TEC3000 Series On/Off or Floating Fan Coil Thermostats Quick Start Guide

Part No. 24-11353-00001 Rev. G

2021-05-04

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.

Warning (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

Industry Canada Statement(s)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage, et
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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, to allow 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 it monitors

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 and Table 2 for the recommended and maximum distances.
- Away from metal and large solid obstructions, that includes equipment rooms and elevator shafts and concrete or brick walls, between the TEC3000 and the ZFR182x or ZFR183x 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 PIR models, make 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 necessary 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 that is found in building interiors.

Note: Allow for sufficient clearance to insert a USB drive into the USB port

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

Table 1: Indoor line-of-sight transmission ranges ZFR182x

Range type	Transmission distance	
	WNC Coordinator Router, ZFR Pro Router/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)

Note: 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).*

Table 2: Indoor line-of-sight transmission ranges ZFR183x

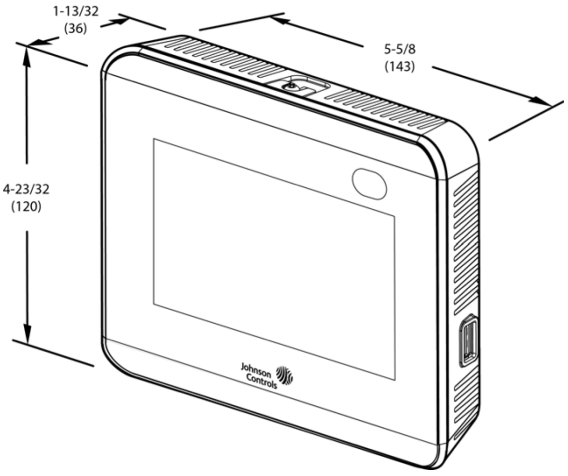
Range type	Transmission distance	
	WRG Coordinator Router, ZFR Pro Router/Repeater	**TEC3000 Wireless Thermostat Controller**
Recommended	250 ft (76.2 m)	250 ft (76.2 m)
Line of sight, maximum	1000 ft (308.4 m)	1000 ft (308.4 m)

Note:

- Actual range depends on the site and installation conditions. See *Technical Documentation* for more information.
- For more details about using ZFR Pro Series communication devices, refer to the *WRG1800/ ZFR183x Pro Series Wireless Field Bus System Technical Bulletin (LIT-12013553).*

Important: ZFR182x Pro Series Wireless System compatible TEC30xx-1x-000 models and ZFR183x Pro Series Wireless System compatible TEC31xx-1x-000 models are not compatible with each other and cannot be used under the same PAN ID (network address).

Figure 1: Thermostat controller shown with occupancy sensor, dimensions, in. (mm)



Installing the thermostat controller

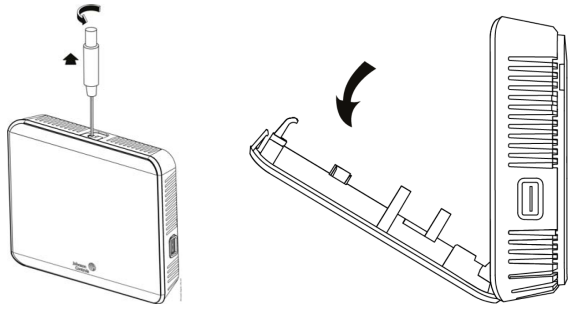
1. Use a 1/16 in. (1.5 mm) Allen wrench or Johnson Controls® T-4000-119 Allen-Head Adjustment Tool (order separately) to remove the security screw if it is installed on the top of the thermostat controller cover as illustrated in Figure 2.
2. Pull the top edge of the cover and open the thermostat controller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

Important: The cover is not secured on the bottom. Do not drop the cover.

Important: If you install 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 correct operation.

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

Figure 2: Removing the security screw and the thermostat controller cover



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.

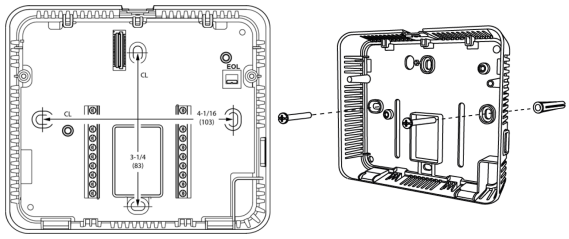
Notes:

- 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.

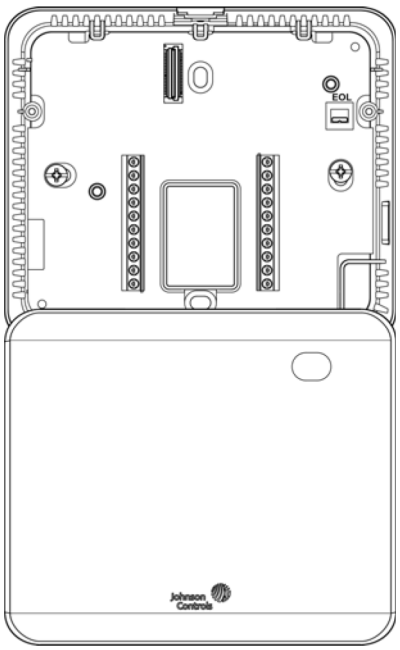
Note: Do not overtighten the mounting screws.

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



Note: When you mount the unit 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



Wiring

About this task: When you replace an existing thermostat controller, remove and label the wires to identify the terminal functions.

WARNING

Risk of Electric Shock

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

AVERTISSEMENT

Risque de décharge électrique

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

CAUTION

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.

ATTENTION

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 correct ESD precautions during installation and servicing to avoid damage to the electronic circuits of the thermostat controller.

To wire the thermostat controller, complete the following steps:

1. Strip the ends of each wire 1/4 in. (6 mm) and connect them to the appropriate screw terminals as indicated in Table 3.
   - **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, make sure to correctly 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.

   You can designate the thermostat controller as the end of the Field Controller (FC) Bus and N2 Bus through the bus EOL termination switch. 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.

Terminal identification

Table 3: Terminal identification (See Wiring diagrams for details)

Terminal label	Function		
	TEC3012, TEC3013, TEC311x Floating FC/ VAV and On/ Off FC[1]	**TEC3312, TEC3313 Floating FC/ VAV and On/ Off FC[1]**	**TEC3612, TEC3613 Floating FC/ VAV and On/ Off FC[1]**
24 V	24 VAC hot from transformer		
FAN H	Fan high		
FAN M	Fan medium		
FAN L	Fan on: single-speed, variable-speed, Fan low: multi-speed		
AUX	Auxiliary binary output		
AUX	Auxiliary power input		
HC/TRI[2]	Cool or heat valve output common		
COM	24 VAC common from transformer		
CLG O	Cool open (Floating), Cooling NC (On/Off), Triac		
CLG C	Cool close (Floating), Cooling NO (On/Off), Triac		
HTG O	Heat open (Floating), Heating NC (On/Off), Triac		
HTG C	Heat close (Floating), Heating NO (On/Off), Triac		
RSEN	Configurable analog input 1		
COS	Configurable analog input 2/Changeover binary switch input		
VSF	Variable speed fan command, configurable 0 VDC to 10 VDC range		
BI-2	Configurable binary input 2		
BI-1	Configurable binary input 1		
NET+	n/a	Not connected	Field bus+/ N2+
NET-	n/a	Not connected	Field bus-/ N2-
NET COM	n/a	Not connected	Isolated common for field bus

1 There is no support for an On and Off VAV.

2 HC/TRI on TB1 must be jumpered to COM on TB2 for low-side switching or to 24 VAC on TB2 for high-side switching.

Wiring diagrams

See Table 3 for terminal identification.

Figure 5: Low-side switching on/off wiring diagram

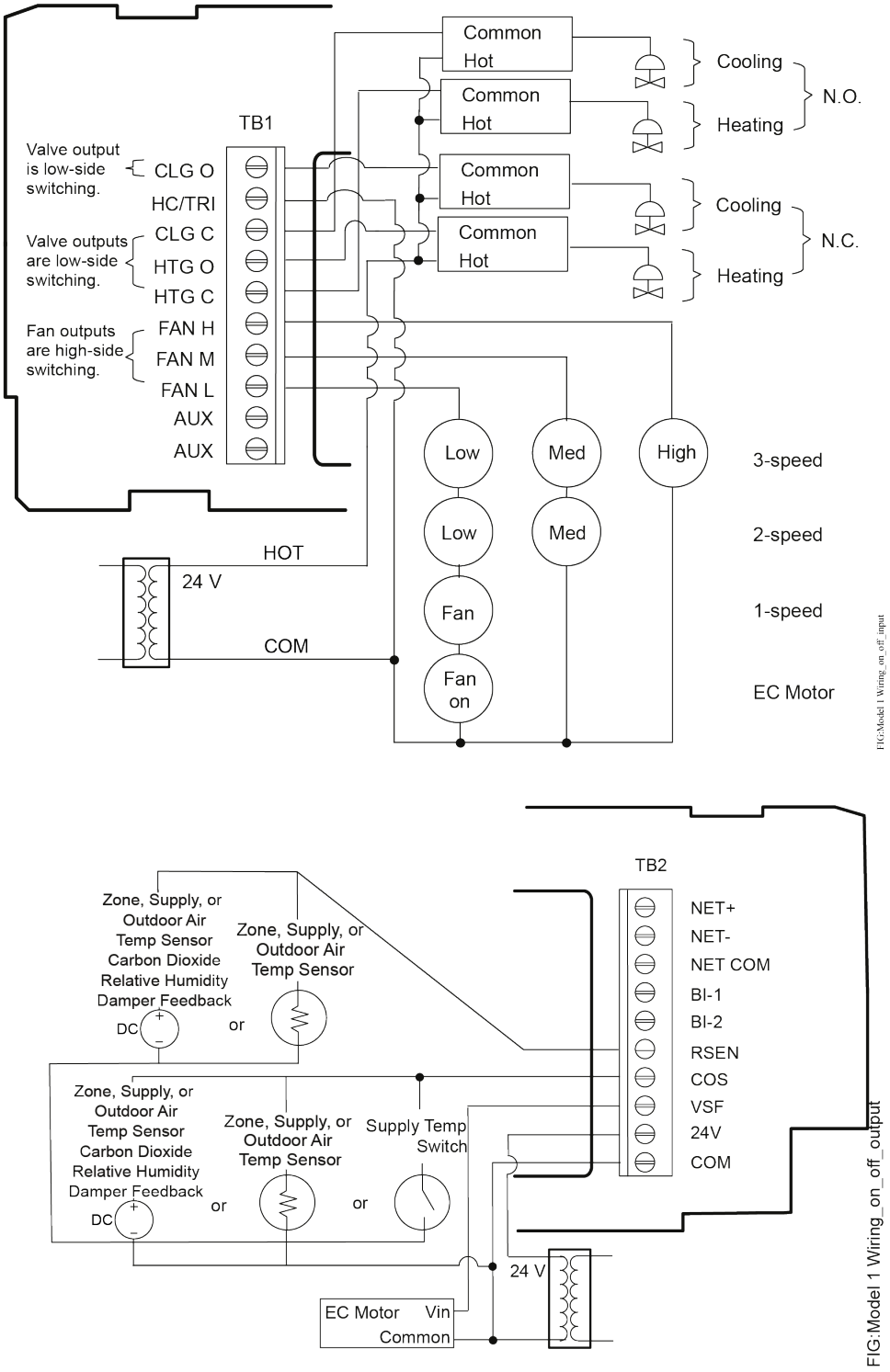


Figure 6: High-side switching on/off wiring diagram

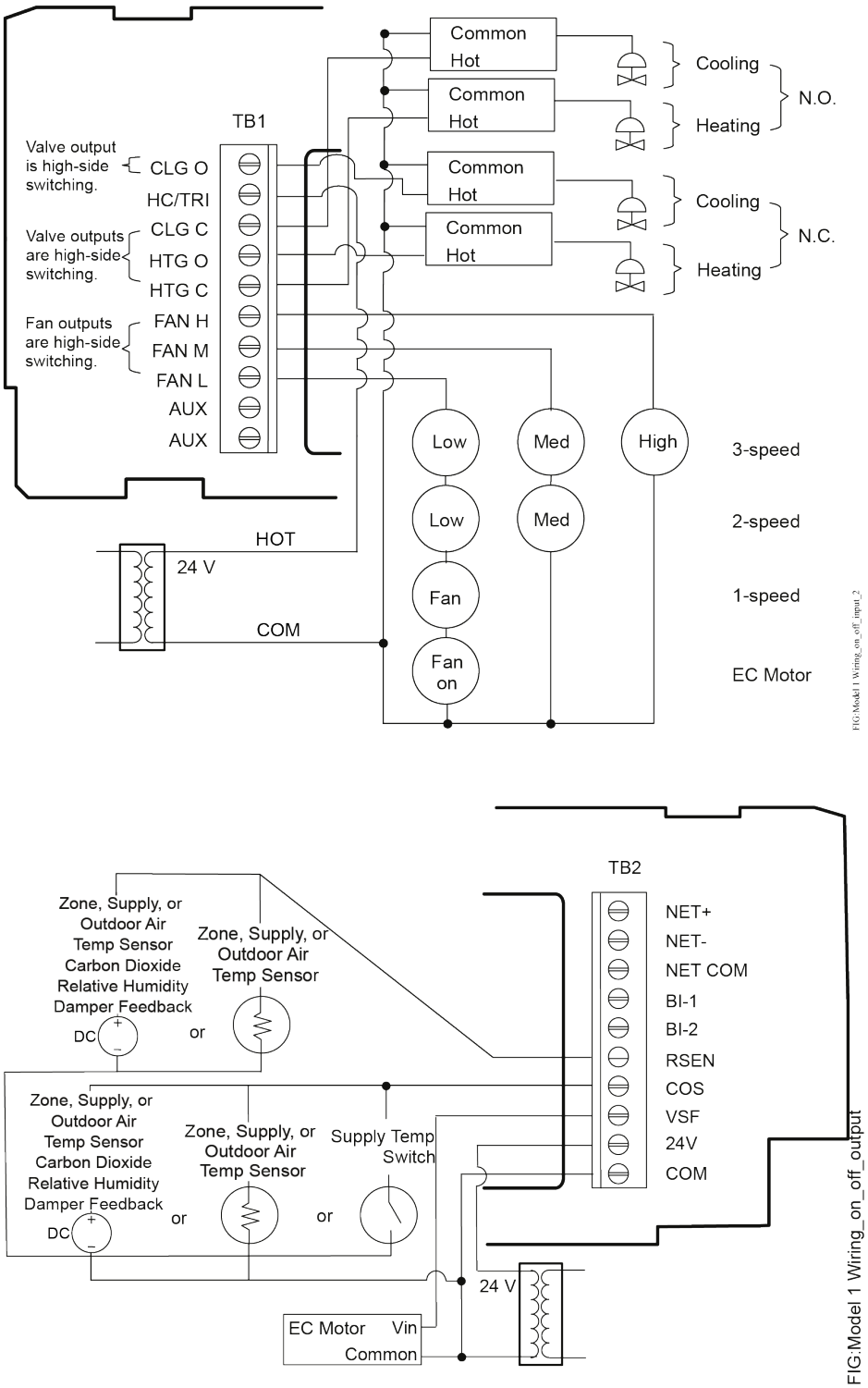


Figure 7: Low-side switched floating wiring diagram

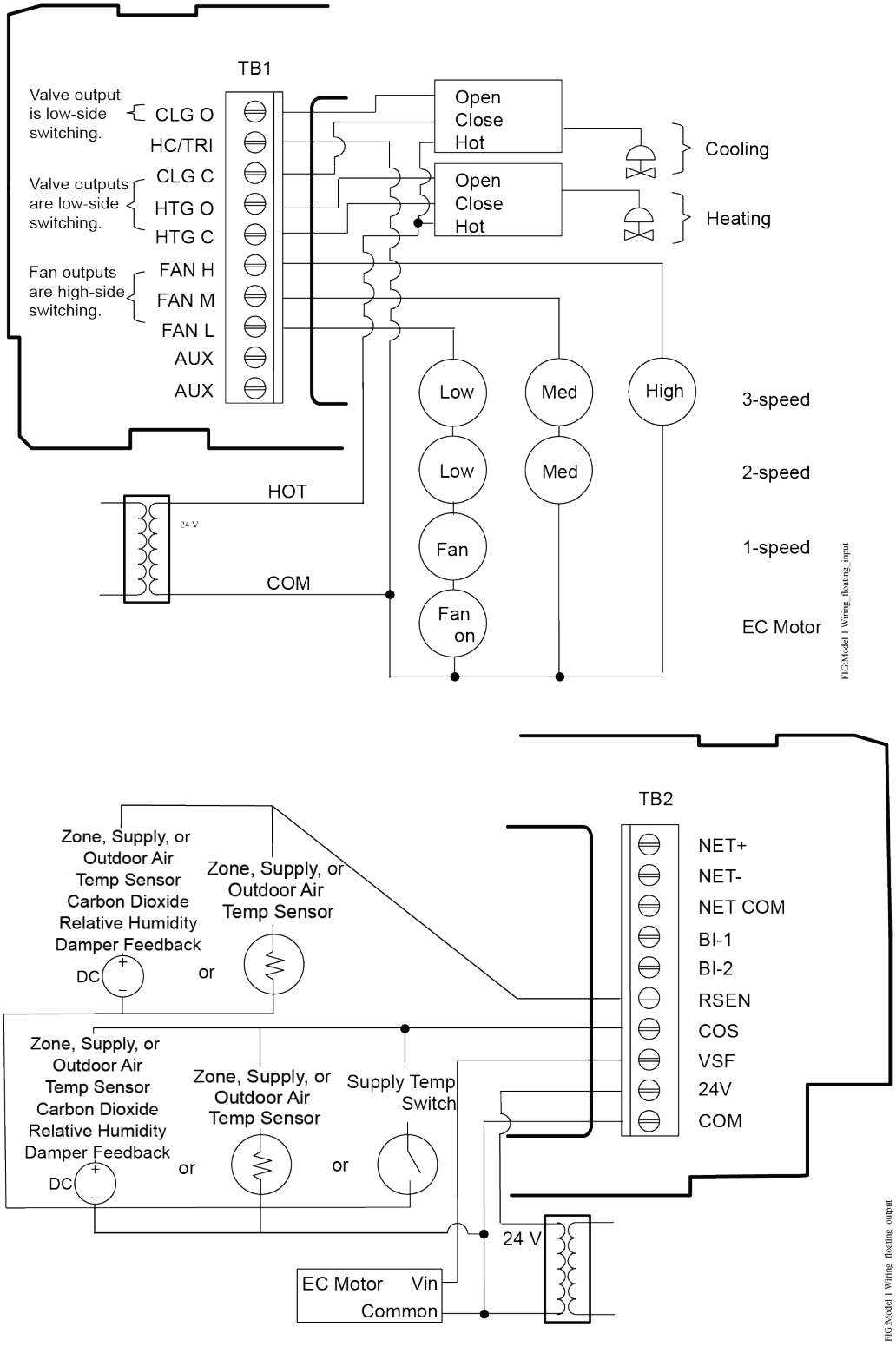


Figure 8: High-side switched floating wiring diagram

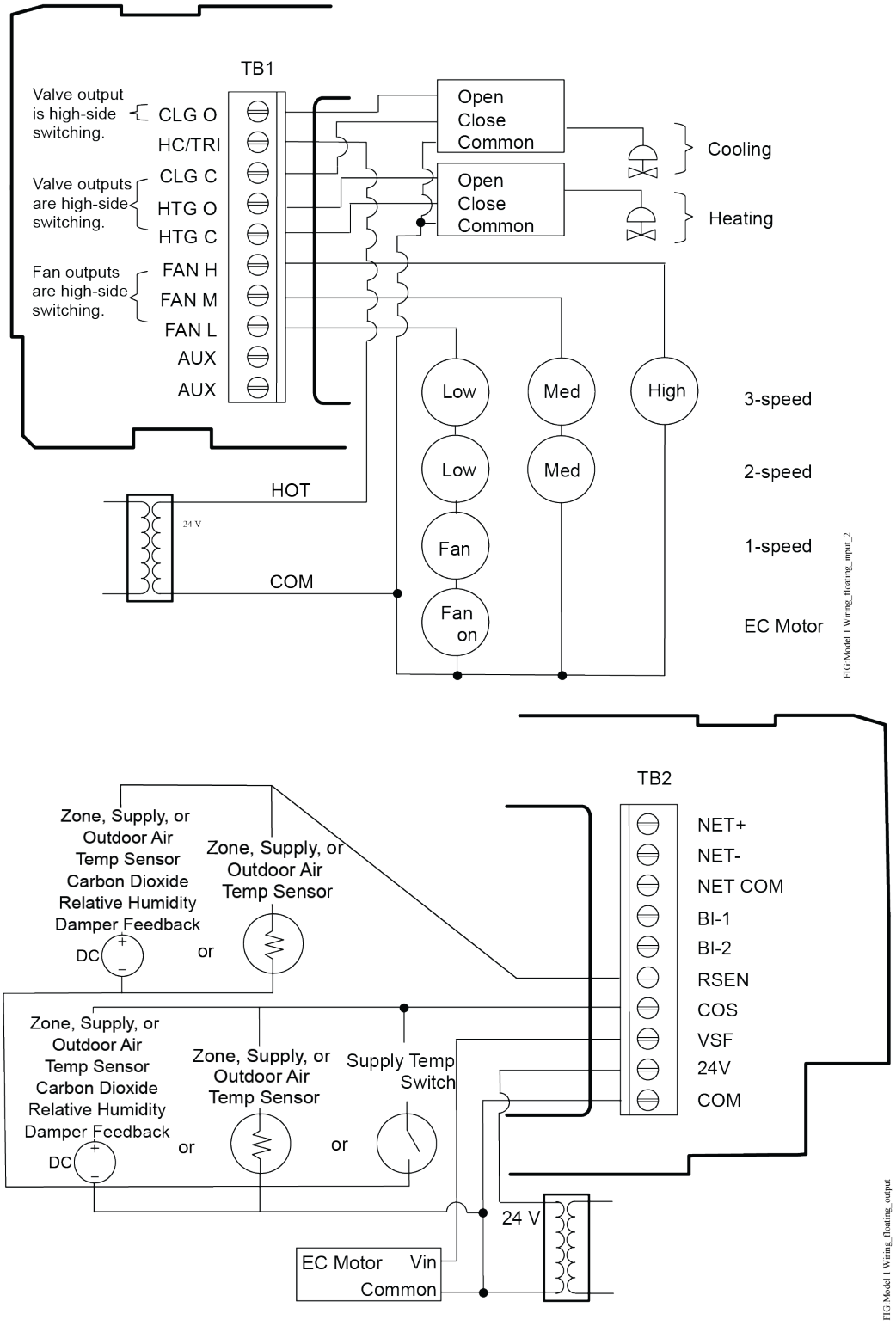


Figure 9: Floating control (pressure-dependent VAV)

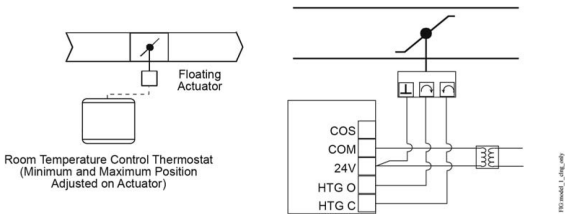


Figure 10: Floating control (pressure-dependent VAV with changeover sensor/switch)

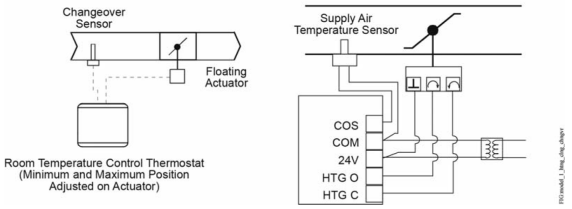


Figure 11: Floating control (pressure-dependent VAV with changeover sensor/switch and reheat)

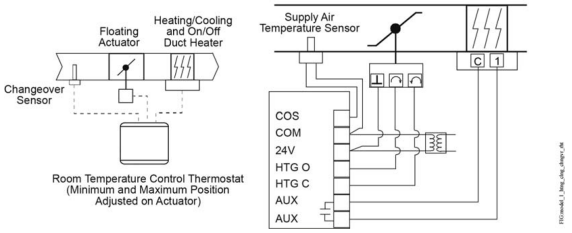


Figure 12: Floating control two-pipe heating and cooling hydronic valve control fan coil application

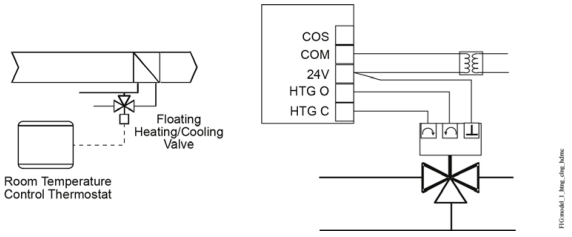


Figure 13: Floating control two-pipe heating and cooling hydronic valve control with changeover fan coil application

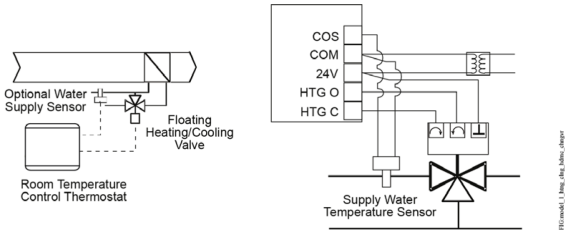


Figure 14: Floating control (on/off two-pipe and four-pipe fan coil applications)

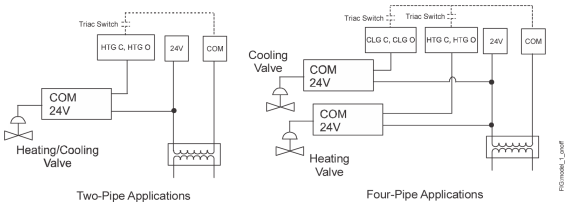


Figure 15: Floating control (floating two-pipe and four-pipe fan coil applications)

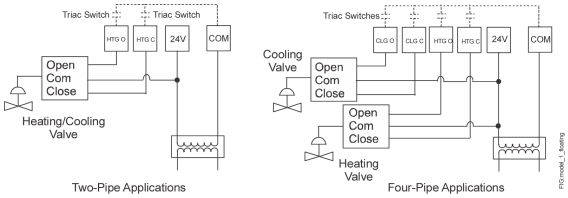


Figure 16: AUX contact wiring

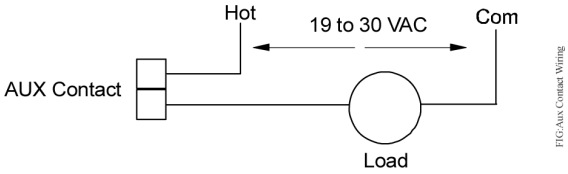
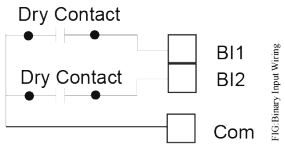


Figure 17: Binary input wiring



Setup and adjustments

➤ **Important:** Table 7 provides a full list of TEC3000 menu settings. Refer to *TEC3000 Series On/Off or Floating Fan Coil Thermostats Installation Guide (LIT-12013161)* for step-by-step instructions on how to access and adjust the more commonly used menus.

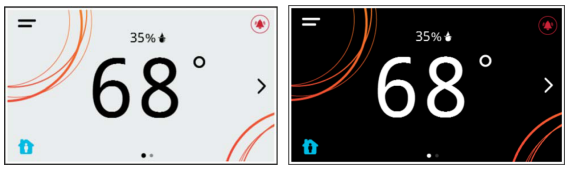
Overview

About this task:

Figure 18 shows the thermostat controller home screen in both the light and dark themes in heating mode. You can customize it to show or hide various elements from the occupant. See Table 4 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 5 provides details of these levels.

Figure 18: Thermostat controller home screen (shown with light and dark themes)



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

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.

Result

Multiple pages are available on the display. The page that you currently view is emphasized with a filled dot. The other available page display 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.

Figure 19: Thermostat controller home screen in cooling mode (left) and heating mode (right)

Customizing the home screen

About this task:

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, complete the following steps:

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 4 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 4.

Table 4: Touchscreen icons

Icon and icon name	Description
Menu	Displays the configuration screens where various settings may be adjusted.
Alarm	Indicates that the thermostat controller has triggered an alarm.
Unit Power On Standby	Powers the thermostat controller on or off. Notes: • This icon disables all equipment control but does not physically power down the unit. • On the modern home screen, if the Unit Power icon is in standby mode, the temperature and humidity also display in standby mode to indicate that control off or standby mode is active.
Humidity On Standby	Indicates the humidity reading.
Degree On Standby	Indicates that the unit is set to degrees.

Table 4: Touchscreen icons

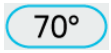
Icon and icon name	Description
Network Communication (for Networked Models)  Network communication No Signal	Network Communication icon indicates that the thermostat controller detected a supervisory controller and both are online. No icon indicates that the thermostat controller did not detect a supervisory controller.
Radio Signal (For Wireless Models)  No signal  Low signal  Medium signal  High signal	Indicates the strength of the radio signal.
 Arrow Up Arrow Down	Increases or decreases the cooling value on the home screen.
 Arrow Up Arrow Down	Increases or decreases the heating value on the home screen.
Cooling Hold 	Indicates that cooling hold mode is enabled. To disable Hold mode, press the button.
Heating Hold 	Indicates that heating hold mode is enabled. To disable Hold mode, press the button.
Cooling Setpoint 	Displays the current cooling setpoint. Indicates that Hold mode is disabled. To enable Hold mode, press the button.
Heating Setpoint 	Displays the current heating setpoint. Indicates that Hold mode is disabled. To enable Hold mode, press the button.
Setpoint Temperature 	Displays the current setpoint temperature. Indicates that the Show Hold button is set to No.
Heating Mode 	Indicates that heating mode is selected.

Table 4: Touchscreen icons

Icon and icon name	Description
Cooling Mode 	Indicates that cooling mode is selected.
Auto Mode 	Indicates that Auto mode is selected.
Fan Overrides for Single-speed Fans  On  Auto  Quiet	Adjusts the fan override between On, Auto, and Quiet for single-speed fans.
Fan Overrides for Variable-speed Fans  On  Auto  Quiet	Adjusts the fan override between On, Auto, and Quiet for variable-speed fans.
Fan Overrides for Multi-speed Fans  Low  Medium  High  Auto  Quiet	Adjusts the fan override between Low, Medium, High, Auto, and Quiet for multi-speed fans.

Table 4: Touchscreen icons

Icon and icon name	Description
Occupancy Status  Unoccupied  Occupied  Temporarily occupied  Standby  Override-occupied  Override-unnoccupied	Adjusts the occupancy between Unoccupied, Occupied, Temporarily occupied, Standby, Occupancy override, Unoccupancy override.
Back 	Moves the display to the previous screen.
Forward 	Moves the display to the next screen.
Home 	Returns the display to the main home screen.
Save 	Saves the current configuration and parameter settings.
Delete 	Deletes the scheduled event.
Clear 	Clears the password entry on the keypad screen.
Exclamation point 	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 5.

Table 5: User lockout levels

Lockout level	Capability
State 0	Provides full access to home screen display adjustments and icons (default).
State 1	Hides the Menu icon.
State 2	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

Use the USB port 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.

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.

Selecting the heating and cooling device type

By default, the thermostat is configured for On-Off (2-position) control. This can be changed to Floating (Incremental) mode when the Unit Type is not set to VAV. For VAV mode, only floating actuators are supported and this option is unavailable.

When in Floating mode, the Actuator Stroke Time must also be set to match the equipment.

Configuring the supply fan - fan coil only

On two-pipe or four-pipe fan coil units, 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 VDC to 10 VDC control signal and an optional binary on/off command.

Note: Fan control is not available 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 user configurable value of temperature differential from setpoint. By default, the Medium Fan On Diff Sp is set to 1.5, the Medium Fan Off Diff Sp is set to 0.5, the High Fan On Diff Sp is set to 2, and the High Fan Off Diff Sp is set to 1.

For VSF control, the output is configurable for any range between 0 VDC and 10 VDC. 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 VDC, the Full Speed Voltage is 10 VDC, and the Minimum Command is 20%.

When the variable speed fan is off, the FAN L binary output is off and the voltage at the VSF output is 0 VDC. When the fan turns on, the FAN L 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 VDC or the Start Voltage minus 1 VDC, whichever value is the lesser, when the fan is turned off.

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 about enabling and disabling end-user controls.

The Fan Mode available to the installer depends on the fan type. The following options are provided for single- and variable-speed fans:

- On—For single-speed fan configurations, the fan is continuously on at a fixed speed. For variable-speed fan configurations, the fan is on at minimum speed when there is no heating or cooling demand. The fan speed increases or decreases proportionately with any variance in heating or cooling demand. The fan never stops in this mode.
- Auto—Fan cycles on demand with the controller entering cooling, heating, or dehumidification modes. The fan stays off if there is no demand for heating, cooling, or dehumidification.
- 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. The fan stays off if there is no demand for heating, cooling, or dehumidification. The fan adjusts its speed according to the user configurable value of temperature differential from setpoint.

- 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 depends on the fan type. The following options are provided for single- and variable-speed fans:

- On—For single-speed fan configurations, the fan is continuously on at a fixed speed. For variable-speed fan configurations, the fan is on at minimum speed when there is no heating or cooling demand. The fan speed increases or decreases proportionately with any variance in heating or cooling demand. The fan never stops in this mode.
- 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 - units configured with floating actuators, multi-speed fans, and variable-speed fans only

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.

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 you use an analog sensor, you can adjust the changeover setpoint. The changeover logic applies a 10°F 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.

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

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

Dehumidification operates when the zone humidity increases above the humidity setpoint and the controller is in a satisfied state with no active call for cooling or heating and when the chilled water temperature is low enough to provide dehumidification. 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 setpoint. When in dehumidification mode, the multi-speed or variable-speed fan operates at the appropriate speed to maintain balance between maximizing condensation and moisture removal and keeping the zone from overcooling.

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).

The four modes of setpoint operation are described in Table 6.

Table 6: Setpoint operation

Mode of setpoint operation	Details
Occ Setpoint Select = Setpoint Offset andHeat Cool Setpoint Mode = Individual Setpoints	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: • There are large constant ranges bounding the individual heating and cooling setpoints. • There is also a smaller configurable range limit set to the Setpoint Offset point (**Control Setup** > **General** > **Max Setpoint Offset**).
Occ Setpoint Select = Min and Max Setpoints andHeat Cool Setpoint Mode = Individual Setpoints	In this mode, the TEC has a heating setpoint and a cooling setpoint. Each setpoint has a configurable range (**Setpoints** > **Min Cooling Setpoint**, **Max Cooling Setpoint**, **Min Heating Setpoint**, and **Max Heating Setpoint**). 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.
Occ Setpoint Select = Setpoint Offset andHeat Cool Setpoint Mode = Common Setpoint	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.
Occ Setpoint Select = Min and Max Setpoints andHeat Cool Setpoint Mode = Common Setpoint	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 required 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.

Enabling the motion sensor (TEC3xx3 Models)

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 *TEC3000 Series On/Off or Floating Fan Coil Thermostats Installation Guide LIT-12013161* for information about configuring the binary inputs). To disable motion sensing capabilities, set the Motion Sensor Timeout to 0 minutes.

Scheduled circulation

You can schedule to run your fan for a minimum duration per hour in order to maintain circulation in a space. If the minimum hourly fan runtime is not exceeded as part of normal HVAC operation, the fan turns on at the end of the hour for the length of time required to fulfill the minimum hourly run time. The fan runtime calculation includes runtime initiated when the Fan Mode is set to On and other overrides. The fan does not turn on if the

fan runtime is already longer than the minimum hourly fan runtime. When you enabled the Scheduled Circulation Only When Occupied setting, the fan does not turn on at the end of the hour to fulfill the minimum runtime unless the occupancy state is set to Occupied.

Menus and submenus

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

Table 7: Menus and submenus

Level 1	Level 2	Level 3
Setpoints	Dehumidification	Dehumidification
		Cooling Valve Minimum Position*
		Cooling Valve Starting Position*
		Heating Valve Starting Position*
		Coil Tempering Time*
		Dehumidification Overcool Limit*
		Chilled Water Supply Temperature Setpoint*
	Temperature	Occupied Cooling
		Occupied Heating
		Unoccupied Cooling
		Unoccupied Heating
		Standby Cooling
		Standby Heating
		Occ Setpoint Select
		Heat Cool Setpoint Mode
		Max Heating Setpoint*
		Min Heating Setpoint*
		Max Cooling Setpoint*
		Min Cooling Setpoint*
		Max Setpoint*
		Min Setpoint*
Scheduling	Schedule Options	
	Set Schedule	
	Optimal Start Enable	
	Temp Occ Duration	
	Motion Sensor Timeout	
	Manual Occupancy Mode	
	Schedule Source	

Table 7: Menus and submenus

Level 1	Level 2	Level 3
Display Settings	Passcode Enabled	
	Passcode*	
	Brightness Setting	
	Enable Backlight Timeout	
	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	

Table 7: Menus and submenus

Level 1	Level 2	Level 3
Setup	General Setup	Control Mode
		Unit Enable
		Fan Mode*
		Max Setpoint Offset
		Fan On Delay*
		Fan Off Delay*
		Frost Protection
		Dehum Enable*
		Unocc Dehum Enable
		Dehumidification Sequence Mode*
		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
		Scheduled Circulation Enable
		Scheduled Circulation Only when Occupied
		Mininum Hourly Fan Runtime
		Variable Speed Fan Circulation Setpoint*
		Multi-speed Fan Circulation Setpoint*
	Input Setup	BI1 Config
		BI2 Config
		Supply Temp Type*
		Supply Temp Sensor*
		Supply Temp Offset*
		Zone Temp Sensor
		Zone Temp Offset
		Humidity Offset
		Reset Sensors
		For networked models: Zone Temp Alarm Enabled
		For networked models: Zone Temp Low Limit
		For networked models: Zone Temp High Limit

Table 7: Menus and submenus

Level 1	Level 2	Level 3
Setup (continued)	Tuning Setup	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*
		Equipment Size
	Network Setup	FC Comm Mode
		BACnet Instance ID*
		For networked models: N2 Address*
		BACnet Address*
		For networked models: MSTP Baud Rate*
		BACnet Encoding Type
		BACnet/MSTP Communication Mode
		For wireless models: Pan ID

Table 7: Menus and submenus

Level 1	Level 2	Level 3
Equipment Setup	General	Unit Type
		Htg/Clg Device Type*
		Actuator Stroke Time*
		Cooling Min On Time*
		Cooling Min Off Time*
		Heating Min On Time*
		Heating Min Off Time*
		Unoccupied Off Delay
		Reheat Min On Time*
		Reheat Min Off Time*
	Supply Fan	Supply Fan Type*
		Start Voltage*
		Full Speed Voltage*
		Minimum Command*
		Medium Speed On Cmd*
		High Speed On Cmd*
		Medium Fan On Diff SP*
		Medium Fan Off Diff SP*
		High Fan On Diff SP*
		High Fan Off Diff SP*
	Reheat	Reheat Installed
		Reheat Min Damper Pos*
		Reheat Fan Required*
	Changeover	Changeover Mode*
		Supply Temp Type*
		Changeover Setpoint*
		Supply Temp Sensor*
		Supply Temp Offset*

Table 7: Menus and submenus

Level 1	Level 2	Level 3
Trend	EFF-ZNT	
	EFF-SETPOINT	
	EFF-ZNH	
	B1 Status	
	B2 Status	
	EFF-OAT	
	EFF-SAT	
	FANSPD-S	
	CLG1-C	
	CLG2-C	
	HTG1-C	
	HTG2-C	
	OAD-O	
	HTG-O	
	CLG-O	
System Status	Occupancy Source	
	Unit Status	
	Supply Air Temperature	
	Changeover State	
	Zone Temp Source	
Control Status	Cooling % Command	
	Heating % Command	
	Reheat % Command	
	Cool Stage 1	
	Heat Stage 1	
	Reheat Stage 1	
	Fan % Command	
	Fan	
Controller Info	Model Name	
	Software Version	
	Unit Name	
	Device Name	
	Device Description	
Commissioning	Supply Air Temperature	
	Heat Command	
	Cool Command	
	Supply Fan	
	Aux	

Table 7: Menus and submenus

Level 1	Level 2	Level 3
Update	View Version	
	Load Firmware	
	Restore*	
	Backup*	
For wireless models: Network Status	Radio Code Version	
	Radio PAN ID	
	Active Channel	
	Signal Strength	
	Connection Status	
	Network State	
	IEEE Address	
	Short Address	

Troubleshooting

Table 8: Fault list

Faults	Probable causes	Solutions
Remote Zone Temp Fail	The External Zone Temperature sensor has been disconnected or has failed.	1. Check the wiring of the sensor. 2. If intentionally disconnected, reset sensors through the menu. 3. If the problem persists, order replacement units and return the affected devices to Johnson Controls under the RMA program.
Supply Temp Fail	The External Supply Temperature sensor has been disconnected or has failed.	1. Check the wiring of the sensor. 2. If intentionally disconnected, result fault by entering the menu, enter Control Setup, and select Inputs to reset the sensors. 3. If the problem persists, order replacement units and return the affected devices to Johnson Controls under the RMA program.
Internal Sensor Fail	An internal sensor has failed on the TEC.	Order replacement units and return the affected devices to Johnson Controls under the RMA program.
Dehum Unavailable	Dehumidification is unavailable because the zone humidity sensor has failed or the humidity reading is not reliable.	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. 2. (For all models) If the problem persists, order replacement units and return the affected devices to Johnson Controls under the RMA program.
Service	Equipment connected to the BI configured for a Service alarm triggers the alarm.	Service the equipment by way of the manufacturer's recommendation.
Dirty Filter	Equipment connected to the BI configured for a Dirty Filter alarm triggers the alarm.	Replace the filter in the equipment as explained in the manufacturer's instructions.

Table 8: Fault list

Faults	Probable causes	Solutions
Calibration Corrupt	Factory calibration data is lost or is not installed.	Order replacement units and return the affected devices to Johnson Controls under the RMA program.
Changeover Fail	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.
Zone Temp Unreliable	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.
Open Window	The switch connected to the BI configured for Open Window senses that the window is opened, and control has shut down.	1. Close the window to resume control. 2. Check sensor functionality with an ohmmeter, and verify the wiring to the TEC. 3. Order replacement units and return the affected devices to Johnson Controls under the RMA program.
Fan Lock	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.	1. Inspect equipment to ensure fan functions. 2. Check sensor functionality with an ohmmeter, and verify wiring to the TEC. 3. Reset fault by entering the menu, selecting Fault Status, and selecting the Fan Lock. 4. Order replacement units and return the affected devices to Johnson Controls under the RMA program.
Humidity Unreliable	The zone humidity reading was reliable and has now failed.	1. If the source of zone humidity was the onboard sensor, contact Johnson Controls product sales and support. 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.
Controller Fault	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.
Touchscreen Unavailable	The touchscreen components fail to initialize.	1. Reboot the controller. 2. If problems persist, order replacement units and return the affected devices to Johnson Controls under the RMA program.
Board Mismatch	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.

Table 8: Fault list

Faults	Probable causes	Solutions
Firmware Mismatch	The previous upgrade did not complete.	1. Upgrade the TEC3000 to the latest released version. 2. Upgrade the TEC3000 to the current version again.
	The previous downgrade has not completed because the previous version is no longer supported.	Reboot the TEC3000 to clear the fault.
USB Malfunction	A USB drive has malfunctioned and drawn more than the maximum allowed current.	1. Attempt to insert and use the USB drive again. 2. Try a new USB drive. 3. If problems persist, order replacement units and return the affected devices to Johnson Controls under the RMA program.
Supply Fan Runtime Limit Extended	The Supply Fan Runtime exceeds the configured Supply Fan Runtime Limit.	1. Service the Supply Fan. 2. Reset the Supply Fan runtime.
Heating Ineffective	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 correctly.
Cooling Ineffective	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 correctly.
Supply Fan Fault	The Supply Fan Status configured for either BI1 or BI2 has not proved within the configured Fan Alarm Delay.	1. Verify that the Supply Fan is operating when turned on. 2. Verify that the Supply Fan Status wiring is connected correctly.
Zone Temperature Too Cold	The Zone Temperature decreased below the configured Zone Temp Low Limit.	Verify that the TEC and the RTU heating are enabled and functioning.
Zone Temperature Too Hot	The Zone Temperature increased above the configured Zone Temp High Limit.	Verify that the TEC and the RTU cooling are enabled and functioning.

Table 9: Troubleshooting details

Symptom	Probable causes	Solutions
The controller displays `Idle` with a Unit Status of `Cooling Unavailable due to Changeover` despite being above cooling setpoint, or with a status of `Heating Unavailable due to Changeover` 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.	1. Check the wiring of the supply temperature sensor/switch. 2. Verify that the changeover is set up correctly for the type of sensor attached (sensor or switch).
	The changeover temperature is sensing a hot supply, but the controller requests cooling.	1. Verify that the supply is not in heating mode. If it is, nothing can be done from the TEC. 2. Check the wiring of the supply temperature sensor or switch. 3. Check the placement of the supply temperature sensor or switch. 4. Verify that the changeover is set up correctly for the type of sensor attached (sensor or switch).
	Changeover temperature is sensing a cold supply, but the controller requests heating.	1. Verify that the supply is not in cooling mode. If it is, nothing can be done from the TEC. 2. Check the wiring of the supply temperature sensor or switch. 3. Check the placement of supply temperature sensor or switch. 4. Verify that the changeover is set up correctly for the type of sensor attached (sensor or switch).
The controller displays `Idle` with a Unit Status of `Cooling Unavailable due to Control Mode` despite being above cooling setpoint, or with a status of `Heating Unavailable due to Control Mode` despite being below the setpoint.	The Control Mode is set to Cooling Mode, but the controller requests heating.	Change the Control Mode to Auto or Heating.
	The Control Mode is set to Heating Mode, but the controller requests cooling.	Change the Control Mode to Auto or Cooling.
The staged equipment shuts off above the cooling setpoint or below the heating setpoint when the PID is running on the TEC. If the unit is in On/Off Control mode, this does not apply.	The PID control algorithm minimizes overshoot and energy usage for the particular equipment and zone, and may cycle the equipment prior to reaching setpoint.	Expected behavior.
The staged equipment cycles too rapidly or too slowly when the PID is running on the TEC.	The control band around the setpoint is determined by the minimum on/off times and is set incorrectly for the equipment, zone, or user preference. There is a tradeoff between reduced control band size and increased energy usage and equipment wear from increased cycling.	1. Verify that equipment minimum on/off times are set correctly. 2. If the default deadband around the setpoint does not provide the required temperature control, set Temp Control Setup to Deadband Override and set the Deadband parameter to the preferred value.
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.

Table 9: Troubleshooting details

Symptom	Probable causes	Solutions
The TEC3000 zone temperature does not change fast enough compared to the measured zone temperature from a verification device, such as a calibrated sensor.	The TEC3000 is configured by default for larger spaces with normal-sized equipment when a proportional device is active.	Select **Control Setup** >**Tuning** > **Equipment Size** > **Oversized**.
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 file allocation table (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 `Board Mismatch`.	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 causes 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 `Controller Fault`.	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 8 for TEC fault causes and resolution.
`Partial Restore Complete` 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 occur when a value is 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.	1. Create a Backup file on a USB drive for the TEC that is showing the issue. 2. Edit the backup file created in the previous step on a PC to reflect the preferred settings. 3. Verify that the modified values are within minimum and maximum range in the backup file. 4. Restore the settings from the newly edited backup file on the TEC.
The temperature displayed is lower than the actual room temperature.	Cold air drafts enter 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.

Table 9: Troubleshooting details

Symptom	Probable causes	Solutions
For networked models, the Online icon does not appear for a networked controller.	There is incorrect field bus wiring.	Refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034).*
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 or WRG Gateway is not communicating with the TEC.	1. Map the TEC into a JCI Supervisory system. 2. Verify that the PAN's WNC or WRG Gateway is online. 3. Add ZFR182x or ZFR183x Routers/Repeaters into the wireless system.
Some icons are hidden.	Lockout levels are used or the icons are hidden due to the display settings.	See Table 5 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.		

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

TEC3000 Series On/off or Floating Fan Coil Thermostats technical specifications

Table 10: TEC3000 Series Networked and Wireless On/off or Floating Fan Coil and Individual Zone Thermostat Controllers with Dehumidification Capability technical specifications

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

Table 10: TEC3000 Series Networked and Wireless On/off or Floating Fan Coil and Individual Zone Thermostat Controllers with Dehumidification Capability technical specifications

Specification		Description
Transmission power (for wireless models)	TEC30xx-1x-000 compatible with ZFR182x Pro Series	10 mW maximum
	TEC31xx-1x-000 compatible with ZFR183x Pro Series	100 mW maximum
Transmission range (for wireless models)	TEC30xx-1x-000 compatible with ZFR182x Pro Series	50 ft (15.2 m) recommended indoor 250 ft (76.2 m) line of sight, maximum
	TEC31xx-1x-000 compatible with ZFR183x Pro Series	250 ft (76.2 m) recommended indoor 1000 ft (304.8 m) line of sight, maximum
Temperature range	Backlit display	-40.0°F to 122.0°F (-40.0°C to 50.0°C) in 0.5° increments
	Heating control	40.0°F to 90.0°F (4.5°C to 32.0°C)
	Cooling control	54.0°F to 100.0°F (12.0°C to 38.0°C)
Accuracy	Temperature	±0.9F° at 70.0°F (±0.5C° at 21.0°C) typical calibrated
	Humidity	±5% RH from 20% to 80% RH at 50°F to 90°F (10°C to 32°C)
Minimum deadband		2F° (1C°) between heating and cooling
Occupancy sensor motion detection (occupancy sensing models)		Minimum of 94 angular degrees up to a distance of 15 ft (4.6 m); based on a clear line of sight
Ambient conditions	Operating	32°F to 122°F (0°C to 50°C); 95% RH maximum, noncondensing
	Storage	-4°F to 122°F (-20°C to 50°C); 95% RH maximum, noncondensing
Compliance	BACnet International	BACnet Testing Laboratories™ (BTL) 135-2001 Listed BACnet Advanced Application Controller (B-AAC)
	United States	UL Listed, File E27734, CCN XAPX, Under UL60730
		Networked models: FCC Compliant to CFR 47, Part 15, Subpart B, Class B
		Wireless models: Transmission complies with FCC Part 15.247 regulations for low power unlicensed transmitters; transmitter identification FCC ID: OEJ-WRZRADIO (ZFR182x), OEJ-ZFRRADIO (ZFR183x)
	Canada	UL Listed, File E27734, CCN XAPX7, Under E60730
		Networked models: Industry Canada, ICES-003
		Wireless models: Industry Canada (IC) RSS-210; Transmitter identification ZFR1810-1: IC ID: 279A-WRZRADIO (ZFR182x), 279A-ZFRRADIO (ZFR183x)
CE	Europe (for networked models only)	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.
	Australia and New Zealand	RCM Mark, Australia/NZ Emissions Compliant
Shipping weight	Models without occupancy sensor	0.75 lb (0.34 kg)
	Models with occupancy sensor	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.

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.

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Patents

Patents: https://jcipat.com

Single point of contact

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