TEC21x6(H)-4 and TEC21x6H-4+PIR Series N2 Networked Thermostat Controllers with Dehumidification Capability, Fan Control, and Occupancy Sensing Capability

Installation Instructions

Part No. 24-9890-1176, Rev. —
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Applications

The TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers are N2 networked devices that provide control of two- or four-pipe fan coils, cabinet unit heaters, or other equipment using on/off, floating, or proportional 0 to 10 VDC control input, three speeds of fan control, and dehumidification capability. The TEC21x6H-4+PIR Series Thermostat Controllers have occupancy sensing capability built into the device. These devices maximize up to 30% energy savings in high-energy usage light commercial buildings, such as schools and hotels, during occupied times by using additional standby setpoints. See the *Occupancy Sensor Operation – TEC21x6H-4+PIR Series Thermostat Controllers* section for more information.

The technologically advanced TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers feature a Building Automation System (BAS) N2 Bus communication capability that enables remote monitoring and programming for efficient space temperature control. Specific models are available to accommodate commercial and hospitality applications.

The TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers feature an intuitive User Interface (UI) with backlit display that makes setup and operation quick and easy. The thermostat controllers also employ a unique, Proportional-Integral (PI) time-proportioning algorithm that virtually eliminates temperature offset associated with traditional, differential-based thermostat controllers.

IMPORTANT: The TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers are intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the thermostat controller could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the thermostat controller.

North American Emissions Compliance

United States

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

Canada

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

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

Installation

Location Considerations

Locate the TEC21x6(H)-4 or TEC21x6H-4+PIR Series Thermostat Controller:

- on a partitioning wall, approximately 5 ft (1.5 m) above the floor in a location of average temperature
- away from direct sunlight, radiant heat, outside walls, behind doors, air discharge grills, stairwells, or outside doors
- away from steam or water pipes, warm air stacks, unconditioned areas (not heated or cooled), or sources of electrical interference

For integrated Passive Infrared (PIR) models, make sure the thermostat controller is located centrally, where occupant movement is frequent.

Note: Allow for vertical air circulation to the TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers.

To install the thermostat controller:

1. Use a Phillips-head screwdriver to remove the security screw on the bottom of the thermostat controller cover.

   Note: Normally, the security screw is packaged separately in a plastic bag with the thermostat controller. Skip this step if the screw is not installed on the bottom of the cover.

2. Pull the bottom edge of the thermostat controller cover and open the thermostat controller as illustrated in Figure 1.

   Note: PIR models have a wiring connection between the cover and the Printed Circuit Board (PCB). This connection allows for proper wiring of the occupancy sensor. Carefully remove the wiring connection from the PCB by pulling up on the connector block. Do not attempt to remove the connector block by pulling on the wires.

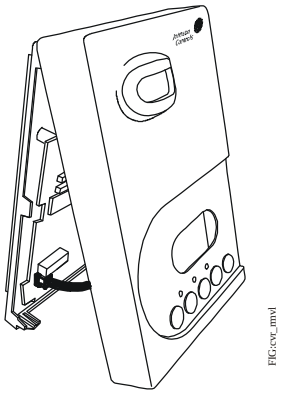


Figure 1: Removing the Thermostat Controller Cover (TEC21x6H-4+PIR)

3. Carefully pull the locking tabs on the right side of the thermostat controller mounting base and unlock the PCB. Open the PCB to the left as illustrated in Figure 2.
4. Pull approximately 6 in. (152 mm) of wire from the wall and insert the wire through the hole in the thermostat controller mounting base.
5. Align the thermostat controller mounting base on the wall and use the base as a template to mark the two mounting hole locations.

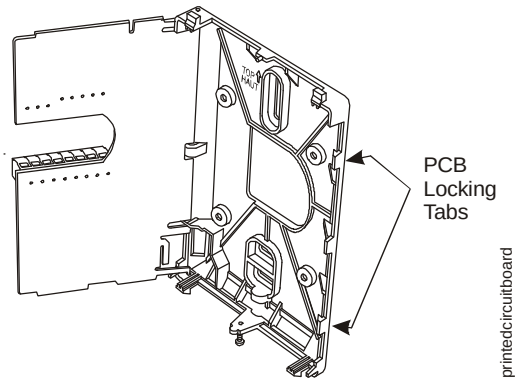


Figure 2: Opening the Thermostat Controller PCB

6. Position the thermostat controller mounting base so that the arrow on the base points upward to indicate the top of the thermostat controller.

   Note: If you need to install the thermostat 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) or 3 x 2 in. (76 x 51 mm) square boxes. This procedure ensures that you have enough space for cabling and end-of-line devices, if needed.

   Note: For surface-mount applications, use durable mounting hardware such as Molly bolt anchors that cannot be easily pulled out of the mounting surface.

7. Secure the mounting base to the wall surface using two mounting screws as illustrated in Figure 3.

   Note: Be careful not to overtighten the mounting screws.

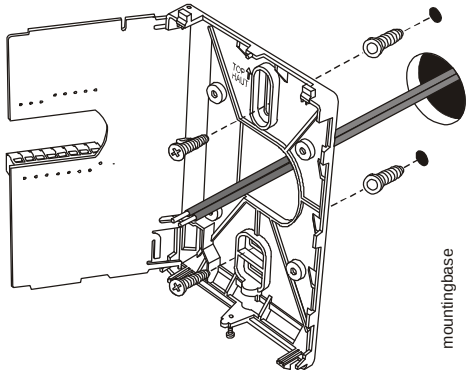


Figure 3: Securing the Thermostat Controller Mounting Base to the Wall

8. Swing the PCB back to the right and carefully snap it into the locking tabs on the thermostat controller mounting base.

9. Remove the screw terminal blocks that are attached to a disposable adhesive. Figure 4 illustrates the locations of the screw terminal blocks on the thermostat controller.

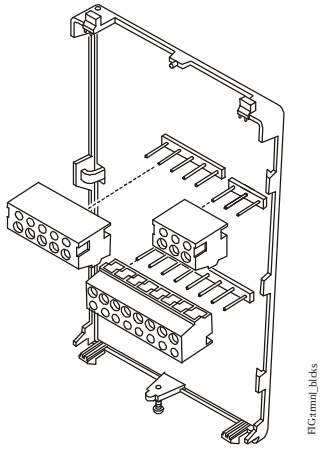


Figure 4: Removing the Screw Terminal Blocks

Wiring

When an existing thermostat controller is replaced, remove and label the wires to identify the terminal functions. When a TEC21x6(H)-4 or TEC21x6H-4+PIR Series Thermostat Controller is replaced, simply remove the old screw terminal blocks and reinsert them onto the PCB of the replacement thermostat controller.

CAUTION: Risk of Electric Shock. Disconnect the power supply before making electrical connections to avoid electric shock.

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.

IMPORTANT: Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the electrical ratings of the TEC21x6(H)-4 and TEC21x6H-4+PIR Series 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 1, and Figure 5 through Figure 9.
2. 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.
3. Reinsert the screw terminal blocks onto the PCB.
4. Reattach the N2 communication wires to the terminal block.

   Note: If multiple wires are inserted into the terminals, be sure to properly twist the wires together prior to inserting them into the terminal connectors.
5. Reattach the thermostat controller cover to the mounting base (top side first).
6. Use a Phillips-head screwdriver to reinstall the security screw on the bottom of the thermostat controller cover.

Table 1: Terminal Identification (See Figure 5.)

Terminal Number	Terminal Label			Function
	TEC2116-4, TEC2116H-4, TEC2116H-4+PIR (On/Off Control)	**TEC2126-4, TEC2126H-4, TEC2126H-4+PIR, TEC2136-4, TEC2136H-4, TEC2136H-4+PIR (On/Off or Floating Control)**	**TEC2146-4, TEC2146H-4, TEC2146H-4+PIR, TEC2156-4, TEC2156H-4, TEC2156H-4+PIR (Proportional 0 to 10 VDC Control)**	
1	Fan-H	Fan-H	Fan-H	Fan On – High
2	Fan-M	Fan-M	Fan-M	Fan On – Medium
3	Fan-L	Fan-L	Fan-L	Fan On – Low
4	24 V~ Hot	24 V~ Hot	24 V~ Hot	24 VAC from Transformer
5	24 V~ Com	24 V~ Com	24 V~ Com	24 VAC (Common) from Transformer
6	BO5 Aux	BO5 Aux	BO5 Aux	Aux BO (Auxiliary Output)
7	BO5 Aux	BO5 Aux	BO5 Aux	Aux BO (Auxiliary Output)
8	BO3	BO3	Blank	Open Heat
9	Blank	BO4	AO2	Close Heat
10	Blank	BO1	AO1	Open Cool
11	BO2	BO2	Blank	Close Cool
12	BI1	BI1	BI1	Configurable Binary Input 1
13	RS	RS	RS	Remote Sensor
14	Scom	Scom	Scom	Sensor Common
15	BI2	BI2	BI2	Configurable Binary Input 2
16	UI3	UI3	UI3	Configurable Universal Input 3
Blank	+, –, REF	+, –, REF	+, –, REF	N2 Bus

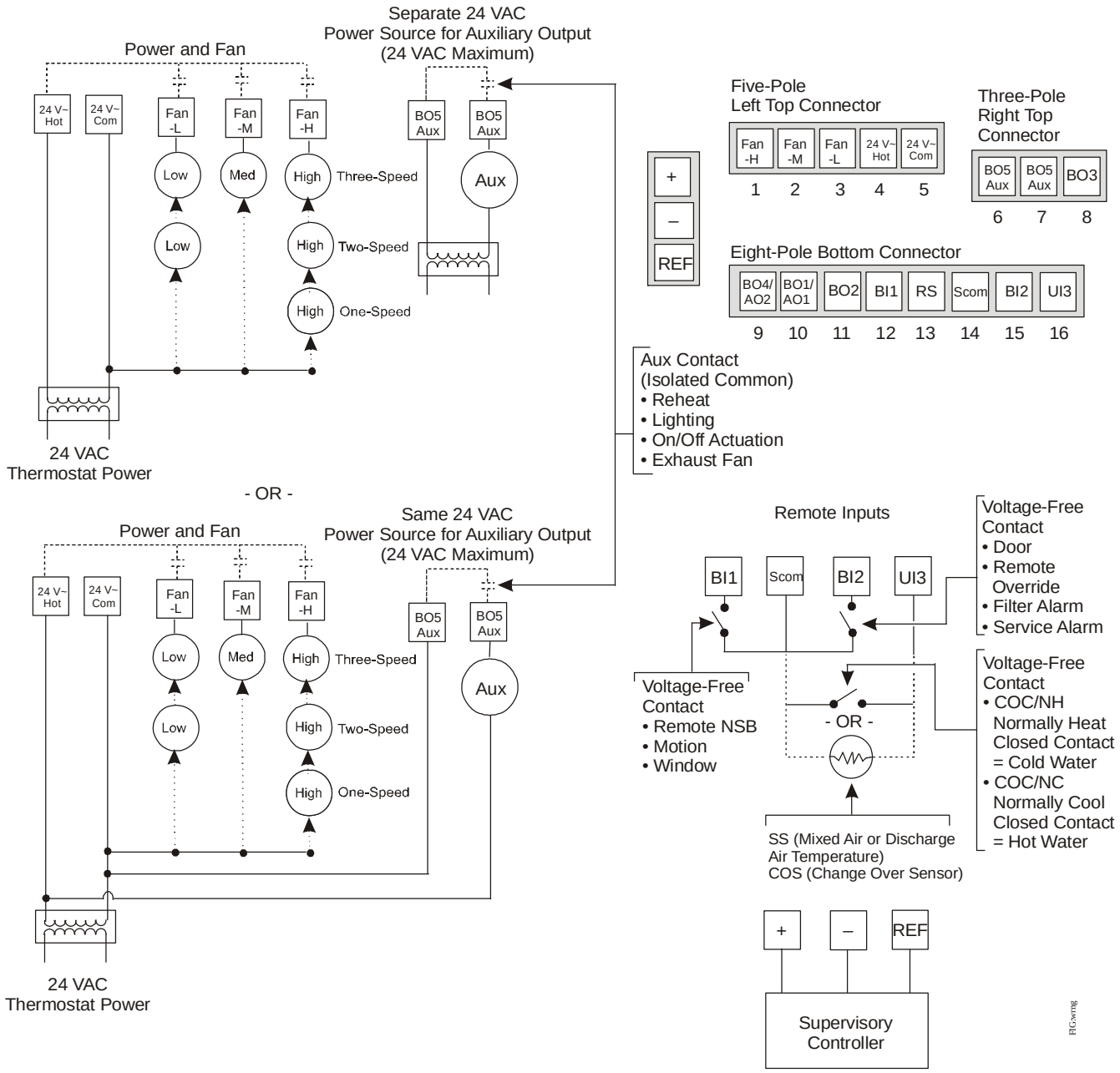


Figure 5: Wiring the TEC21x6(H)-4 or TEC21x6H-4+PIR Series Thermostat Controller (See Table 1.)

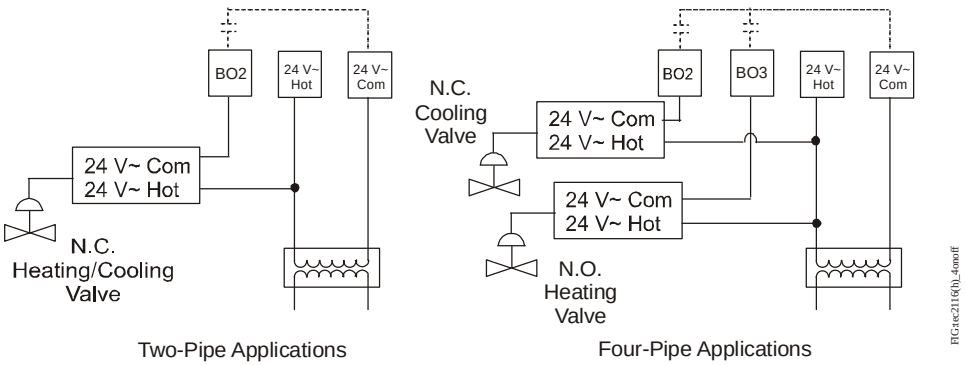


Figure 6: Wiring TEC2116(H)-4 Thermostat Controllers for On/Off Control

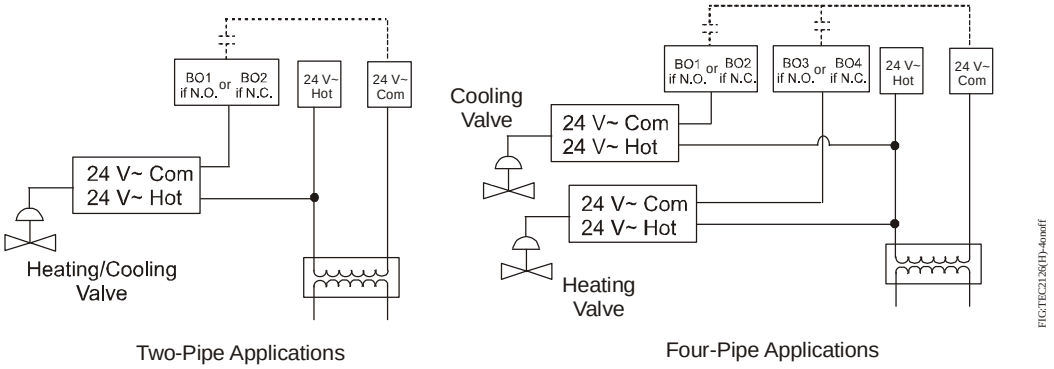


Figure 7: Wiring TEC2126(H)-4 and TEC2136(H)-4 Thermostat Controllers for On/Off Control

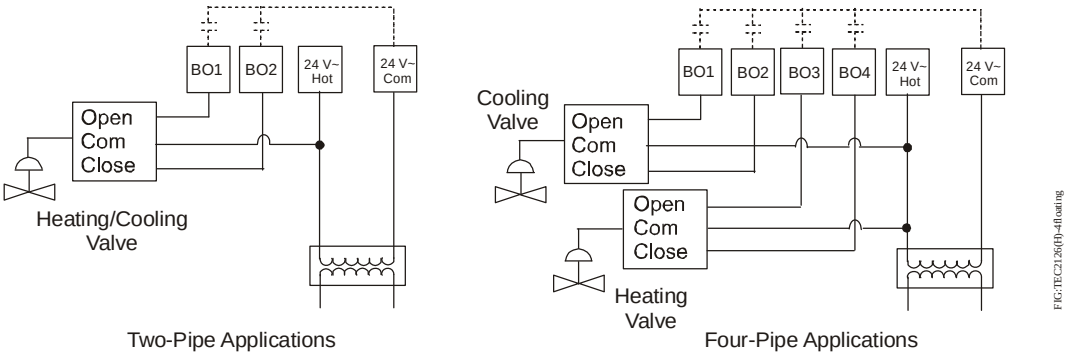


Figure 8: Wiring TEC2126(H)-4 and TEC2136(H)-4 Thermostat Controllers for Floating Control

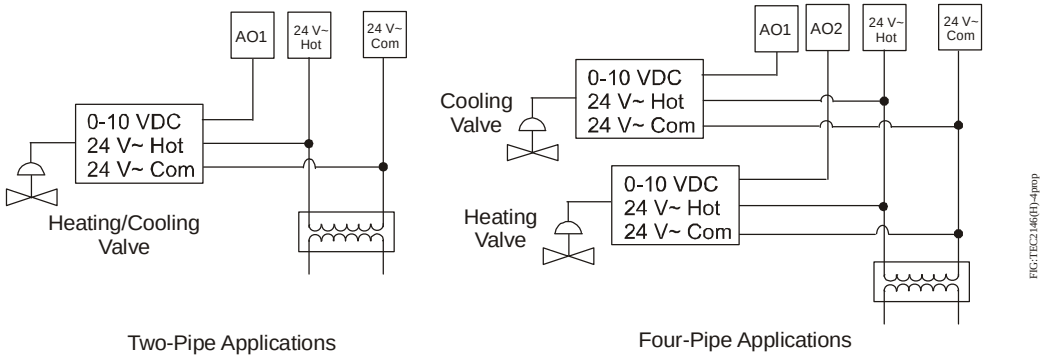


Figure 9: Wiring TEC2146(H)-4 and TEC2156(H)-4 Thermostat Controllers for Proportional Control

Table 2: N2 Bus Objects (Part 1 of 2)

Point Name	Thermostat Controller Point (Type/Address)	N2 Bus Object Type	Model Point Type	Range
Room Temp[1]	ADI-1	N2 AI	CSAD	-40.0°F/-40.0°C to 122.0°F/50.0°C
Room Humidity	ADI-2	N2 AI	CSAD	5 to 90% RH
Heating SP[1, 2] (Occupied Heating SP)	ADI-3	N2 AO	CSAD	40.0°F/4.5°C to 90.0°F/32.0°C
Cooling SP[1, 2] (Occupied Cooling SP)	ADI-4	N2 AO	CSAD	54.0°F/12.0°C to 100.0°F/38.0°C
Setback Heating SP[1, 2] (Unoccupied Heating SP)	ADI-5	N2 AO	CSAD	40.0°F/4.5°C to 90.0°F/32.0°C
Setback Cooling SP[1, 2] (Unoccupied Cooling SP)	ADI-6	N2 AO	CSAD	54.0°F/12.0°C to 100.0°F/38.0°C
PI Heating Demand	ADI-7	N2 AI	CSAD	0 to 100%
PI Cooling Demand	ADI-8	N2 AI	CSAD	0 to 100%
Supply Air Temperature/ Change Over Temp (UI3)	ADI-9	N2 AI	CSAD	-40.0°F/-40.0°C to 122.0°F/50.0°C
Standby Heating SP[1, 2]	ADI-10	N2 AO	CSAD	40.0°F/4.5°C to 90.0°F/32.0°C
Standby Cooling SP[1, 2]	ADI-11	N2 AO	CSAD	54.0°F/12.0°C to 100.0°F/38.0°C
Password[1]	ADI-12	N2 AO	CSAD	0 to 1,000
Outdoor Temperature[1, 3, 4]	ADI-13	N2 AI	CSAD	-40.0°F/-40.0°C to 122.0°F/50.0°C
Maximum Heating SP[1]	ADI-14	N2 AO	CSAD	40.0°F/4.5°C to 90.0°F/32.0°C
Minimum Cooling SP[1]	ADI-15	N2 AO	CSAD	45.0°F/7.0°C 90.0°F/32.0°C
Fan[1]	BD-1	N2 MSO[5]	CSMS	0 = Auto 1 = On 2 = Low 3 = Med 4 = High
System Mode[1]	BD-2	N2 MSO[5]	CSMS	0 = Off 1 = Cool 2 = Heat 3 = Auto
Occupancy[1]	BD-3	N2 BO	CSBD	0 = Unoccupied 1 = Occupied
Sequence of Operation[1, 6]	BD-4	N2 MSO[5]	CSMS	0 = Cooling 1 = Heating 2 = Cooling with Reheat 3 = Heating with Reheat 4 = Heating/Cooling, Four-Pipe 5 = Heating/Cooling with Reheat, Four-Pipe
AUX Status	BD-5	N2 BI	CSBD	0 = Off 1 = On

Table 2: N2 Bus Objects (Part 2 of 2)

Point Name	Thermostat Controller Point (Type/Address)	N2 Bus Object Type	Model Point Type	Range
Low Fan Output	BD-6	N2 BI	CSBD	0 = Off 1 = On
Med Fan Output	BD-7	N2 BI	CSBD	0 = Off 1 = On
High Fan Output	BD-8	N2 BI	CSBD	0 = Off 1 = On
Temp Units[1]	BD-9	N2 BO	CSBD	0 = °C 1 = °F
Status of Thermostat Controller Occupancy Override	BD-10	N2 BI	CSBD	0 = No Override 1 = Override
Dehumid Lockout[1]	BD-11	N2 BO	CSBD	0 = Off 1 = On
Dehumid Active Status	BD-12	N2 BI	CSBD	0 = Off 1 = On
Temporary Occupancy Time[1]	BD-13	N2 MSO[5]	CSMS	0 to 24 Hours in 1-Hour Increments For example: 0 = 0 Hours 1 = 1 Hour 2 = 2 Hours . . . 24 = 24 Hours
Standby Time[1]	BD-14	N2 MSO[5]	CSMS	0.5 to 24.0 Hours in 0.5-Hour Increments For example: 0 = 0.5 Hours 1 = 1.0 Hour 2 = 1.5 Hours . . . 47 = 24.0 Hours
Unoccupied Time[1]	BD-15	N2 MSO[5]	CSMS	0.0 Hours to 24.0 Hours in 0.5-Hour Increments For example: 0 = 0.0 Hours 1 = 0.5 Hours 2 = 1.0 Hour . . . 48 = 24.0 Hours
Effective Occupancy	BD-16	N2 MSI[7]	CSMS	0 = Occupied 1 = Unoccupied 2 = User Requested Temporary Occupancy 3 = Standby
Setpoint Deadband[1]	BD-17	N2 MSO[5]	CSMS	0 = 2.0F°/1.0C° 1 = 3.0F°/1.5° 2 = 4.0F°/2.0C°
AUX Command[1]	BD-18	N2 BO	CSBD	0 = Off 1 = On
BI1[8, 9]	BI-1	N2 BI	CSBI	0 = Off 1 = On
BI2[8, 9]	BI-2	N2 BI	CSBI	0 = Off 1 = On
UI3[8, 9, 10] **(as binary)**	BI-3	N2 BI	CSBI	0 = Off 1 = On

1. Commandable.
2. If a heating (cooling) setpoint is overridden, the TEC21x6(H)-4 or TEC21x6H-4+PIR Series Thermostat Controller may automatically override the corresponding cooling (heating) setpoint to maintain the minimum deadband between the two setpoints.
3. The TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers do not support an Outdoor Air Temperature sensor. The supervisory controller writes the object so that the Outdoor Air Temperature known to the supervisory controller can be displayed at the TEC21x6(H)-4 or TEC21x6H-4+PIR Series Thermostat Controller.
4. Writing -40°/-40°C to the TEC21x6(H)-4 or TEC21x6H-4+PIR Series Thermostat Controller indicates that the Outdoor Temperature is not known. The TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers does not display an Outdoor Temperature.
5. The Multiple Command Object (MCO) is used to command multiple Multistate Object (MSO) outputs. If downloading points via a PRN file, it is necessary to change the Object Type to MSO in order to use multiple outputs.
6. The Sequence of Operation Range 4 and Range 5 should only be for four-pipe systems.
7. If downloading via a PRN file, you must change the object type to MSI to view the multiple inputs.
8. Can be Change-of-State (COS) alarm to the supervisory controller to initiate dial-out.
9. The state of BI1, BI2, and UI3 (as binary) is communicated over the N2 network even if the digital inputs are configured as **None** through the local interface at the thermostat controller.
10. Approximate binary threshold at UI3: >=84k ohm for **Off**, <83k ohm for **On**.

Connecting the N2 Bus

To connect the N2 Bus:

1. Set the N2 address of the TEC21x6(H)-4 or TEC21x6H-4+PIR Series Thermostat Controller per the engineering drawings and test for bus voltage, polarity, and isolation prior to wiring the N2 Bus. (See the **Com addr** parameter in Table 5 to set the N2 address for the thermostat controller.)

   Note: Pressing and holding the **UP/DOWN** arrow keys simultaneously displays the N2 address that is assigned.

2. Observe the polarity when connecting the N2 Bus wires to the thermostat controller.

3. After the N2 Bus wires are connected to the first thermostat controller, continue in a daisy-chained fashion to the next thermostat controller.

   Note: The N2 Bus wiring must be twisted-pair lines. Do not run the N2 Bus wiring in the same conduit as line voltage wiring (30 VAC or above) or other wiring that switches power to highly inductive loads (such as contactors, coils, motors, or generators).

For more N2 Bus overview information, refer to the *N2 Communications Bus Technical Bulletin (LIT-636018)* and the *ASC and N2 Bus Networking and Troubleshooting Guide (LIT-6363003)*.

N2 Write, Override, and Release Commands

N2 overrides take priority over any local adjustment or command in the thermostat controller until the override is released. For example, if the supervisory controller sends an N2 override message to turn System Mode Off and then the user selects System Mode On at the thermostat controller keypad, the thermostat controller keeps the System Mode Off.

When an N2 override is released, the object may once again be changed through the thermostat controller keypad. The thermostat controller does not retain any data entered at the thermostat controller keypad during the override.

The thermostat controller automatically releases all N2 overrides after 10 minutes of no communications. For example, if the network cable is removed from the thermostat controller or if the supervisory controller goes offline.

The thermostat controller does not maintain an internal command priority table. The most recent command received by any of the Object Types listed in Table 2 controls the thermostat controller.

However, if the Metasys system sends an N2 write command to turn System Mode Off and the user selects System Mode On at the thermostat controller keypad, the thermostat controller keeps the System Mode On.

Handling Setpoints

If a setpoint is overridden, the thermostat controller adjusts the other setpoint to maintain the minimum deadband between the setpoints, if necessary. The setpoints can be spread farther apart but can never be adjusted closer than the current minimum deadband value.

- The value for Heating SP (ADI-3), Unoccupied Heating SP (ADI-5), and Standby Heating SP (ADI-10) must stay within the limits for Minimum Heat SP (40°F / 4.5°C) and Maximum Heat SP (ADI-14).
- The value for Cooling SP (ADI-4), Unoccupied Cooling SP (ADI-6), and Standby Cooling SP (ADI-11) must stay within the limits established in the controller by Minimum Cool SP (ADI-15) and Maximum Cool SP (100°F / 37.5°C).

Failure to stay within the limits for a command results in an N2 Negative Acknowledgment (NAK) error from the thermostat controller.

N2 Device Mapping

Metasys® System Person-Machine Interface (PMI)

Define the N2 thermostat controller as a Vendor Device (VND) when adding the thermostat controller to the supervisory controller.

Do not direct-map any points; instead, run control of these points through the Control System (CS) object. The supervisory controller Model Point Type is the definition inside the model file. Use a CS object to retrieve the data.

Metasys System Extended Architecture

The Controller Point Type is the fixed-point definition inside the controller. Refer to the *N2 Integration with the NAE Technical Bulletin (LIT-1201683)* for more information on Controller Point Types.

Network Automation Engine (NAE) Setpoint commands translate into N2 Write commands. NAE Operator Override and Release Operator Override translate into N2 Override and Release commands, respectively.

You must not have a Relinquish Default for the setpoints if you want to change them from the thermostat controller display.

If there is a Relinquish Default for the setpoints, the NAE always has an Override for either an adjusted value or the Relinquish Default Value. You should use Operator Override and Release Operator Override if you want to command the setpoint and release it to local control.

Once all the NAE commands are released, the Override Status in the Hardware tab displays False. At that time, the user is can change the setpoint from the local display.

Setup and Adjustments

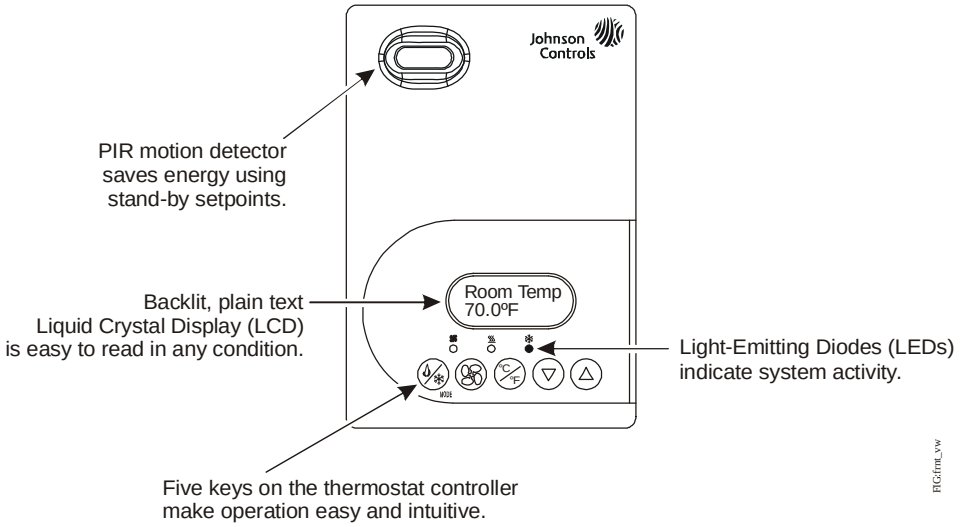


Figure 10: Front Cover of Thermostat Controller (TEC21x6H-4+PIR Series Model Shown)

Thermostat Controller User Interface Keys

The TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers' UI consists of five keys on the front cover (Figure 10). The function of each key is as follows:

- **MODE** key toggles among the system modes available, as defined by selecting the appropriate operation sequence in the Installer Configuration Menu (Off, Heat, Cool, Auto).
- **FAN** key toggles among the fan modes available, as defined by selecting the appropriate fan menu options defined in the Installer Configuration Menu (Low, Med, High, Auto).
- **OVERRIDE** key (commercial models) overrides the unoccupied mode to occupied at the local user interface for the specified TOccTime. (TOccTime is defined by selecting the appropriate time period in the Installer Configuration Menu.)

  If one of the binary inputs is configured to operate as a remote override contact, this **OVERRIDE** function is disabled. The **OVERRIDE** key also allows access to the Installer Configuration Menu. See the *Configuring the TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers* section.
- **°C/°F** key (hospitality models) changes the temperature scale to either Celsius or Fahrenheit and allows access to the Installer Configuration Menu. See the *Configuring the TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers* section.

  Note: For hospitality models, binary inputs can override from the unoccupied mode to occupied mode.
- **UP/DOWN** arrow keys change the configuration parameters and activate a setpoint adjustment.

Backlit Liquid Crystal Display (LCD)

The TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers include a 2-line, 8-character backlit display. Low-level backlighting is present during normal operation, and it brightens when any user interface key is pressed. The backlight returns to low level when the thermostat controller is left unattended for 45 seconds.

Light-Emitting Diodes (LEDs)

Three LEDs are included to indicate the fan status, call for heat, or call for cooling:

- The fan LED is on when the fan is on.
- The heat LED is on when heating is on.
- The cool LED is on when cooling is on.

Integrated PIR Sensor – TEC21x6H-4+PIR Series Thermostat Controllers

The integrated PIR sensor allows for automatic switching between fully adjustable Occupied and Stand-By temperature setpoints without user interaction. This feature generates incremental energy savings during scheduled occupied periods while the space is unoccupied.

Status Display Menu

The Status Display Menu is displayed during normal thermostat controller operation. This menu continuously scrolls through the following parameters:

- Room Temperature (All Models) and Humidity (TEC2136-4, TEC2136H-4, TEC2136H-4+PIR, TEC2156-4, TEC2156H-4, and TEC2156H-4+PIR Models)

  Note: For models with dehumidification capability, the default setting is no humidity reading on the display (**%RH disp** parameter is set to **off**). The **%RH** disp parameter must be set to **on** to display the current humidity reading.
- System Mode
- Occupancy Status (Occupied/Unoccupied/Override)
- Applicable Alarms (The backlight lights up as an alarm condition is displayed.)

Note: An option is available within the Installer Configuration Menu to lock out the scrolling display and show only the **Room Temperature** parameter.

Dehumidification Operation – TEC2136(H)-4 and TEC2156(H)-4 Thermostat Controller Models

Upon detection of room humidity above the adjustable humidity setpoint as sensed by the integral humidity sensor, dehumidification activates.

Note: Dehumidification operation functions only in the Cooling mode; dehumidification operation does not function in either the Off or the Heating mode.

Note: A central network command can globally lock out dehumidification operation to all thermostat controllers.

If the room temperature resides in the deadband between the Heating and Cooling setpoint:

- the thermostat controller forces the fan to low speed
- the chilled water valve opens to the specified maximum value set by **CoolMax**
- the thermostat controller stages Heating to maintain the room temperature at the Cooling setpoint, as sensed by the thermostat controller

If the room temperature falls below the current Heating setpoint, the thermostat controller disables dehumidification operation.

If the thermostat controller is in Cooling demand:

- the chilled water valve opens to 100%
- the thermostat controller stages Heating to maintain the room temperature at the Cooling setpoint, as sensed by the thermostat controller

If the thermostat controller is in Cooling demand and the room temperature rises 2F°/1C° above the Cooling setpoint, the thermostat controller automatically disables dehumidification operation. Likewise, if the thermostat controller is in Cooling demand and the room temperature falls below the current Heating setpoint, the thermostat controller disables dehumidification operation.

Occupancy Sensor Operation – TEC21x6H-4+PIR Series Thermostat Controllers

A TEC21x6H-4+PIR Series Thermostat Controller (or a TEC21x6(H)-4 Series Thermostat Controller equipped with a PIR accessory cover) provides advanced occupancy logic.

Note: The PIR strategy is an occupied strategy. If the thermostat controller is programmed to be Unoccupied, the PIR function does not have an effect on the occupancy strategy.

The thermostat controller automatically switches occupancy levels from Occupied to Stand-By and Unoccupied as required, when local movement is sensed.

Occupancy sensing is enabled only if a PIR cover is installed on the thermostat controller (PIR models) or if a remote input is configured as a remote PIR sensor (**MotionNO** or **MotionNC**).

PIR Warm-Up Period

When a PIR cover is used and a thermostat controller is powered up, there is a 1-minute warm-up period before any local movement can be detected and acknowledged by the PIR sensing device. The local status LEDs for the PIR function are not active, and the sensor is in Stand-By mode for the 1-minute period. The PIR functionality and local movement status LEDs are activated after the 1-minute warm-up period has elapsed after the initial powering of the thermostat controller. If movement is present, the mode changes to Occupied.

PIR Diagnostic LEDs

The diagnostic LEDs inside the PIR lens brighten when movement is detected within the first 30 minutes after powerup. The LEDs do not light up or brighten after the initial 30-minute period.

Setpoints

The Stand-By setpoints are under the same limitations and restrictions as the Occupied and Unoccupied setpoints. Stand-By setpoints reside between the corresponding Occupied and Unoccupied setpoint values.

The installer must be certain that the difference between the Stand-By and Occupied values can be recovered within a timely fashion to ensure occupancy comfort. In addition, the difference between the two values must be large enough to warrant maximum energy savings.

Hotel and lodging applications can benefit from the addition of an entry door switch wired to one of the binary inputs of the thermostat controller. When a door contact is used and configured, the Stand-By timer and its configuration are no longer active or used. The occupancy toggle between Occupied and Stand-By is then dictated by both the door contact and the PIR sensing device used. If movements are detected by the PIR sensor and the door is closed, the room is considered occupied. The thermostat controller switches back to Stand-By mode only if the door switch toggles open/closed. Motion is ignored when the door switch indicates an open door.

PIR occupancy functionality is dictated by both the Stand-By timer and Unoccupied timer configuration value and movements present in the area.

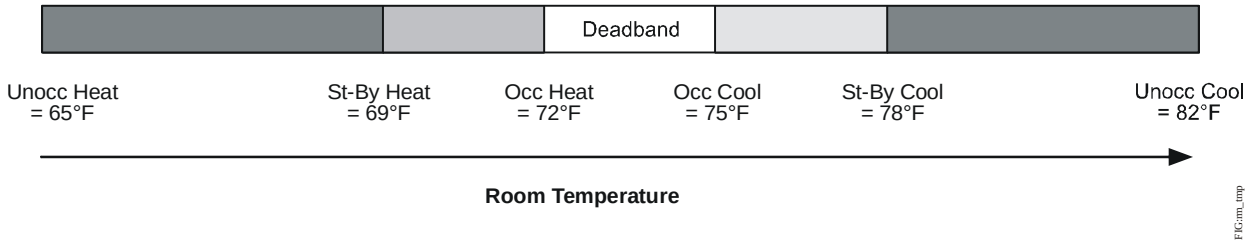


Figure 11: Increasing Room Temperature Setpoints

Unoccupied Timer Disable

It might be preferable for the local area to stay out of Unoccupied mode and always stay at the Stand-By occupancy level when no activity is present. In instances when areas always need to be in Stand-By mode, ready to respond to demand at any given point in time, we recommend disabling the Unoccupied timer.

When the local PIR occupancy routine is running at the thermostat controller, the zone drifts into Unoccupied mode when the Unoccupied timer is set above its factory default value of 0.0 hours.

For more information on occupancy sensor operation, refer to the *TEC2x45-4, TEC2xx6(H)-4, TEC2xx6H-4+PIR, and TEC2xx7-4 Series Thermostat Controllers Application Note (LIT-12011594).*

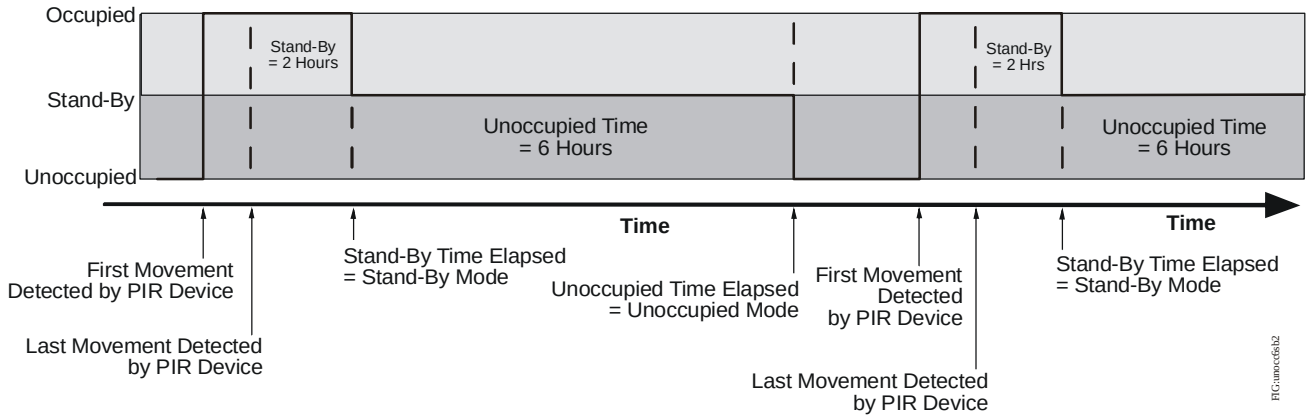


Figure 12: Unoccupied Timer Set to 6 Hours and Stand-By Timer Set to 2 Hours

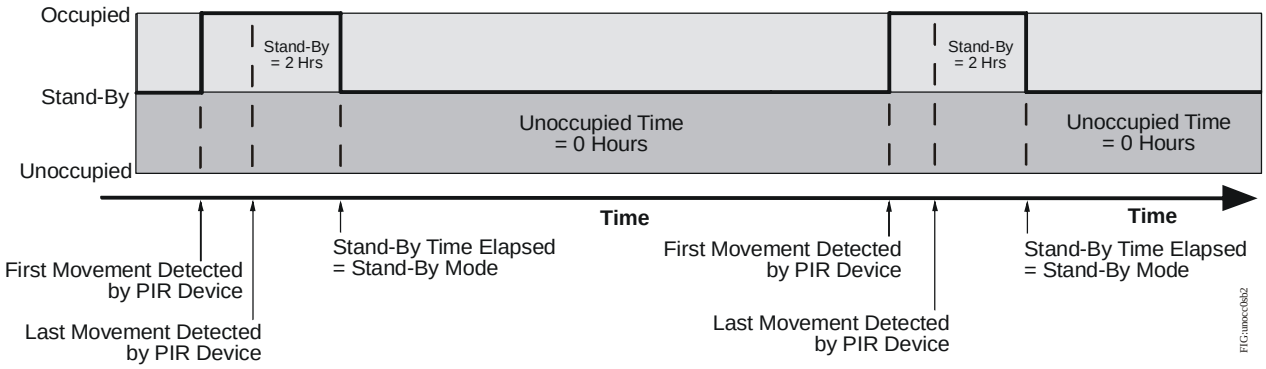


Figure 13: Unoccupied Timer Set to 0 Hours and Stand-By Timer Set to 2 Hours

Configuring the TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers

The TEC21x6(H)-4 and TEC21x6H-4+PIR Series Thermostat Controllers ship from the factory with default settings for all configurable parameters. The default settings are shown in Table 5. To reconfigure the parameters via the thermostat controller, follow the steps in this section.

1. To access the Installer Configuration Menu, press and hold the center key for approximately 8 seconds.

   Note: If the **Password** parameter is configured, Password 0 appears on the thermostat controller display indicating that the configured password is required to proceed. Use the **UP/DOWN** arrow keys to indicate the configured password, then press the **MODE** key to proceed through the Installer Configuration Menu parameters.

2. Once the Installer Configuration Menu begins, press and release the center key to scroll through the parameters listed in Table 5.
3. When the desired parameter is displayed, use the **UP/DOWN** arrow keys to choose the desired selection option.
4. Press and release the center key to continue scrolling through the parameters.

Note: Pressing the **FAN** key during configuration restarts the list of displayed parameters at the first parameter listed in Table 5.

When the thermostat controller is in the Installer Configuration Menu and left unattended for approximately 8 seconds, the thermostat controller reverts to the Status Display Menu.

Configuring Inputs BI1, BI2, and UI3

When BI1 and BI2 are configured for an alarm condition, an alarm condition is displayed locally when the input is closed. An alarm message is included on the scrolling Status Display Menu and when the message is displayed, the backlight momentarily lights up.

The UI3 input provides changeover of hot/cold water switching, or supply air temperature monitoring at the thermostat controller.

Each input can be configured to the Selection Options included in Table 5.

Configuring the Sequence of Operation (SeqOpera)

Choose the appropriate sequence of operation. The modes presented are user-dependent on the sequence of operation selected. For two-pipe applications using a changeover sensor, choose the selection option **(0): Cooling only**. Changeover occurs between **Cooling only** and **Heating only**. See Figure 14 through Figure 19 for sequence of operation examples.

Table 3: Selection Options for Sequence of Operation in Two-Pipe Applications

Selection Option	Control Curve	Terminal Numbers Used (See Table 1 and Figure 5.)		
		On/Off Control	Floating Control	Proportional 0 to 10 VDC Control
(0): Cooling Only	See Figure 14.	**10:** N.O. Cooling **11:** N.C. Cooling	**10:** Open Cooling **11:** Closed Cooling	**10:** Proportional Cooling
(1): Heating Only	See Figure 15.	**10:** N.O. Heating **11:** N.C. Heating	**10:** Open Heating **11:** Closed Heating	**10:** Proportional Heating
(2): Cooling with Reheat	See Figure 16.	**6 and 7:** Reheat **10:** N.O. Cooling **11:** N.C. Cooling	**6 and 7:** Reheat **10:** Open Cooling **11:** Closed Cooling	**6 and 7:** Reheat **10:** Proportional Cooling
(3): Heating with Reheat	See Figure 17.	**6 and 7:** Reheat **10:** N.O. Heating **11:** N.C. Heating	**6 and 7:** Reheat **10:** Open Heating **11:** Closed Heating	**6 and 7:** Reheat **10:** Proportional Heating

Table 4: Selection Options for Sequence of Operation in Four-Pipe Applications

Selection Option	Control Curve	Terminal Numbers Used (See Table 1 and Figure 5.)		
		On/Off Control	**Floating Control**	**Proportional 0 to 10 VDC Control**
(0): Cooling Only	See Figure 14.	**10:** N.O. Cooling **11:** N.C. Cooling	**10:** Open Cooling **11:** Closed Cooling	**10:** Proportional Cooling
(1): Heating Only	See Figure 15.	**8:** N.O. Heating **9:** N.C. Heating	**8:** Open Heating **9:** Closed Heating	**9:** Proportional Heating
(2): Cooling with Reheat	See Figure 16.	**6 and 7:** Reheat **10:** N.O. Cooling **11:** N.C. Cooling	**6 and 7:** Reheat **10:** Open Cooling **11:** Closed Cooling	**6 and 7:** Reheat **10:** Proportional Cooling
(3): Heating with Reheat	See Figure 17.	**6 and 7:** Reheat **8:** N.O. Heating **9:** N.C. Heating	**6 and 7:** Reheat **8:** Open Heating **9:** Closed Heating	**6 and 7:** Reheat **9:** Proportional Heating
(4): Cooling/Heating Four Pipes	See Figure 18.	**8:** N.O. Heating **9:** N.C. Heating **10:** N.O. Cooling **11:** N.C. Cooling	**8:** Open Heating **9:** Closed Heating **10:** Open Cooling **11:** Closed Cooling	**9:** Proportional Heating **10:** Proportional Cooling
(5): Cooling/Heating with Reheat, Four Pipes	See Figure 19.	**6 and 7:** Reheat **8:** N.O. Heating **9:** N.C. Heating **10:** N.O. Cooling **11:** N.C. Cooling	**6 and 7:** Reheat **8:** Open Heating **9:** Closed Heating **10:** Open Cooling **11:** Closed Cooling	**6 and 7:** Reheat **9:** Proportional Heating **10:** Proportional Cooling

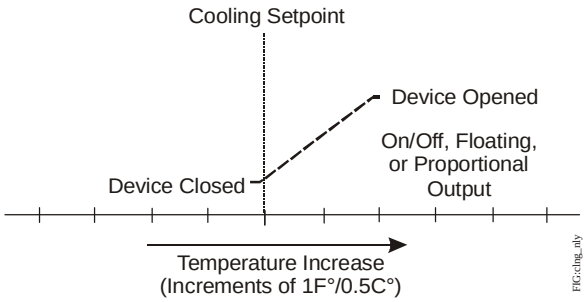


Figure 14: Cooling Only, Two- or Four-Pipe Applications

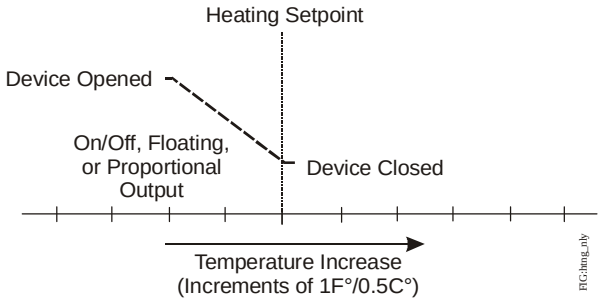


Figure 15: Heating Only, Two- or Four-Pipe Applications

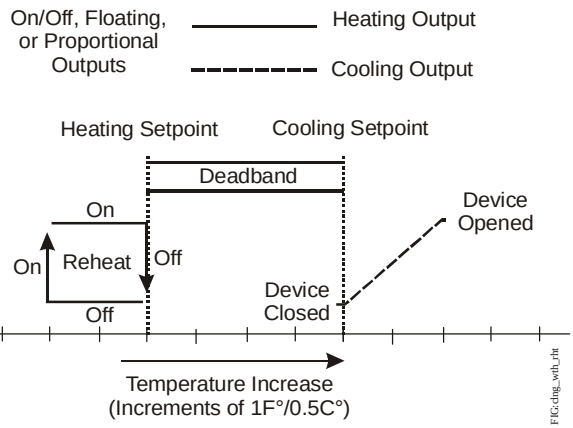


Figure 16: Cooling with Reheat, Two- or Four-Pipe Applications

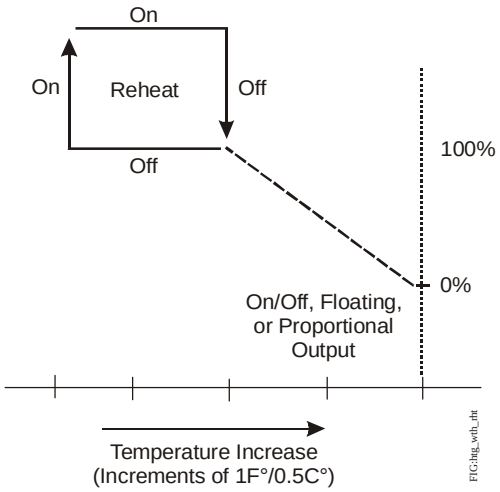
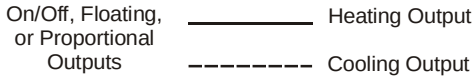


Figure 17: Heating with Reheat, Two- or Four-Pipe Applications



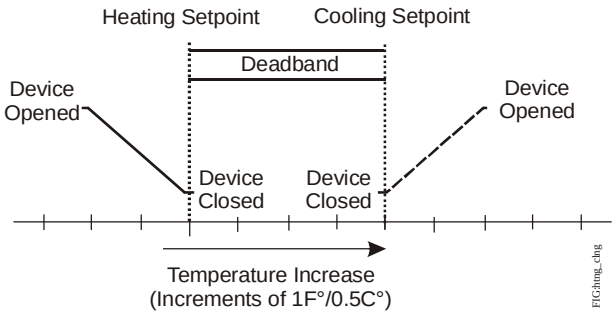


Figure 18: Heating/Cooling, Four-Pipe Applications

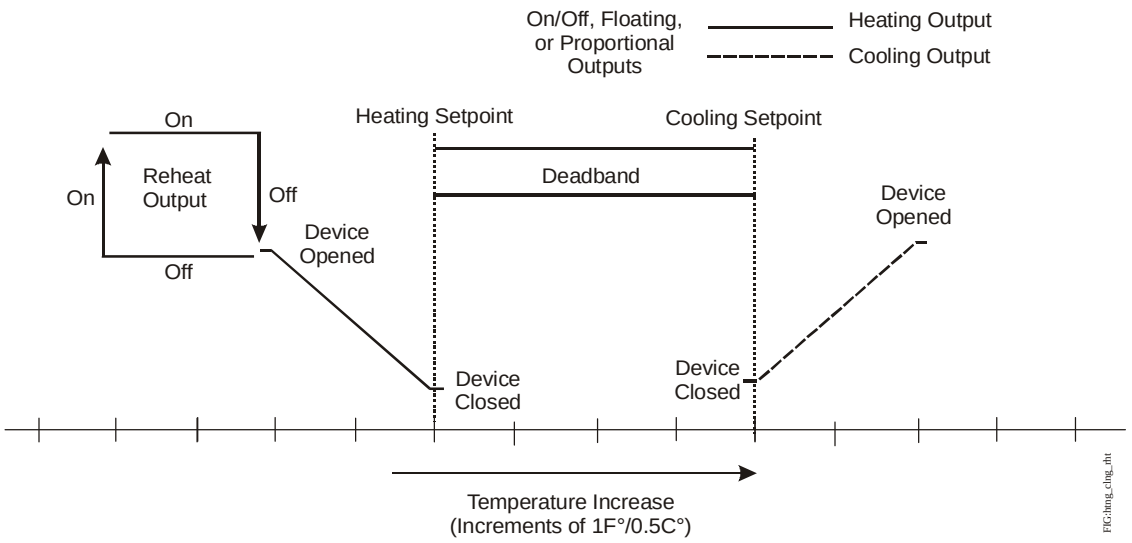


Figure 19: Heating/Cooling with Reheat, Four-Pipe Applications

Configuring Automatic Fan Speed

Use the **Fan Menu** parameter in the Installer Configuration menu to set the available Fan Mode options. Use the **FAN** key to select the desired Fan Mode option.

When selection option **(2): Low-Med-High-Auto** is chosen in the **Fan Menu** parameter, the fan operates as shown in Figure 20. When selection option **(3): Low-High-Auto** is chosen in the **Fan Menu** parameter, the fan operates at only the low and high settings and ignores the medium setting (Figure 20). This operation applies to the occupied mode when the fan is set to **Auto**.

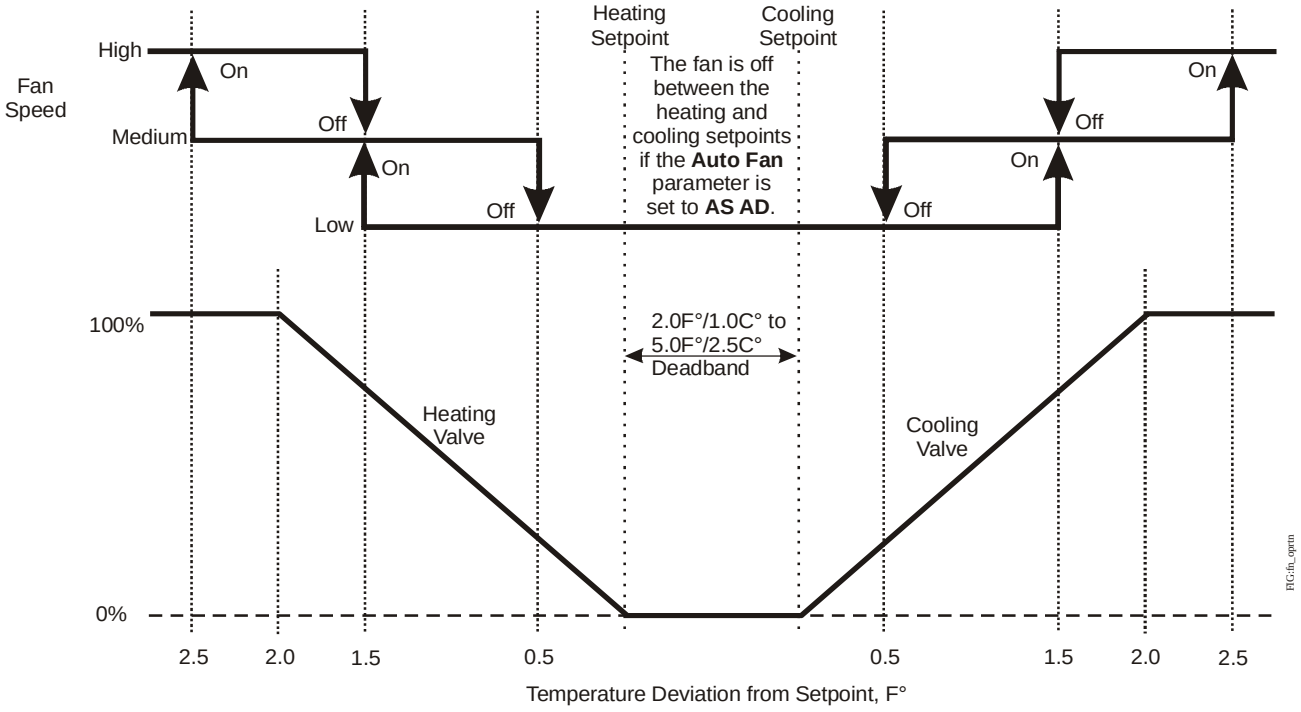


Figure 20: Low-Med-High-Auto and Low-High-Auto Fan Operation

Table 5: Installer Configuration Menu (Part 1 of 8)

Parameter Appearing on Display	Description and Default	Selection Options
Pswrd	Sets the protective access password to prevent unauthorized access to the Installer Configuration Menu. Default: **0** **Note:** The default setting does not lock out access to the Installer Configuration Menu.	Range: **0** to **1,000**
Com addr	N2 address at the thermostat controller; coincides with the address assigned at the supervisory controller. Default: **254**	Range: **0** to **254**
BI1	Configuration of Binary Input 1. Default: **None**	**(None):** No function is associated with an input. **(Rem NSB):** Remote Night Setback (NSB) via a time clock input, an occupancy sensor, or from a voltage-free contact. Contact open = Occupied; contact closed = Unoccupied. **(MotionNO*):** Temporary occupancy request via a motion detector input. Contact open = Unoccupied. When the contact closes, the thermostat goes into the occupied mode for a specified TOccTime. Once the TOccTime begins, the thermostat remains in the occupied mode if the contact is open, until the TOccTime expires. **(MotionNC*):** Temporary occupancy request via a motion detector input. Contact closed = Unoccupied. When the contact opens, the thermostat goes into the occupied mode for a specified TOccTime. Once the TOccTime begins, the thermostat remains in the occupied mode if the contact is closed, until the TOccTime expires. **(Window):** Cancels the thermostat heating or cooling action when a window is open. The fan operation is only affected if the Fan Menu parameter is set to (4): On-Auto and Auto is the selected fan mode. A Window alarm appears, indicating that the window needs to be closed to resume heating or cooling. *These settings disable any local override function.
BI2	Configuration of Binary Input 2. Default: **None**	**(None):** No function is associated with an input. **(Door Dry):** Door contact only has an effect if BI1 is set to MotionNO or MotionNC. (See the *BI1* parameter earlier in this table.) The occupancy is now dictated via BI1 and BI2. Any motion detected sets the zone to Occupied status. The zone remains permanently in occupied mode until the door contact switch opens momentarily. The thermostat then enters stand-by mode. If more movements are detected, the occupied mode resumes. While the door is opened, any movements detected by the remote PIR sensor or the PIR accessory cover are ignored. Use a Normally Closed contact switching device. Contact opened = Door opened, Contact closed = Door closed. **(RemOVR):** Temporary occupancy request via a remote input. This override function is controlled by a manual remote occupancy override. When enabled, this condition disables the override capability of the thermostat. **(Filter):** A Filter alarm is displayed. This alarm can be connected to a differential pressure switch that monitors a filter. **(Service):** A Service alarm is displayed on the thermostat when the input is energized. This input can be tied into the air conditioning unit control card, which provides an alarm should there be a malfunction.

Table 5: Installer Configuration Menu (Part 2 of 8)

<table>
<tr><th>Parameter Appearing on Display</th><th>Description and Default</th><th>Selection Options</th></tr>
<tr><td>UI3</td><td>Configuration of Universal Input 3.
Default: None</td><td>(None): No function is associated with an input.
(COC/NH): Changeover Contact/Normally Heat: A dry contact input is used to signal seasonal hot/cold water changeover. The contact closes when cold water is present. Valid only for two-pipe systems.
(COC/NC): Changeover Contact/Normally Cool: A dry contact input is used to signal seasonal hot/cold water changeover. The contact closes when hot water is present. Valid only for two-pipe systems.
(COS): Changeover Analog Sensor: Used for hot/cold water changeover switching. Valid only for two-pipe systems.
• A water temperature greater than 78.0°F (25.6°C) indicates hot water is present.
• A water temperature less than 75.0°F (23.9°C) indicates cold water is present.
Note: Choose the selection option (0): Cooling Only for the SeqOpera parameter to allow changeover to occur between Cooling Only and Heating Only. The changeover sensor does not operate in Cooling and Reheat, Heating and Reheat, or Cool/Heat Four-Pipe and Reheat applications.
(SS): Supply Air Sensor Monitoring
Note: The temperature readings from these sensors can be monitored at the thermostat controller or the supervisory controller.</td></tr>
<tr><td>MenuScro</td><td>Gives the option of having the display continuously scroll the parameters.
Default: on</td><td>(off): The scroll is inactive.
(on): The scroll is active.</td></tr>
<tr><td>AutoMode</td><td>Enables the Auto function (if Option 2 is chosen in the SeqOpera parameter) to be visible within the MODE key menu. (The MODE key is the key at the far left of the thermostat controller cover.)
Default: off</td><td>(on): The Auto function is active (Off-Auto-Heat-Cool). Provides automatic changeover between heating and cooling.
(off): The auto function is inactive (Off-Heat-Cool).</td></tr>
<tr><td>C or F</td><td>Provides temperature scale options for display.
Default: °F</td><td>(°C): Celsius scale
(°F): Fahrenheit scale</td></tr>
<tr><td>%RH disp</td><td>Displays the current humidity reading (TEC2136-4, TEC2136H-4, TEC2136H-4+PIR, TEC2156-4, TEC2156H-4, and TEC2156H-4+PIR models).
Default: off</td><td>(on): Displays the current humidity reading in % RH.
(off): Does not display the current humidity reading.</td></tr>
<tr><td>Lockout</td><td>Selectable Lockout Levels for limiting end user keypad interaction.
Default: 0</td><td>
<table>
<tr><th rowspan="2">Lockout Level</th><th colspan="4">Function</th></tr>
<tr><th>Mode Setting</th><th>Fan Setting</th><th>Local Override</th><th>Occupied Temperature Setpoints</th></tr>
<tr><td>(0)</td><td>Access</td><td>Access</td><td>Access</td><td>Access</td></tr>
<tr><td>(1)</td><td>Access</td><td>Access</td><td>No Access</td><td>Access</td></tr>
<tr><td>(2)</td><td>No Access</td><td>No Access</td><td>Access</td><td>Access</td></tr>
<tr><td>(3)</td><td>No Access</td><td>No Access</td><td>No Access</td><td>Access</td></tr>
<tr><td>(4)</td><td>No Access</td><td>No Access</td><td>Access</td><td>No Access</td></tr>
<tr><td>(5)</td><td>No Access</td><td>No Access</td><td>No Access</td><td>No Access</td></tr>
</table>
</td></tr>
</table>

Table 5: Installer Configuration Menu (Part 3 of 8)

Parameter Appearing on Display	Description and Default	Selection Options
Pipe No	Selectable number of pipes in the system. Default: **4.0 Pipes**	**(2.0 Pipes):** Limits the number of sequences of operation available from 0 to 3, and enables heat/cool operation from the same output. **(4.0 Pipes):** Allows access to all sequences of operation from 0 to 5, and enables heat/cool operation from different outputs.
CntrlTyp	Defines the control output for the type of valves used in the installation (TEC2126-4, TEC2126H-4, TEC2126H-4+PIR, TEC2136-4, TEC2136H-4, and TEC2136H-4+PIR models). Default: **Floating**	**(On/Off):** For Normally Open (N.O.) or Normally Closed (N.C.) 24 VAC two-position valves. **(Floating):** For proportional three-wire control of 24 VAC floating valves.
SeqOpera	Determines the sequence of operation. Default: **1**	**(0):** Cooling (Off-Cool). The default is **Cool**. **(1):** Heating (Off-Heat). The default is **Heat**. **(2):** Cooling with Reheat (Off-Auto*-Heat-Cool). The default is **Auto**. **(3):** Heating with Reheat (Off-Heat). The default is **Heat**. **(4):** Heating/Cooling, Four-Pipe (Off-Auto*-Heat-Cool). The default is **Auto**. **(5):** Heating/Cooling with Reheat, Four-Pipe (Off-Auto*-Heat-Cool). The default is **Auto**. * Auto can be disabled with the **AutoMode** parameter. **Note:** Choose the selection option **(0): Cooling Only** when using a changeover sensor to allow changeover to occur between **Cooling Only** and **Heating Only**. Choose the selection option **(2): Cooling and Reheat** when using a changeover sensor to allow changeover to occur between **Cooling and Reheat** and **Heating and Reheat**.
Fan Menu	Sets the Fan Mode options. Default: **4**	**(0):** Low-Med-High: Three-speed configuration using three fan relays (L-M-H). The default is **High**. **(1):** Low-High: Two-speed configuration using two fan relays (L-H). The default is **High**. **(2):** Low-Med-High-Auto: Three-speed configuration with Auto Fan speed mode using two fan relays (L-H). The default is **High**. **(3):** Low-High-Auto: Two-speed configuration with Auto Fan speed mode using two fan relays (L-H). The default is **High**. **(4):** On-Auto: One-speed configuration, (H) Auto is for Fan on demand and On is for Fan on all the time. The default is **Auto**.
DHumiLCK	Locks out the dehumidification capability (TEC2136-4, TEC2136H-4, TEC2136-4+PIR, TEC2156-4, TEC2156H-4, and TEC2156H-4+PIR models). Default: **on**	**(off):** Dehumidification is locked out. **(on):** Dehumidification is allowed.
%RH set[1]	Sets the dehumidification setpoints (TEC2136-4, TEC2136H-4, TEC2136H-4+PIR, TEC2156-4, TEC2156H-4, and TEC2156H-4+PIR models). This parameter can be used only if the dehumidification sequence is enabled. Default: **50.0% RH**	Range: **30.0** to **95.0% RH**

Table 5: Installer Configuration Menu (Part 4 of 8)

Parameter Appearing on Display	Description and Default	Selection Options
DehuHyst[1]	Sets the dehumidification hysteresis (TEC2136-4, TEC2136H-4, TEC2136H-4+PIR, TEC2156-4, TEC2156H-4, and TEC2156H-4+PIR models). This parameter can be used only if the dehumidification sequence is enabled. Default: **5.0% RH**	Range: **2.0** to **20.0% RH**
DehuCool[1]	Sets the maximum dehumidification cooling output (TEC2136-4, TEC2136H-4, TEC2136H-4+PIR, TEC2156-4, TEC2156H-4, and TEC2156H-4+PIR models). This parameter can be used only if the dehumidification sequence is enabled. Default: **100%**	Range: **20.0** to **100.0%** **Note:** This parameter can be used to balance smaller reheat loads installed with regard to the capacity of the cooling coil.
St-By TM	Sets stand-by timer value when used with occupancy sensor; time delay between moment where occupancy sensor detected the last movement in the area and the time which the thermostat stand-by mode and setpoints become active. Default: **0.5 hours**	Range: **0.5** to **24.0 hours**, in 0.5 hour increments
Unocc TM	Sets Unoccupied Timer Value when used with occupancy sensor; time delay between the moment where the thermostat toggles to stand-by mode and the time which the thermostat unoccupied mode and setpoints become active. Default: **0.0** hours	**0.0 hours** or Factory Value: Setting this parameter to its default 0 value disables the occupied timer and prevents the thermostat from drifting from stand-by mode to unoccupied mode when occupancy sensor functions are used. Range: **0.0** to **24.0 hours** in 0.5 hour increments

Table 5: Installer Configuration Menu (Part 5 of 8)

Parameter Appearing on Display	Description and Default	Selection Options	
St-By HT	Sets Stand-by heating setpoint when used with occupancy sensor; value is between occupied and unoccupied heating setpoints. Default: **69.0°F/20.6°C**	Range: **40.0°F/4.5°C** to **90.0°F/32.0°C**	**Note:** When adjusting the temperature, press the **UP/DOWN** arrow keys to change the temperature in 0.5F°/0.5C° increments; press and hold the **UP/DOWN** arrow keys to change the temperature in 5.0F°/5.0C° increments.
St-By CL	Sets Stand-by cooling setpoint limit when used with occupancy sensor; value is between occupied and unoccupied cooling setpoints. Default: **78.0°F/25.6°C**	Range: **54.0°F/12.0°C** to **100.0°F/37.5°C**	
Unocc HT	Sets the Unoccupied Heating setpoint value. Default: **62.0°F/16.5°C**	Range: **40.0°F/4.5°C** to **90.0°F/32.0°C**	
Unocc CL	Sets the Unoccupied Cooling setpoint value. Default: **80.0°F/26.5°C**	Range: **54.0°F/12.0°C** to **100.0°F/37.5°C**	
Heat max	Sets the Occupied and Unoccupied maximum Heating setpoint values. Default: **90.0°F/32.0°C**	Range: **40.0°F/4.5°C** to **90.0°F/32.0°C**	
Cool min	Sets the Occupied and Unoccupied minimum Cooling setpoint values. Default: **54.0°F/12.0°C**	Range: **54.0°F/12.0°C** to **100.0°F/37.5°C**	
Pband	Proportional Band used by the PI temperature control loop of the thermostat. Pband is not converted with C or F scale and is always shown with a range of 3 to 10. Default: **3** (**3F°/1.7C°**)	**Value**	**F Scale Pband/C Scale Pband**
		3	3.0F°/1.7C°
		4	4.0F°/2.2C°
		5	5.0F°/2.8C°
		6	6.0F°/3.3C°
		7	7.0F°/3.9C°
		8	8.0F°/4.4C°
		9	9.0F°/5.0C°
		10	10.0F°/5.6C°
		Note: The use of a larger proportional band is not to use the thermostat as a discharge air controller device. The use of a larger proportional band can be used to solve issues for flawed HVAC design with basic sizing and thermostat location errors that cannot be worked around.	
Set type	Provides the option of temporarily changing the heating or cooling setpoint by pressing the **UP/DOWN** arrow keys. Default: **permnent**	**(temporar):** Local changes to the heating or cooling setpoints are temporary, and remain effective for the specified TOccTime. **(permnent):** Local changes to the heating or cooling setpoints are permanently stored in the thermostat controller memory.	

Table 5: Installer Configuration Menu (Part 6 of 8)

Parameter Appearing on Display	Description and Default	Selection Options
Spt Func	Determines the operation and usage of the local setpoint interface by the user. Default: **Dual Stp**	**(Attch Stp):** Single Occupied Setpoint Adjustment. The displayed setpoint is the setpoint from the last action taken by the thermostat controller, or the setpoint currently in use. Both the heating and cooling setpoints are changed simultaneously, while respecting the minimum configured deadband. If one setpoint is desired over the other, use the **MODE** key to toggle between the two setpoints. **(Dual Stp):** Dual Occupied Setpoint Adjustment. The displayed setpoint is the setpoint from the last action taken by the thermostat controller, or the setpoint currently in use. The heating and cooling setpoints can be separated individually, allowing the minimum configured deadband to expand. If one setpoint is desired over the other, use the **MODE** key to toggle between the two setpoints.
TOccTime	Sets the duration of the Temporary Occupancy Time when the heating or cooling setpoints in the Occupied mode are established by: • an Override Function enabled in the Main User Menu (when the thermostat controller is in the Unoccupied mode) • a temporary heating or cooling setpoint Default: **2.0 hrs**	Range: **0.0** to **24.0 hrs** in 1-hour increments
Deadband	Sets the minimum deadband between the heating and cooling setpoints. Default: **2.0F°/1.0C°**	Range: **2.0F°/1.0C°** to **5.0F°/2.5C°** (adjustable in 1.0F°/0.5C° increments)
Cal RS	Sets the desired room air sensor calibration (offset). The offset can be added to or subtracted from the actual displayed room temperature. Default: **0.0F°/0.0C°**	Range: **-5.0F°/-2.5C°** to **5.0F°/2.5C°** (adjustable in 1.0F°/0.5C° increments)
Cal RH	Sets the desired humidity sensor calibration (offset). The offset can be added to or subtracted from the actual displayed room humidity (TEC2136-4, TEC2136H-4, TEC2136H-4+PIR, TEC2156-4, TEC2156H-4, and TEC2156H-4+PIR models). This parameter can be used only if the dehumidification sequence is enabled. Default: **0.0% RH**	Range: **-15.0% RH** to **15.0% RH** (adjustable in 1% RH increments)

Table 5: Installer Configuration Menu (Part 7 of 8)

Parameter Appearing on Display	Description and Default	Selection Options			
Aux cont	Determines the auxiliary contact function and configuration. Default: **0**	**(0)**	Not used, or used for reheat	If the sequence of operation is set to reheat (2, 3, or 5), ignore this parameter.	
		(1)	Auxiliary N.O.	Occupied = contact closed Unoccupied = contact open	The output aligns with occupancy.
		(2)	Auxiliary N.C.	Occupied = contact open Unoccupied = contact closed	
		(3)	Auxiliary N.O.	Occupied and fan On = contact closed Unoccupied and fan On or Off = contact open	The output aligns with occupancy and the fan on command.
		(4)	Auxiliary N.C.	Occupied and fan On = contact open Unoccupied and fan On or Off = contact closed	
		(5)	This selection option is not used.		
Auto Fan	Affects the auto mode of operation for the following **Fan Menu** parameter selection options only: • **(2):** Low-Med-High-Auto • **(3):** Low-High-Auto Default: **AS**	**(AS AD):** The fan is on Auto during occupied periods. The Med and High speeds operate automatically on a temperature error from the setpoint. The Low speed operates Auto on demand. When there is no demand, the Low speed shuts down. The Low speed is only re-activated when there is a heating or cooling demand. **(AS):** The fan is always on during occupied periods. The fan is on Auto during unoccupied periods. The Low, Med, and High speeds operate automatically on a temperature error from the setpoint.			
FL time	Sets the maximum actuator stroke timing (floating **CntrlTyp** TEC2126-4, TEC2126H-4, TEC2126H-4+PIR, TEC2136-4, TEC2136H-4, and TEC2136H-4+PIR models). Default: **1.5 min**	Range: **0.5** to **9.0 min** (adjustable in 0.5 minute increments)			
Cph	Sets the maximum number of cycles per hour (TEC2116-4, TEC2116H-4, TEC2116H-4+PIR, and on/off **CntrlTyp** TEC2126-4, TEC2126H-4, TEC2126H-4+PIR, TEC2136-4, TEC2136H-4, and TEC2136H-4+PIR models). Default: **4**	Range: **3** to **8 cycles per hour**			
RA/DA	Choice of reverse or direct acting analog output signal (TEC2146-4, TEC2146H-4, TEC2146H-4+PIR, TEC2156-4, TEC2156H-4, and TEC2156H-4+PIR models). Default: **DA**	**(RA):** Reverse acting, 0 to 100% = 10 to 0 VDC **(DA):** Direct acting, 0 to 100% = 0 to 10 VDC			

Table 5: Installer Configuration Menu (Part 8 of 8)

Parameter Appearing on Display	Description and Default	Selection Options
Reheat	Sets the duty cycle time for reheat output (if Option 2, 3, or 5 is chosen in the **SeqOpera** parameter). Default: **0**	**(1):** 10 seconds (six cycles per minute), for various equipment with solid-state relays that withstand short duty cycles such as electric heat. **(0):** 15 minutes (four cycles per hour), for various equipment with mechanical relays or contactors controlling mechanical reheat systems.
UI3 dis	Displays the supply or changeover temperature when UI3 is configured as an analog input (supply sensor or changeover sensor). Default: **-40°F/-40°C**	Used as a diagnostic/service help, to troubleshoot and diagnose sensor operation.

1. When adjusting the numeric value, press the **UP** or **DOWN** arrow key to change the value by single increments; press and hold the **UP** or **DOWN** arrow key to change the numeric value in increments of ten.

Troubleshooting

See Table 7 for display messages. See Table 8 for further troubleshooting details.

Accessories

All the accessories in Table 6 include mounting hardware; contact the nearest Johnson Controls® representative to order any of these parts.

Note: Review the technical specifications of the accessories prior to their use in an application.

Repair Information

If a TEC21x6(H)-4 or TEC21x6H-4+PIR Series Thermostat Controller fails to operate within its specifications, replace the unit. For a replacement thermostat controller, contact the nearest Johnson Controls representative.

Table 6: Accessories (Order Separately)

Code Number	Description
SEN-600-1	Remote Indoor Air Temperature Sensor
SEN-600-4	Remote Indoor Air Temperature Sensor with Occupancy Override and LED
TE-6361M-1[1]	Duct Mount Air Temperature Sensor
TE-636S-1[1]	Strap-Mount Temperature Sensor
TEC-6-PIR[2]	Cover with Occupancy Sensor
TEC-6H-PIR[3]	Cover with Occupancy Sensor for Hospitality Models

1. Additional TE-636xx-x Series 10k ohm Johnson Controls Type II Thermistor Sensors are available; refer to the *TE-6300 Series Temperature Sensors Product Bulletin (LIT-216320)* for more details.
2. The TEC-6-PIR Accessory Cover can be used to replace the existing cover on a non-PIR TEC21x6-4 Series Thermostat Controller to provide occupancy sensing capability.
3. The TEC-6H-PIR Accessory Cover can be used to replace the existing cover on a non-PIR TEC21x6H-4 Series Thermostat Controller to provide occupancy sensing capability.

Table 7: Display Messages

Display	Function
Service	Indicates that there is a service alarm in accordance with the programmable Binary Input (BI2).
Filter	Indicates that the filter(s) is dirty in accordance with the programmable Binary Input (BI2).
Window	Indicates that an outside window or door is open and has cancelled the thermostat controller heating or cooling action in accordance with the programmable Binary Input (BI1).

Table 8: Troubleshooting Details

Error/Trouble Condition	Probable Cause	Solution
Thermostat Controller Cycles Online and Offline	Two or more controllers have the same address.	Change each duplicate address to a unique number.
	There are Y or T taps on the N2 Bus, or the repeater has lost power or is wired incorrectly.	Refer to the *N2 Communications Bus Technical Bulletin (LIT-636018).*
Thermostat Controller Does Not Come Online	Two or more controllers have the same address.	Change each duplicate address to a unique number.
	The N2 Bus contains too many devices.	Do not exceed the maximum number of devices allowed on the N2 Bus per supervisory controller limitations.
	The thermostat controller does not have power.	Apply power to the thermostat controller.
	The N2 cable runs are broken.	Locate the break and correct the wiring.
	The thermostat controller device type is incorrect.	Change the thermostat controller device type to VND.
N2 Bus is Offline	The wiring on the N2 Bus is broken.	Repair the wiring.
	No point mapping has been entered.	Define the BAS dataset.

Technical Specifications

TEC21x6(H)-4 and TEC21x6H-4+PIR Series N2 Networked Thermostat Controllers with Dehumidification Capability, Fan Control, and Occupancy Sensing Capability (Part 1 of 2)

Power Requirements		19 to 30 VAC, 50/60 Hz, 2 VA (Terminals 4 and 5) at 24 VAC Nominal, Class 2 or Safety Extra-Low Voltage (SELV)
Triac Output Rating (BO1, BO2, BO3, BO4)	**On/Off and Floating Control**	19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A In-Rush, Class 2 or SELV
Analog Output Rating	**Proportional Control**	0 to 10 VDC into 2k ohm Resistance (Minimum)
Fan Relay Output Rating		19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A In-Rush
Auxiliary Output Rating	**Triac Output**	19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A In-Rush
Analog Inputs		Resistive Inputs (RS and UI3) for 10k ohm Johnson Controls Type II Negative Temperature Coefficient (NTC) Thermistor Sensors
Binary Inputs		Voltage-Free Contacts across Terminal Scom to Terminals BI1, BI2, or UI3
Temperature Sensor Type		Local 10k ohm NTC Thermistor
Wire Size		18 AWG (1.0 mm Diameter) Maximum, 22 AWG (0.6 mm Diameter) Recommended
Temperature Range	**Backlit Display**	-40.0°F/-40.0°C to 122.0°F/50.0°C in 0.5° Increments
	Heating Control	40.0°F/4.5°C to 90.0°F/32.0°C
	Cooling Control	54.0°F/12.0°C to 100.0°F/38.0°C
Accuracy	**Temperature**	±0.9F°/±0.5C° at 70.0°F/21.0°C Typical Calibrated
	Humidity	±5% RH from 20 to 80% RH at 50 to 90°F (10 to 32°C)
Default Minimum Deadband		2F°/1C° between Heating and Cooling
Ambient Conditions	**Operating**	32 to 122°F (0 to 50°C); 95% RH Maximum, Noncondensing
	Storage	-22 to 122°F (-30 to 50°C); 95% RH Maximum, Noncondensing

TEC21x6(H)-4 and TEC21x6H-4+PIR Series N2 Networked Thermostat Controllers with Dehumidification Capability, Fan Control, and Occupancy Sensing Capability (Part 2 of 2)

Compliance	**United States**	UL Listed, File E27734, CCN XAPX, Under UL 873, Temperature Indicating and Regulating Equipment
		FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	Canada	UL Listed, File E27734, CCN XAPX7, Under CAN/CSA C22.2 No. 24, Temperature Indicating and Regulating Equipment
		Industry Canada, ICES-003
	Europe	CE Mark, EMC Directive 2004/108/EC
	Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant
Shipping Weight		**TEC21x6(H)-4 Models:** 0.75 lb (0.34 kg) **TEC21x6H-4+PIR Models:** 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, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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