply Temp Fail</b>	The External Supply Temperature sensor has been disconnected or has failed.	<ol style="list-style-type: none"> <li>1. Check the wiring of the sensor.</li> <li>2. If intentionally disconnected, result fault by entering the menu, enter Control Setup, and select Inputs to reset the sensors.</li> <li>3. If the problem persists, order replacement units and return the affected devices to Johnson Controls under the RMA program.</li> </ol>
<b>Internal Sensor Fail</b>	An internal sensor has failed on the TEC.	Order replacement units and return the affected devices to Johnson Controls under the RMA program.
<b>Dehum Unavailable</b>	Dehumidification is unavailable because the zone humidity sensor has failed or the humidity reading is not reliable.	<ol style="list-style-type: none"> <li>1. If the source of zone humidity was a BAS, check the BAS to ensure that it is still online and is providing the TEC with the humidity reading. If removal of the BAS mapping was intentional, reset the sensors through the menu.</li> <li>2. (For all models) If the problem persists, order replacement units and return the affected devices to Johnson Controls under the RMA program.</li> </ol>
<b>Service</b>	Equipment connected to the BI configured for a Service alarm is triggering the alarm.	Service the equipment by way of the manufacturer's recommendation.
<b>Dirty Filter</b>	Equipment connected to the BI configured for a Dirty Filter alarm is triggering the alarm.	Replace the filter in the equipment as explained in the manufacturer's instructions.
<b>Calibration Corrupt</b>	Factory calibration data is lost or is not installed.	Order replacement units and return the affected devices to Johnson Controls under the RMA program.
<b>Changeover Fail</b>	The Supply Temperature Sensor is not installed, has failed, or has been disconnected and the TEC can no longer detect changeover mode to cool or heat.	Follow the same steps as Supply Temp Fail alarm.
<b>Zone Temp Unreliable</b>	All sources of zone temperature are unreliable, including the onboard sensor.	Order replacement units and return the affected devices to Johnson Controls under the RMA program.
<b>Open Window</b>	The switch connected to the BI configured for Open Window is sensing that the window is opened, and control has shut down.	<ol style="list-style-type: none"> <li>1. Close the window to resume control.</li> <li>2. Check sensor functionality with an ohmmeter, and verify the wiring to the TEC.</li> <li>3. Order replacement units and return the affected devices to Johnson Controls under the RMA program.</li> </ol>



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**Table 7: Fault list (Part 2 of 3)**

Faults	Probable causes	Solutions
<b>Fan Lock</b>	The switch connected to the BI configured for Fan Lock did not sense airflow within 10 seconds of starting the fan, and control has been shut down.	<ol style="list-style-type: none"> <li>1. Inspect equipment to ensure fan functions.</li> <li>2. Check sensor functionality with an ohmmeter, and verify wiring to the TEC.</li> <li>3. Reset fault by entering the menu, selecting Fault Status, and selecting the Fan Lock.</li> <li>4. Order replacement units and return the affected devices to Johnson Controls under the RMA program.</li> </ol>
<b>Humidity Unreliable</b>	The zone humidity reading was reliable and has now failed.	<ol style="list-style-type: none"> <li>1. If the source of zone humidity was the onboard sensor, contact Johnson Controls product sales and support.</li> <li>2. If the source of zone humidity was a BAS, check the BAS to ensure that it is still online and providing the TEC with the humidity reading. If removal of the BAS mapping was intentional, reset sensors through the menu.</li> </ol>
<b>Controller Fault</b>	The controller has detected an internal fault that it cannot recover.	Order replacement units and return the affected devices to Johnson Controls under the RMA program.
	An unknown error has prevented the controller from turning on.	Order replacement units and return the affected devices to Johnson Controls under the RMA program.
<b>Touchscreen Unavailable</b>	The touchscreen components have failed to initialize.	<ol style="list-style-type: none"> <li>1. Reboot the controller.</li> <li>2. If problems persist, order replacement units and return the affected devices to Johnson Controls under the RMA program.</li> </ol>
<b>Board Mismatch</b>	The baseboard and CPU board are paired incorrectly. An error message appears on the TEC indicating the model number of the baseboard and CPU board.	Match the baseboard to its corresponding CPU board.
<b>Firmware Mismatch</b>	The previous upgrade has not completed.	<ol style="list-style-type: none"> <li>1. Upgrade the TEC3000 to the latest released version.</li> <li>2. Upgrade the TEC3000 to the current version again.</li> </ol>
	The previous downgrade has not completed because the previous version is no longer supported.	Reboot the TEC3000 to clear the fault.
<b>USB Malfunction</b>	A USB drive has malfunctioned and drawn more than the maximum allowed current.	<ol style="list-style-type: none"> <li>1. Attempt to insert and use the USB drive again.</li> <li>2. Try a new USB drive.</li> <li>3. If problems persist, order replacement units and return the affected devices to Johnson Controls under the RMA program.</li> </ol>
<b>Supply Fan Runtime Limit Extended</b>	The Supply Fan Runtime has exceeded the configured Supply Fan Runtime Limit.	<ol style="list-style-type: none"> <li>1. Service the Supply Fan.</li> <li>2. Reset the Supply Fan runtime.</li> </ol>
<b>Heating Ineffective</b>	The Supply Air Temperature has not increased above the configured Supply Air Temperature Alarm Offset while heating has been active for at least the Supply Air Temperature Alarm Delay.	Verify that the heating elements on the rooftop are functioning properly.



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**Table 7: Fault list (Part 3 of 3)**

Faults	Probable causes	Solutions
<b>Cooling Ineffective</b>	The Supply Air Temperature has not decreased below the configured Supply Air Temperature Alarm Offset while cooling has been active for at least the Supply Air Temperature Alarm Delay.	Verify that the cooling elements on the rooftop are functioning properly.
<b>Supply Fan Fault</b>	The Supply Fan Status configured for either B11 or B12 has not proved within the configured Fan Alarm Delay.	<ol style="list-style-type: none"> <li>1. Verify that the Supply Fan is operating when turned on.</li> <li>2. Verify that the Supply Fan Status wiring is connected correctly.</li> </ol>
<b>Zone Temperature Too Cold</b>	The Zone Temperature has decreased below the configured Zone Temp Low Limit.	Verify that the TEC and the RTU heating are enabled and functioning.
<b>Zone Temperature Too Hot</b>	The Zone Temperature has increased above the configured Zone Temp High Limit.	Verify that the TEC and the RTU cooling are enabled and functioning.

**Table 8: Troubleshooting details<sup>1</sup> (Part 1 of 3)**

Symptom	Probable causes	Solutions
The controller displays <b>Idle</b> with a <b>Unit Status of Cooling Unavailable due to Changeover</b> despite being above cooling setpoint, or with a status of <b>Heating Unavailable due to Changeover</b> despite being below the setpoint.	The two-pipe fan coil/VAV system does not have a changeover sensor and switch connected, or the sensor/switch has failed.	<ol style="list-style-type: none"> <li>1. Check the wiring of the supply temperature sensor/switch.</li> <li>2. Verify that the changeover is set up correctly for the type of sensor attached (sensor or switch).</li> </ol>
	The changeover temperature is sensing a hot supply, but the controller is requesting cooling.	<ol style="list-style-type: none"> <li>1. Verify that the supply is not in heating mode. If it is, nothing can be done from the TEC.</li> <li>2. Check the wiring of the supply temperature sensor or switch.</li> <li>3. Check the placement of the supply temperature sensor or switch.</li> <li>4. Verify that the changeover is set up correctly for the type of sensor attached (sensor or switch).</li> </ol>
	Changeover temperature is sensing a cold supply, but the controller is requesting heating.	<ol style="list-style-type: none"> <li>1. Verify that the supply is not in cooling mode. If it is, nothing can be done from the TEC.</li> <li>2. Check the wiring of the supply temperature sensor or switch.</li> <li>3. Check the placement of supply temperature sensor or switch.</li> <li>4. Verify that the changeover is set up correctly for the type of sensor attached (sensor or switch).</li> </ol>
The controller displays <b>Idle</b> with a <b>Unit Status of Cooling Unavailable due to Control Mode</b> despite being above cooling setpoint, or with a status of <b>Heating Unavailable due to Control Mode</b> despite being below the setpoint.	The Control Mode is set to Cooling Mode, but the controller is requesting heating.	Change the Control Mode to Auto or Heating.
	The Control Mode is set to Heating Mode, but the controller is requesting cooling.	Change the Control Mode to Auto or Cooling.
The controller provides an error when trying to upgrade firmware.	The firmware on the USB drive is below the minimum required version. Error code 1025.	Please use firmware version 3.0.2.xxxx (for networked models) or 2.0.2.xxxx (for wireless models) or higher. A reboot is required to clear the Firmware Mismatch fault that occurs.



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**Table 8: Troubleshooting details<sup>1</sup> (Part 2 of 3)**

Symptom	Probable causes	Solutions
The TEC3000 zone temperature does not change fast enough compared to the measured zone temperature from a verification device (a calibrated sensor).	The TEC3000 is configured by default for larger spaces with normal-sized equipment when a proportional device is active.	Select <b>Control Setup &gt; Tuning &gt; Equipment Size &gt; Oversized</b> .
The zone space temperature increases or decreases too much when the unit is active in unoccupied mode.	The heating and cooling equipment are too big for the unoccupied space.	Decrease the Unoccupied Off Delay parameter from 10 minutes to a more appropriate time for the equipment configuration.
The controller provides an error when trying to back up settings.	The USB drive is defective.	Try a different USB drive.
The controller provides an error when trying to restore settings from a backup.	The USB drive is defective.	Try a different USB drive.
	The Restore file is corrupt.	Try restoring a different backup file.
	The Restore file is from an incompatible model TEC.	Ensure that the backup file being restored was from the same model TEC.
The controller is unable to access a USB drive.	The drive is formatted as NTFS or another unsupported format. The TEC supports FAT (for networked models), FAT16 (for wireless models), and FAT32 (for all models) formats only.	Reformat the USB drive, or try a different USB drive with a supported format.
	The USB drive is defective.	Try a different USB drive.
The controller displays <b>Board Mismatch</b> .	The I/O board that the display board is currently attached to does not match the one that initially shipped with the display board.	Attach the display board to the correct I/O board.
	A hardware failure is causing the two boards to incorrectly identify themselves.	Order replacement units and return the affected devices to Johnson Controls under the RMA program.
The controller displays <b>Controller Fault</b> .	An internal fault was detected and the controller was unable to recover.	Order replacement units and return the affected devices to Johnson Controls under the RMA program.
The Bell icon is displayed on the TEC home page.	The fault has been detected on the TEC.	See Table 7 for TEC fault causes and resolution.
<b>Partial Restore Complete</b> is displayed when trying to restore settings from a backup file.	Not all of the items in the backup file have been restored. This error can be caused by a value being out of the minimum or maximum range in the backup file. It may also occur if there are inconsistencies in the reliability of a setting in the backup file and on the TEC device.	<ol style="list-style-type: none"> <li>1. Create a Backup file on a USB drive for the TEC that is showing the issue.</li> <li>2. Edit the backup file created in the previous step on a PC to reflect the desired settings.</li> <li>3. Verify that the modified values are within minimum and maximum range in the backup file.</li> <li>4. Restore the settings from the newly edited backup file on the TEC.</li> </ol>
The temperature displayed is lower than the actual room temperature.	Cold air drafts are entering the back of the TEC.	Seal any holes behind the TEC to reduce drafts.
	Air is being forced through the TEC from a nearby vent.	Move the location of the TEC or change the venting to prevent air from being forced through the TEC.
For networked models, the Online icon does not appear for a networked controller.	There is improper field bus wiring.	Refer to the <i>MS/TP Communications Bus Technical Bulletin (LIT-12011034)</i> .



## Installation / Operation Manual

# TEC-3622 Thermostat Zone Controller (Full Color LCD Touchscreen)

**Table 8: Troubleshooting details<sup>1</sup> (Part 3 of 3)**

Symptom	Probable causes	Solutions
For wireless models, Supervisory Status = Offline	The supervisory controller is not communicating with the TEC. The TEC is not mapped to a JCI Supervisory System. The WNC Gateway is not communicating with the TEC.	<ol style="list-style-type: none"> <li>Map the TEC into a JCI Supervisory system.</li> <li>Verify that the PAN's WNC Gateway is online.</li> <li>Add ZFR Pro Routers/Repeaters into the wireless system.</li> </ol>
Some icons are hidden.	Lockout levels are used or the icons are hidden due to the display settings.	See Table 4 for lockout levels and access details.
The touchscreen is unresponsive.	You tap the display or touch the controller within 5 mm of the display when power is applied to the controller.	Reboot the controller. Do not interact with the controller until the home screen displays.
You do not tap the touchscreen, but the display acts as if it is tapped, which causes the display to blink or toggle between screens.		
You need to tap the display at an offset from a touch point to activate the display.		

1. For common MS/TP troubleshooting information, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

### Repair Information

If the TEC3000 Series Thermostat Controller fails to operate within its specifications, replace the unit. For a replacement thermostat controller, contact the nearest Johnson Controls representative.

### Technical specifications

#### **TEC3000 Series Networked And Wireless Proportional Fan Coil And Individual Zone Thermostat Controllers With Dehumidification Capability (Part 1 of 2)**

<b>Power requirements</b>	19 to 30 VAC, 50/60 Hz, 4 VA at 24 VAC nominal, Class 2 or safety extra-low voltage (SELV)
<b>USB port power rating</b>	120 to 250 mA current draw supported
<b>Analog output rating</b>	0 to 10 VDC into 2k ohm resistance (minimum)
<b>Fan relay output rating</b>	19 to 30 VAC, 1.0 A maximum, 15 mA minimum, 3.0 A in-rush
<b>Auxiliary output rating/triac output</b>	19 to 30 VAC, 1.0 A maximum, 15 mA minimum, 3.0 A in-rush
<b>Binary inputs</b>	Dry contact across terminal COM to terminals BI1, BI2, or COS
<b>Analog inputs</b>	Nickel, platinum, A99B, 2.25k ohm NTC, 10k ohm NTC, 10k ohm NTC Type 3 across terminal COM to terminals R SEN or COS
<b>Temperature sensor type</b>	Local digital sensor
<b>Wire size</b>	18 AWG (1.0 mm diameter) maximum, 22 AWG (0.6 mm diameter) recommended
<b>MS/TP network guidelines</b>	<p><b>For wired models:</b> Up to 100 devices maximum for each Network Automation Engine (NAE); 4,000 ft (1,219 m) maximum cable length. Refer to the MS/TP Technical Bulletin for the Metasys, FX, or Verasys® system installed.</p> <p><b>For wireless models:</b> Up to 100 devices maximum for each Network Automation Engine (NAE)</p>
<b>Wireless band (for wireless models)</b>	Direct-sequence spread-spectrum 2.4 GHz ISM bands
<b>Transmission power (for wireless models)</b>	10 mW maximum



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# TEC-3622 Thermostat Zone Controller (Full Color LCD Touchscreen)

### **TEC3000 Series Networked And Wireless Proportional Fan Coil And Individual Zone Thermostat Controllers With Dehumidification Capability (Part 2 of 2 )**

<b>Transmission range (for wireless models)</b>		50 ft (15.2 m) recommended indoor	
		250 ft (76.2 m) line of sight, maximum	
<b>Temperature range</b>	<b>Backlit display</b>	-40.0°F/-40.0°C to 122.0°F/50.0°C in 0.5° increments	
	<b>Heating control</b>	40.0°F/4.5°C to 90.0°F/32.0°C	
	<b>Cooling control</b>	54.0°F/12.0°C to 100.0°F/38.0°C	
<b>Accuracy</b>	<b>Temperature</b>	±0.9°F/±0.5°C° at 70.0°F/21.0°C typical calibrated	
	<b>Humidity</b>	±5% RH from 20 to 80% RH at 50 to 90°F (10 to 32°C)	
<b>Minimum deadband</b>		2F°/1C° between heating and cooling	
<b>Occupancy sensor motion detection (occupancy sensing models)</b>		Minimum of 94 angular degrees up to a distance of 15 ft (4.6 m); based on a clear line of sight	
<b>ambient conditions</b>	<b>Operating</b>	32°F to 122°F (0°C to 50°C); 95% RH maximum, noncondensing	
	<b>Storage</b>	-4°F to 122°F (-20°C to 50°C); 95% RH maximum, noncondensing	
<b>Compliance</b>	<b>BACnet International</b>	BACnet Testing Laboratories™ (BTL) 135-2001 Listed BACnet Advanced Application Controller (B-AAC)	
		<b>United States</b>	UL Listed, File E27734, CCN XAPX, Under UL60730
			<b>Networked models:</b> FCC Compliant to CFR 47, Part 15, Subpart B, Class B
	<b>Canada</b>	UL Listed, File E27734, CCN XAPX7, Under E60730	
		<b>Networked models:</b> Industry Canada, ICES-003	
		<b>Wireless models:</b> Industry Canada (IC) RSS-210; Transmitter identification ZFR1810-1: IC: 279A-WRZRADIO	
	<b>Europe (for networked models only)</b>	CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and the RoHS Directive.	
<b>Australia and New Zealand</b>		RCM Mark, Australia/NZ Emissions Compliant	
<b>shipping weight</b>	<b>Models without occupancy sensor</b>	0.75 lb (0.34 kg)	
	<b>Models with occupancy sensor</b>	0.77 lb (0.35 kg)	

*The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.*

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