

TEC22x2-4 and TEC22x2-4+PIR LONWORKS® Networked Heat Pump Thermostat Controllers

Installation Instructions

TEC2202-4, TEC2202-4+PIR
TEC2262-4, TEC2262-4+PIR

Part No. 24-9890-1281, Rev. —
Issued February 8, 2010

Applications

The TEC2262-4(+PIR) Programmable and TEC2202-4(+PIR) Non-programmable Thermostat Controllers are LONWORKS® networked devices that provide control of heat pump equipment. The TEC2262-4+PIR and TEC2202-4+PIR Thermostat Controllers provide advanced active occupancy logic that automatically switches occupancy from Occupied to Unoccupied as required by the presence of local activity. See the [Occupancy Sensor Operation – TEC22x2-4+PIR Thermostat Controller](#) section for more information.

The technologically advanced TEC22x2-4 and TEC22x2-4+PIR Thermostat Controllers feature a Building Automation System (BAS) LONWORKS network communication capability that enables remote monitoring and programming for efficient space temperature control.

The TEC22x2-4 and TEC22x2-4+PIR Series Thermostat Controllers feature an intuitive User Interface (UI) with backlit display that makes setup and operation quick and easy. The thermostat controller also employs a unique, Proportional-Integral (PI) time-proportioning algorithm that virtually eliminates temperature offset associated with traditional, differential-based thermostat controller controllers.

IMPORTANT: The TEC22x2-4 and TEC22x2-4+PIR 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 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 TEC22x2-4 or TEC22x2-4+PIR Thermostat Controllers:

- 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 TEC22x2-4 and TEC22x2-4+PIR Thermostat Controller.

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.**

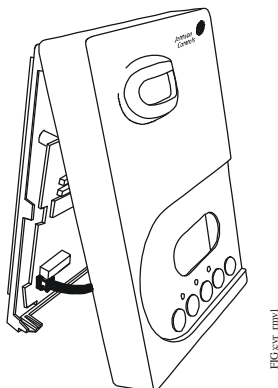


Figure 1: Removing the Thermostat Controller Cover (TEC22x2-4+PIR Model Shown)

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.

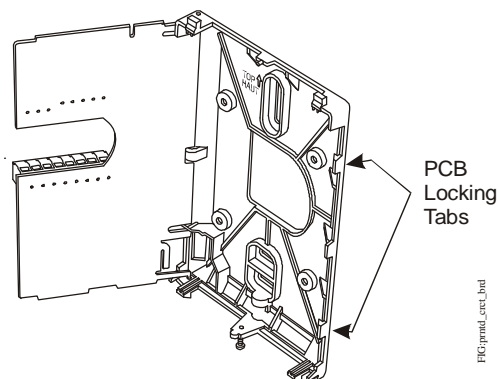


Figure 2: Opening the Thermostat Controller PCB

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

Note: Be careful not to overtighten the mounting screws.

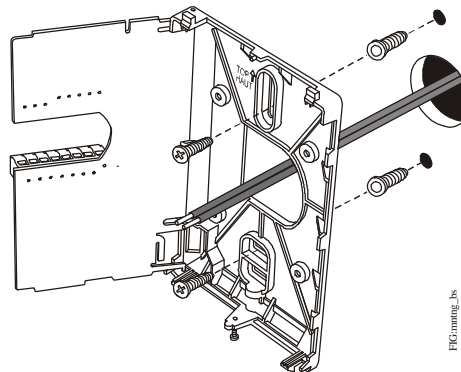


Figure 3: Securing the Thermostat Controller Mounting Base to the Wall

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

- 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.

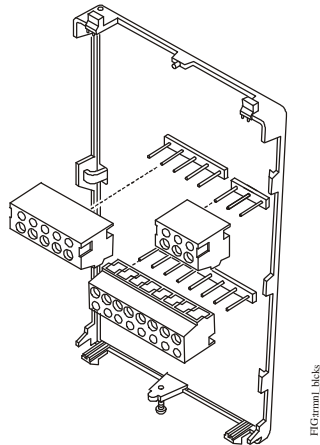


Figure 4: Removing the Screw Terminal Blocks

Wiring

When an existing thermostat controller is replaced, remove and label the wires to identify the terminal functions. When a TEC22x2-4 or TEC22x2-4+PIR 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 TEC22x2-4 and TEC22x2-4+PIR thermostat controller.

To wire the thermostat controller:

- Strip the ends of each wire 1/4 in. (6 mm) and connect them to the appropriate screw terminals as indicated in Table 1, Figure 5, Figure 6, and Figure 7.

Note: For more details on wiring the LONWORKS network, refer to the *LONWORKS Network Layout Technical Bulletin (LIT-1162150)*.

- 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.

- Reinsert the screw terminal blocks onto the PCB.
- Reattach the LONWORKS communication wires to the LON terminal block. See Figure 5.

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

- Reattach the thermostat controller cover to the mounting base (top side first).
- Use a Phillips-head screwdriver to reinstall the security screw on the bottom of the thermostat controller cover.

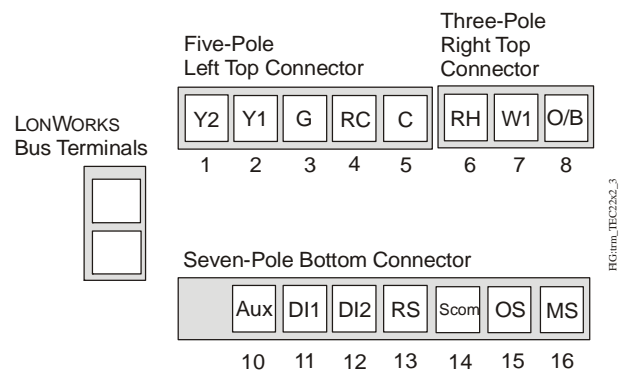


Figure 5: TEC22x2-4 and TEC22x2-4+PIR Thermostat Controller Terminals

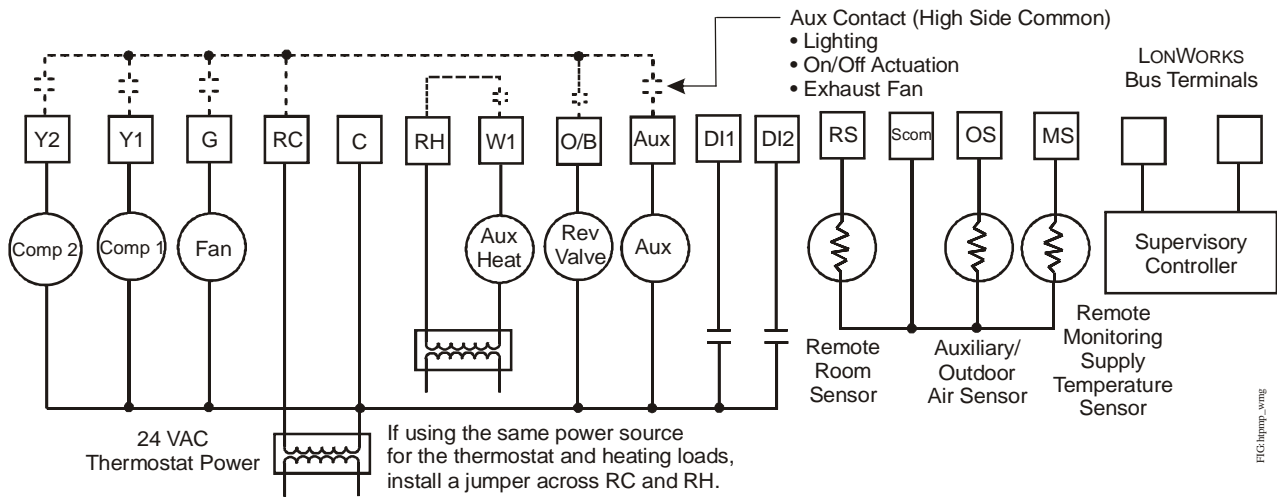


Figure 6: TEC22x2-4 and TEC22x2-4+PIR Thermostat Controller General Application

Table 1: Terminal Identification (See Figure 5.)

Number	Label	Function
1	Y2	Energizes second-stage compressor on a call for heating or cooling.
2	Y1	Energizes first-stage compressor on a call for heating or cooling.
3	G	Energizes fan in accordance with selected fan mode.
4	RC	24 VAC from equipment transformer
5	C	24 VAC (Common) from equipment transformer
6	RH	24 VAC for heating stage
7	W1	Energizes on a call for auxiliary heat.
8	O/B	Energizes reversing valve. Configurable to energize valve on a call for heating or a call for cooling.
10	Aux	Auxiliary output
11	DI1	Configurable Digital Input 1
12	DI2	Configurable Digital Input 2
13	RS	Remote Room Air Temperature Sensor
14	Scom	Sensor Common
15	OS	Auxiliary/Outdoor Air Sensor
16	MS	Remote Monitoring Supply Temperature Sensor
Blank	Blank	LONWORKS Bus

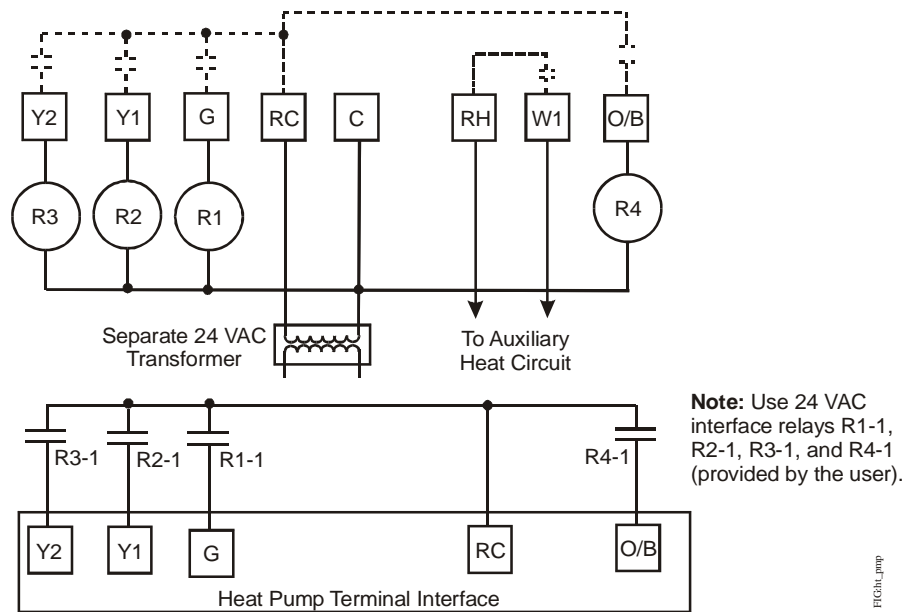


Figure 7: VDC Switching Application for Heat Pumps

Connecting the LONWORKS Network

The wiring rules for the LONWORKS network differ from the wiring rules for the Metasys® N2 Bus and the BACnet® Master-Slave/Token Passing (MS/TP) Bus. For more details on wiring the LONWORKS network, refer to the *LONWORKS Network Layout Technical Bulletin (LIT-1162150)*.

To connect the thermostat controller to the LONWORKS network:

1. Connect the LONWORKS network wires to the LONWORKS network terminal block on the thermostat controller (Figure 5, Figure 6, Figure 7, and Figure 8).

Note: There is no polarity when connecting the LONWORKS network wires to the thermostat controller; however, we recommend keeping the polarity consistent throughout the network.

2. After the LONWORKS network wires are connected to the first thermostat controller, continue in a daisy-chained fashion to the next device.

Note: The LONWORKS network wiring must be twisted-pair lines.

Do not run the LONWORKS network wiring in the same conduit as line voltage wiring (higher than 30 VAC) or other wiring that switches power to highly inductive loads (such as contactors, coils, motors, or generators).

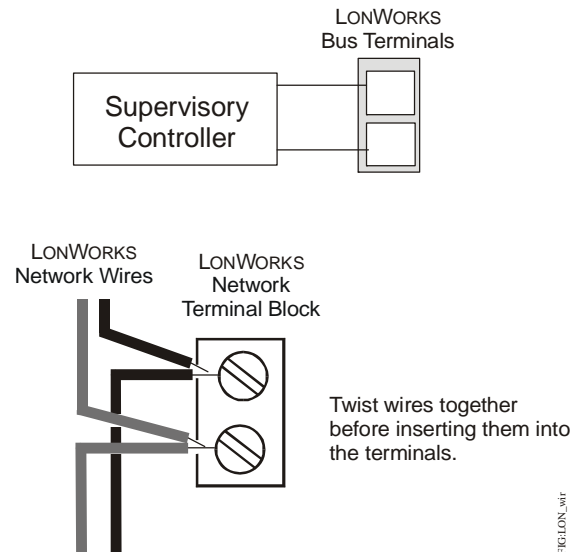


Figure 8: Thermostat Controller to Network Connection

The LONWORKS network requires proper termination and biasing at the end of a segment (a segment is a physically continuous length of wire). The thermostat controller is not equipped with the ability to provide this termination; therefore, it cannot be located at the physical end of a LONWORKS network segment unless a terminator is attached. Refer to *LONWORKS Network Layout Technical Bulletin (LIT-1162150)* for end-of-line solutions.

Setup and Adjustments

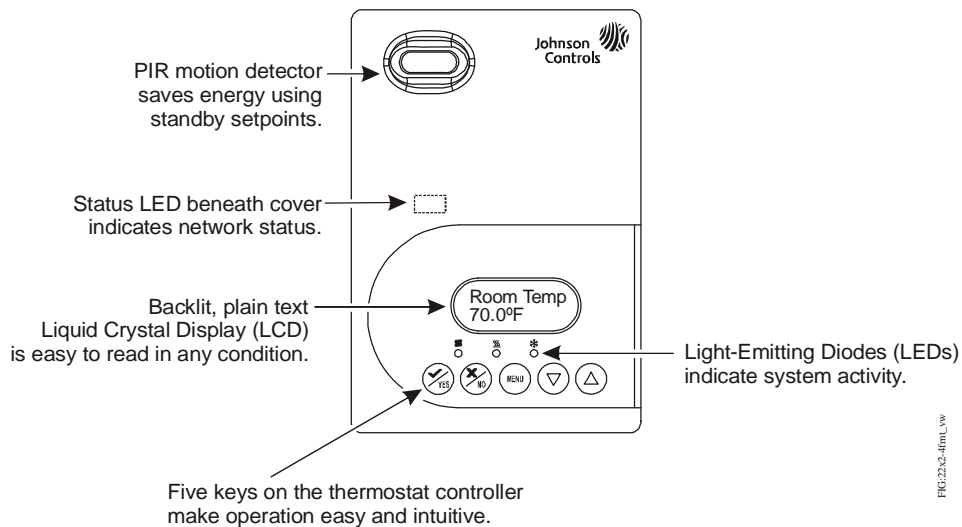


Figure 9: Front Cover of Thermostat Controller (TEC22x2-4+PIR Model Shown)

Thermostat Controller User Interface Keys

The TEC22x2-4 and TEC22x2-4+PIR Thermostat Controller UI consists of five keys on the front cover (Figure 9). The function of each key is as follows:

- Use the **YES** key to:
 - confirm menu selections and to advance to the next menu item
 - stop the Status Display Menu from scrolling and to manually scroll to the next parameter on the menu

Note: When the thermostat controller is left unattended for 45 seconds, the thermostat controller display resumes scrolling.




- Use the **NO** key to decline a parameter change and to advance to the next menu item.
- Use the **MENU** key to:
 - access the Main User Menu or to exit the menu (See the [Main User Menu](#) section.)
 - access the Installer Configuration Menu or to exit the menu (See the [Configuring the TEC22x2-4 and TEC22x2-4+PIR Thermostat Controller](#) section.)
- Use the **UP/DOWN** arrow keys to change the configuration parameters and to activate a setpoint adjustment.

Backlit Liquid Crystal Display (LCD)

The TEC22x2-4 and TEC22x2-4+PIR thermostat controller includes 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 – TEC22x2-4+PIR Thermostat Controller

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

Status LED

The status LED shows the operational status of the thermostat controller. See Table 2. The Status LED is a small green light under the thermostat controller cover (under the LONWORKS daughter board on the left edge when facing the thermostat controller).

Table 2: Status LED Explanation

Status LED Condition	Explanation
Continuously On	The thermostat controller does not have an application loaded in its memory.
Flashing at a 0.5 Hz Rate	The thermostat controller has an application loaded in its memory but is not configured. Use a LONWORKS network management tool to bind the thermostat controller to a LONWORKS network.
Continuously Off	The thermostat controller has an application loaded in its memory and is bound to a LONWORKS network.

Programming Overview

Three menus are used to view, program, and configure the TEC22x2-4 and TEC22x2-4+PIR Thermostat Controllers: the Status Display Menu, the Main User Menu, and the Installer Configuration Menu.

Status Display Menu

The Status Display Menu is displayed during normal thermostat controller operation, and continuously scrolls through the following parameters:

- Room Temperature
- Clock (TEC2262-4 and TEC2262-4+PIR only)
- System Mode
- Occupancy Status (Occupied/Unoccupied/Override)
- Outside Temperature – An outside air temperature sensor must be installed and connected.
- Applicable Alarms – The backlight lights up as an alarm condition is displayed.

Note: Press the **YES** key to temporarily stop this menu from scrolling.

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

Main User Menu

Use the Main User Menu to access and change the basic operating parameters of the thermostat controller. Access the menu by pressing the **MENU** key during normal thermostat controller operation.

Installer Configuration Menu

Use the Installer Configuration Menu to set up the thermostat controller for application-specific operation. To access the menu, press and hold the **MENU** key for approximately 8 seconds.

Occupancy Sensor Operation – TEC22x2-4+PIR Thermostat Controller

A TEC22x2-4+PIR Thermostat Controller (or a TEC22x2-4 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 the occupancy level between Occupied and Unoccupied as required, when local movement is sensed. In the Occupied mode, if no movement is detected beyond the **Unocc TM** parameter setting, the mode changes to Unoccupied. Once movement is detected, the mode changes back to Occupied.

Occupancy sensing is enabled only if a PIR cover is installed. The PIR cover, when installed, is auto detected.

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

These setpoints and Unoccupied time are adjustable to allow for customization, as dictated by the individual space requirements. See Figure 10 for an example of increasing room temperature setpoints.

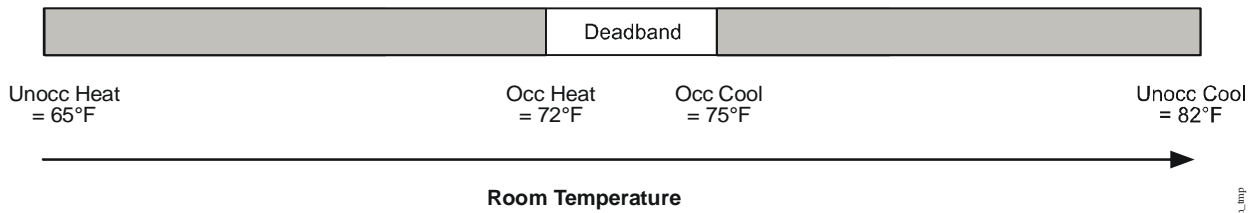


Figure 10: Increasing Room Temperature Setpoints

Configuring the TEC22x2-4 and TEC22x2-4+PIR Thermostat Controller

The TEC22x2-4 and TEC22x2-4+PIR Thermostat Controllers ship from the factory with default settings for all configurable parameters. The default settings are shown in Table 3. 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 **MENU** 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 **MENU** key to proceed through the Installer Configuration Menu parameters.

2. Once the Installer Configuration Menu begins, release and press the **NO** key to scroll through the parameters listed in Table 3.
3. When the desired parameter is displayed, use the **YES** key to choose the desired selection option.
4. Press the **YES** key and then the **NO** key to continue scrolling through the parameters.

To exit the Installer Configuration Menu any time, press the **MENU** key, and at the exit prompt, press the **YES** key. To pass over a parameter without changing it, press the **NO** key.

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.

For additional information on commissioning and configuring thermostat controllers, adding thermostat controllers to a Network Automation Engine (NAE), thermostat controller mapping, and remote thermostat controller commanding, refer to *TEC226x-4(+PIR) and TEC220x-4(+PIR) Series LONWORKS® Network Configurable Staged Thermostat Controllers Technical Bulletin (LIT-12011611)*.

Configuring the Thermostat Controller's Neuron® Identification

Press and hold the **YES/NO** keys simultaneously for 5 seconds to broadcast the thermostat controller's Neuron Identification on the LONWORKS network.

If the cover is removed, you can see a green LED under the LON board flash when the thermostat controller broadcasts the Neuron ID. The Neuron ID is on a label on the Echelon® chip.

You cannot send the Neuron ID while in the Installer Configuration menu.

Configuring Inputs DI1 and DI2

When DI1 and DI2 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.

Each input can be configured to the Selection Options included in Table 3.

Table 3: Installer Configuration Menu (Part 1 of 5)

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
DI1¹	Configuration of Digital Input 1. Default: None	<p>(None): No function is associated with an input.</p> <p>(RemNSB): Remote Night Setback (NSB) via a time clock input, an occupancy sensor, or from a voltage-free contact. Contact open = Occupied; contact closed = Unoccupied.</p> <p>(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 controller.</p> <p>(Filter): A Filter alarm is displayed. This alarm can be connected to a differential pressure switch that monitors a filter.</p> <p>(Service): A Service alarm is displayed on the thermostat controller when the input is energized. Tie this input into the air conditioning unit control card, which provides an alarm if a malfunction occurs.</p> <p>(Fan lock): A backlit flashing Fan lock alarm is displayed on the thermostat controller when the input is not energized. This alarm is used in conjunction with a local airflow sensor connected to the input. The thermostat controller heating or cooling action is locked out if no airflow is detected 10 seconds after the fan (Terminal G) is energized. Contact open = no airflow; contact closed = airflow present.</p>
DI2¹	Configuration of Digital Input 2. Default: None	<p>(None): No function is associated with an input.</p> <p>(RemNSB): Remote Night Setback (NSB) via a time clock input, an occupancy sensor, or from a voltage-free contact. Contact open = Occupied; contact closed = Unoccupied.</p> <p>(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 controller.</p> <p>(Filter): A Filter alarm is displayed. This alarm can be connected to a differential pressure switch that monitors a filter.</p> <p>(Service): A Service alarm is displayed on the thermostat controller when the input is energized. Tie this input into the air conditioning unit control card, which provides an alarm if a malfunction occurs.</p> <p>(Fan lock): A backlit flashing Fan lock alarm is displayed on the thermostat controller when the input is not energized. This alarm is used in conjunction with a local airflow sensor connected to the input. The thermostat controller heating or cooling action is locked out if no airflow is detected 10 seconds after the fan (Terminal G) is energized. Contact open = no airflow; contact closed = airflow present.</p>
MenuScro	Gives the option of having the display continuously scroll the parameters. Default: on	<p>(off): The scroll is inactive.</p> <p>(on): The scroll is active.</p>

Table 3: Installer Configuration Menu (Part 2 of 5)

Parameter Appearing on Display	Description and Default	Selection Options			
Lockout Selectable Lockout Levels for limiting end-user keypad interaction. Default: 0		Function	Lockout Level		
			(0)	(1)	(2)
		Occupancy Override	Access	Access	No Access
		Permanent Temperature Setpoints	Access	No Access	No Access
		Temporary Temperature Setpoints	Access	Access	No Access
		System Mode Setting	Access	No Access	No Access
		Fan Mode Setting	Access	No Access	No Access
		Schedules Setting⁵	Access	No Access	No Access
Clock Setting⁵	Access	Access	Access		
Pwr del²	Sets the delay time period at thermostat controller powerup, or at each time power is removed and reapplied, before any operation (fan, heating, or cooling) is authorized. Also can be used to sequence the startup of multiple units in one location. Default: 10.0 sec	Range: 10.0 to 120.0 sec			
Frost pr	Provides a minimum heating setpoint of 42.0°F/5.5°C to prevent freezing in the zone controlled by the thermostat controller. Forces system to Emergency Mode. Default: off	(on): Enabled (off): Disabled			
Heat max³	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 min³	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 controller. Pband is not converted with C or F scale and is always shown with a range of 2 to 8. Default: 2 (2.0F°/1.1C°)		Value	F Scale Pband/C Scale Pband		
		2	2.0F°/1.1C°		
		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°		
Note: The use of a larger proportional band is not to use the thermostat controller 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 controller location errors that cannot be worked around.					

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

Parameter Appearing on Display	Description and Default	Selection Options
Anticycl	Anti-Short Cycle timer sets the minimum on/off times for heating and cooling stages. Default: 2.0 min	Range: 0.0 to 5.0 min adjustable in 1-minute increments Set the anti-short cycle timer to 0.0 min for equipment that already has its own anti-short cycle timer.
Heat cph	Sets the maximum number of Heating cycles per hour. Default: 4.0	Range: 3.0 to 8.0 cycles per hour
Cool cph	Sets the maximum number of Cooling cycles per hour. Default: 4.0	Range: 3.0 or 4.0 cycles per hour
Deadband	Sets the minimum deadband between the heating and cooling setpoints. Default: 2.0F°/1.0C°	Range: 2.0F°/1.0C° to 4.0F°/2.0C° adjustable in 1.0F°/0.5C° increments
Fan cont	Determines how the fan is activated in response to a call for heating or cooling. Default: on	(off) : Enables the thermostat controller to activate the fan in response to a call for cooling only. (on) : Enables the thermostat controller to activate the fan in response to a call for heating or cooling. When there is a call for auxiliary heating, the fan is activated by the equipment fan and limit control.
Fan del	Fan delay extends fan operation after a heating or cooling cycle has ended. Default off	(on) : Extends fan operation by 60 seconds after a heating or cooling cycle has ended. (off) : No extension of fan operation after a heating or cooling cycle has ended. The fan delay is only active when the fan is in the Auto mode.
TOccTime	Sets the duration of the Temporary Occupancy Time when the heating or cooling setpoints in the Occupied mode are established by: <ul style="list-style-type: none"> • 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: 3.0 hrs	Range: 0.0 to 12.0 hrs adjustable in 1-hour increments
Cal RS	Sets the desired room air temperature 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 OS	Sets the desired outdoor air temperature 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

Table 3: Installer Configuration Menu (Part 4 of 5)

Parameter Appearing on Display	Description and Default	Selection Options
HP stage	Sets the number of heat pump compressor stages. Default: 2.0	(1.0): One Stage (2.0): Two Stages Reverts the operation of a two-stage thermostat controller to a single-stage thermostat controller when the second cooling stage is not needed.
H lock⁴	Discontinues heating operation in response to the outdoor air temperature. Requires that an outdoor air temperature sensor be installed and connected. Default: 120°F/49°C	Range: -15°F/-26°C to 120°F/49°C adjustable in 5F°/5C° increments
C lock⁴	Discontinues cooling operation in response to the outdoor air temperature. Requires that an outdoor air temperature sensor be installed and connected. Default: -40°F/-40°C	Range: -40°F/-40°C to 95°F/35°C adjustable in 5F°/5C° increments
Unocc TM	Sets the time delay between the moment when the thermostat controller toggles from the Occupied mode to the Unoccupied mode after the last motion is detected by the occupancy sensor. Default: 0.5 hours	Range: 0.5 hours to 24.0 hours adjustable in 0.5 hour increments
2/4event⁵	Sets the number of events within a 24-hour period. Default: 2.0	(2.0): Two events (one occupied and one unoccupied) within a 24-hour period (4.0): Four events (two occupied and two unoccupied) within a 24-hour period
Aux cont	Energizes peripheral devices (lighting equipment, exhaust fans, and economizers). Default: n.o.	(n.c.): Contact open = Occupied; contact closed = Unoccupied (n.o.): Contact closed = Occupied; contact open = Unoccupied The contact toggles with the internal Occupied/Unoccupied schedule (or the NSB contact on one of the digital inputs, if used).
Prog rec⁵	Provides the desired occupied temperature either at the start of the occupied schedule or after the occupied schedule begins. Note: Progressive recovery is disabled if either DI1 or DI2 is configured as remote NSB. Default: off	(on): Enabled (provides the desired occupied temperature at the start of the occupied schedule) (off): Disabled (provides the desired occupied temperature after the occupied schedule begins)
Hi b. p.⁴	Sets the high balance point – the outdoor air temperature at which the auxiliary heat is not used. Default: 90.0°F/32.0°C	Range: 34.0°F/1.0°C to 90.0°F/32.0°C Above the high balance point, only the heat pump is used to maintain the heating setpoint. If no outdoor air sensor is connected to Terminal OS, auxiliary heat pump operation may still be used above the high balance point.
Lo b. p.⁴	Sets the low balance point – the outdoor air temperature at which the heat pump operation terminates when the heat pump is in the heating mode. Default: -12.0°F/-24.0°C	Range: -40.0°F/-40°C to 30.0°F/-1.0°C Below the low balance point, only the auxiliary heat is used to maintain the heating setpoint. Heat pump operation may still be used below the low balance point if no outdoor air sensor is connected to Terminal OS.

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

Parameter Appearing on Display	Description and Default	Selection Options
Comf/eco	Selects how the auxiliary heat is used. Default: comfort	(economy) – in the heating mode: If the heat pump is not able to satisfy the heating setpoint, the auxiliary heat is energized to satisfy the setpoint only when the temperature has dropped 2F°/1C° below the heating setpoint. Note: Selecting economy in the heating mode adds a deadband between the heat pump and auxiliary heat. The actual temperature maintained is lower than the true heating setpoint to maximize the heat pump operation. When the outdoor air temperature drops below the low balance point, the deadband is eliminated. (economy) – in the emergency heat mode: The setpoint that is maintained is the heating setpoint. (comfort) – in the heating mode: If the heat pump is not able to satisfy the heating setpoint, the auxiliary heat is energized to satisfy the setpoint.
Re valve	Governs the reversing valve operation. Default: O	(B): Energizes the valve in heating operation (valve is normally cool) (O): Energizes the valve in cooling operation (valve is normally heat)
Comp/aux	Sets the mode of interaction between the heat pump and the auxiliary heat. Default: off	(on) – in the heating mode only: If the heat pump is not able to satisfy the heating setpoint, the auxiliary heat is energized and the heat pump is shut off. This typically applies when the air handler heat pump coil is installed after the auxiliary heat. There is a 2-minute delay to restart the heat pump after the auxiliary heat is shut down. (off) – in the heating mode only: If the heat pump is not able to satisfy the heating setpoint, the auxiliary heat is energized at the same time as the heat pump stage. This typically applies when the air handler heat pump coil is installed before the auxiliary heat (all electric systems).

1. Setting DI1 or DI2 to RemNSB disables schedules and stops the Schedule menu display. Any other setting enables schedules and the Schedule menu. (TEC2262-4 and TEC2262-4+PIR only)
2. 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.
3. When adjusting the temperature, press the **UP** or **DOWN** arrow key to change the value in 0.5F°/0.5C° increments; press and hold the **UP** or **DOWN** arrow key to change the value in 5.0F°/5.0C° increments.
4. When the outdoor air sensor is not connected or it has a short, the thermostat controller bypasses heating lockout, cooling lockout, high balance point, and low balance point. Emergency mode bypasses heating lockout and permits auxiliary heating whenever a heating demand occurs.
5. TEC2262-4 and TEC2262-4+PIR only

Operation

Programming/Operating the TEC22x2-4 and TEC22x2-4+PIR Thermostat Controller

Once the thermostat controller is configured via the Installer Configuration Menu, its operating parameters can be programmed via the Main User Menu. Access this menu by pressing the **MENU** key during normal thermostat controller operation. The Main User Menu contains the basic operating features of the thermostat controller.

The Main User Menu also uses Auto Help, which is displayed automatically in the menu when there is a pause in programming activity. To exit Auto Help, continue with the programming selection. When the thermostat controller is in the Main User Menu and is left unattended for 45 seconds, the menu reverts to the Status Display Menu.

Enabling Override Schedule

Note: Enabling Override Schedule only appears when in the Unoccupied Mode.

The override schedule prompt only appears when the thermostat controller is in the unoccupied state. This menu selection gives the user the option of overriding the unoccupied setpoints with the occupied setpoints for the amount of time specified under the **TOccTime** parameter. See the [Configuring the TEC22x2-4 and TEC22x2-4+PIR Thermostat Controller](#) section.

Note: If one of the digital inputs is configured to operate as a remote override contact, this menu is disabled.

To override the unoccupied state while in the Main User Menu:

1. Press the **NO** key to all prompts until the Override Schedule prompt appears. If the thermostat controller is in the unoccupied state, this is the first prompt.
2. Press the **YES** key to enable the temporary override. The thermostat controller returns to the Status Display Menu.

When scrolling through the Status Display Menu, Override now appears for the schedule status parameter.

Resuming the Programmed Schedule

This menu only appears when the thermostat controller is in the unoccupied override mode.

To resume the schedule while in the Main User Menu:

1. Press the **NO** key to all prompts until the **Cancel ovrd Y/N** prompt appears. If the thermostat controller is in the unoccupied override state, this is the first prompt.
2. Press the **YES** key to resume the programmed schedule.

The thermostat controller returns to the Status Display Menu.

Entering Permanent Temperature Setpoints

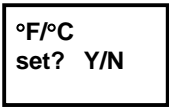
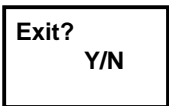
The first prompt appearing in the Main User Menu of the thermostat controller when in the occupied state is to set the permanent temperature setpoint. Permanent setpoints are stored in the programmed schedule.

To enter the permanent heating and cooling setpoints for the Occupied and Unoccupied Modes, follow the steps in Table 4. When changing the temperatures, press the keys once to change the temperature in 0.5F°/0.5C° increments; press and hold down the keys to change the temperature in 5.0F°/5.0C° increments.

Table 4: Entering Permanent Temperature Setpoints (Part 1 of 2)

Thermostat Controller Display	Description
RoomTemp 75.0°F	Press the MENU key while in the Status Display Menu to enter the Main User Menu.
Temperat set? Y/N	Press the NO key to all prompts until the temperature setpoint prompt appears on the display (it may be the first prompt). Press the YES key to enter the temperature setting menu.
Cooling set? Y/N	Press the YES key to change the occupied cooling setpoint. Press the NO key to advance to the occupied heating setpoint menu.
Cooling 75.0°F	Press the UP/DOWN arrow keys to set the temperature. Press the YES key to store the value and advance to the next menu.
Heating set? Y/N	Press the YES key to change the occupied heating setpoint. Press the NO key to advance to the unoccupied cooling setpoint menu.
Heating 68.0°F	Press the UP/DOWN arrow keys to set the temperature. Press the YES key to store the value and advance to the next menu.
Unocc CL set? Y/N	Press the YES key to change the unoccupied cooling setpoint. Press the NO key to advance to the unoccupied heating setpoint.
Unocc CL 80.0°F	Press the UP/DOWN arrow keys to set the temperature. Press the YES key to store the value and advance to the next menu.
Unocc HT set? Y/N	Press the YES key to change the unoccupied heating setpoint. Press the NO key to advance to the temperature display units.
Unocc HT 62.0°F	Press the UP/DOWN arrow keys to set the temperature. Press the YES key to store the value and advance to the next menu.

Table 4: Entering Permanent Temperature Setpoints (Part 2 of 2)

Thermostat Controller Display	Description
	Press the YES key to set the display units to °F or °C. Press the NO key to advance to the temperature setpoint type menu.
	Press the YES key to return to the Status Display Menu or press the NO key to reenter the temperature setting menu.

Entering Temporary Temperature Setpoints

To temporarily change the setpoint, press the **UP/DOWN** arrow keys to change the temporary setpoint for the current mode of operation.

Note: Whether the thermostat controller is heating or cooling, the respective setpoint is temporarily adjusted. To toggle between the temporary heating and cooling setpoints, press the **NO** key while changing the temporary setpoints.

Ending Temporary Temperature Setpoints

The temporary setpoints remain in effect for the duration set in the **TOccTime** parameter or until manually released.

To release the temporary setpoint sooner, while in the Main User Menu:

1. Press the **YES** key to the first prompt that appears.
2. If the thermostat controller does not immediately return to the Status Display Menu, press the **MENU** key again and press the **YES** key to exit the Main User Menu.

The setpoint reverts to the Permanent Temperature Setpoint.

Selecting the System Mode

The thermostat controller has four system modes:

- **Automatic Mode (auto):** Automatic changeover between heating and cooling. This is the default setting.
- **Cooling Mode (cool):** Cooling operation only.
- **Emergency Heat Mode (emergenc):** Forced auxiliary heat operation only.
- **Heating Mode (heat):** Heating operation only.
- **Off Mode (off):** The thermostat controller is off; however, when frost protection (**Frost pr** parameter) is enabled, the thermostat controller still calls for heat (if required).

To set the system mode while in the Main User Menu:

1. Press the **NO** key to all prompts until the system mode prompt appears on the display. Press the **YES** key to select the desired system mode.
2. Press the **UP/DOWN** arrow keys to locate the desired system mode. Press the **YES** key to select the desired system mode.
3. Press the **YES** key to return to the Status Display Menu or press the **NO** key to return to the system mode selection menu.

Selecting the Fan Mode

The thermostat controller has three fan mode settings:

- **On Fan Mode (on):** Energizes the fan all the time for both occupied and unoccupied states, even if the system mode is set to off.
- **Automatic Fan Mode (auto):** Energizes the fan only on a call for heating or cooling, for both occupied and unoccupied states.
- **Smart Fan Mode (smart):** Energizes the fan all the time for occupied states, and only on a call for heating or cooling in unoccupied states. This is the default setting.

To select the fan mode while in the Main User Menu:

1. Press the **NO** key to all prompts until the fan mode prompt appears on the display. Press the **YES** key to set the fan mode.
2. Press the **UP/DOWN** arrow keys to locate the desired fan mode. Press the **YES** key to select the desired fan mode.
3. Press the **YES** key to return to the Status Display Menu or press the **NO** key to return to the fan mode selection menu.

Selecting Schedule (TEC2262-4 and TEC2262-4+PIR Only)

Programming the Daily Schedule – Two-Event

The schedule-setting menu is used to enter the occupied or unoccupied states for each day of the week. The schedule-setting menu reflects either a two- or a four-event schedule per day, based on what was selected in the **2/4event** parameter during the configuration process. If the schedule-setting menu does not reflect a two-event schedule, select two events in the **2/4event** parameter of the Installer Configuration Menu.

When changing the time, press the **UP/DOWN** arrow keys once to change the time in 1-minute increments; press and hold down the keys to change the time in 30-minute increments.

Note: Programming one of the digital inputs to remote NSB disables all schedules and disables the schedule-setting menu.

To set the time schedule for a two-event schedule, follow the steps in Table 5. See Table 7, Events 1 and 2, for an example of a two-event office schedule.

Table 5: Programming the Daily Schedule – Two-Event (Part 1 of 2)

Thermostat Controller Display	Description
RoomTemp 75.0°F	Press the MENU key while in the Status Display Menu to enter the Main User Menu.
Schedule set? Y/N	Press the NO key to all prompts until the schedule set prompt appears on the display. Press the YES key to enter the scheduling menu.
Monday set? Y/N	Press the YES key to set the schedule for Monday or press the NO key to advance to Tuesday.
Occupied day? Y/N	Press the YES key to set the occupied start time for Monday or press the NO key to advance to Tuesday. Selecting NO leaves the thermostat controller in the unoccupied state for the entire day.

Table 5: Programming the Daily Schedule – Two-Event (Part 2 of 2)

Thermostat Controller Display	Description
Occupied 12:00 AM	Press the UP/DOWN arrow keys to set the occupied start time. Press the YES key to enter the time.
Unoccup 12:00 AM	Press the UP/DOWN arrow keys to set the unoccupied start time. Press the YES key to enter the time.
Tuesday set? Y/N	Press the YES key to set the schedule for Tuesday or press the NO key to advance to Wednesday.
Copy Y/N previous	Press the YES key to copy the schedule from the previous day. Press the NO key to set a different schedule.
Wednesda set? Y/N	If the YES key was pressed, the next prompt is for Wednesday. Repeat the procedure for the rest of the days of the week.
Exit? Y/N	After setting the schedule for all the days of the week, following the last entry for Sunday, press the YES key to return to the Status Display Menu or press the NO key to start again at Monday.

Programming the Daily Schedule – Four-Event

The schedule-setting menu is used to enter the occupied and unoccupied states for each day of the week. The schedule-setting menu reflects either a two- or four-event schedule per day, based on what was selected in the **2/4event** parameter during the configuration process. If the schedule-setting menu does not reflect a four-event schedule, select four events in the **2/4event** parameter of the Installer Configuration Menu.

When changing the time, press the **UP/DOWN** arrow keys once to change the time in 1-minute increments; press and hold down the keys to change the time in 30-minute increments.

Note: Programming one of the digital inputs to remote NSB disables the menu.

To set the time schedule for a four-event schedule, follow the steps in Table 6. See Table 7 for an example of a four-event office schedule.

Table 6: Programming the Daily Schedule – Four-Event (Part 1 of 2)

Thermostat Controller Display	Description
RoomTemp 75.0°F	Press the MENU key from the Status Display Menu to enter the Main User Menu.
Schedule set? Y/N	Press the NO key to all prompts until the schedule set prompt appears on the display. Press the YES key to enter the scheduling menu.
Monday set? Y/N	Press the YES key to set the schedule for Monday or press the NO key to advance to Tuesday.
Occupied day? Y/N	Press the YES key to set the occupied start time for Monday or press the NO key to advance to Tuesday. Selecting NO leaves the thermostat controller in the unoccupied state for the entire day.
Occupied 12:00 AM	Press the UP/DOWN arrow keys to set the first occupied start time. Press the YES key to enter the time.
Unoccup 12:00 AM	Press the UP/DOWN arrow keys to set the first unoccupied start time. Press the YES key to enter the time.

Table 6: Programming the Daily Schedule – Four-Event (Part 2 of 2)

Thermostat Controller Display	Description
Occupie2 12:00 AM	Press the UP/DOWN arrow keys to set the second occupied start time. Press the YES key to enter the time.
Unoccup2 12:00 AM	Press the UP/DOWN arrow keys to set the second unoccupied start time. Press the YES key to enter the time.
Tuesday set? Y/N	Press the YES key to set the schedule for Tuesday or press the NO key to advance to Wednesday.
Copy Y/N previous	Press the YES key to copy the schedule from the previous day. Press the NO key to set a different schedule.
Wednesda set? Y/N	If the YES key was pressed, the next prompt is for Wednesday. Repeat the procedure for all days of the week.
Exit? Y/N	After setting the schedule for all the days of the week, following the last entry for Sunday, press the YES key to return to the Status Display Menu or press the NO key to start again at Monday.

Table 7: Four-Event Office Schedule

Event	Event 1		Event 2		Event 3		Event 4	
	Occupied		Unoccupied		Occupied 2		Unoccupied 2	
	Cool	Heat	Cool	Heat	Cool	Heat	Cool	Heat
	72°F (22°C)	70°F (21°C)	80°F (27°C)	62°F (17°C)	72°F (22°C)	70°F (21°C)	80°F (27°C)	62°F (17°C)
Monday	7:00 A.M.		5:00 P.M.		12:00 P.M. ¹		12:00 P.M. ¹	
Tuesday	7:00 A.M.		5:00 P.M.		12:00 P.M. ¹		12:00 P.M. ¹	
Wednesday	7:00 A.M.		5:00 P.M.		12:00 P.M. ¹		12:00 P.M. ¹	
Thursday	7:00 A.M.		5:00 P.M.		7:00 P.M.		10:30 P.M.	
Friday	7:00 A.M.		5:00 P.M.		7:00 P.M.		10:30 P.M.	
Saturday	12:00 P.M. ¹		12:00 P.M. ¹		12:00 P.M. ¹		12:00 P.M. ¹	
Sunday	12:00 P.M. ¹		12:00 P.M. ¹		12:00 P.M. ¹		12:00 P.M. ¹	

1. Programming different events to the same time for that day cancels those events and leaves the thermostat controller in the unoccupied state.

Setting the Day and Time

Upon initial powerup (or after a power loss of greater than 6 hours), the thermostat controller shows a **SetClock** alarm on its display. As the thermostat controller scrolls through the Status Display Menu, the **SetClock** message causes the backlight to light up until the clock is set.

When changing the time, press the **UP/DOWN** arrow keys once to change the time in 1-minute increments; press and hold down the keys to change the time in 30-minute increments.

To set the clock while in the Main User Menu:

1. Press the **NO** key to all prompts until the clock set prompt appears on the display. Press the **YES** key to enter the clock set menu.
2. Press the **YES** key to set the time or press the **NO** key to advance to the day set menu.
3. Press the **UP/DOWN** arrow keys to adjust the time. When the correct time is displayed, press the **YES** key to store the time.
4. Press the **YES** key to enter the day set menu or press the **NO** key to enter the clock format menu.
5. Press the **UP/DOWN** arrow keys to adjust the day. When the correct day is displayed, press the **YES** key to store the day.
6. Press the **YES** key to choose the time format or press the **NO** key to access the Main User Menu exit prompt.

7. Press the **UP/DOWN** arrow keys to select the desired time format. Press the **YES** key to enter the format.
8. Press the **YES** key to return to the Status Display Menu or press the **NO** key to return to the time set menu.

When the thermostat controller scrolls through the day and time, the new day and time should show on the display and no alarm or backlight should be present. If the day or time is incorrect, repeat the Setting the Day and Time procedure.

Troubleshooting

See Table 9 for display messages. See Table 10 for troubleshooting details.

Accessories

All the accessories in Table 8 include mounting hardware; contact the nearest Johnson Controls® representative to order any of these parts.

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

Repair Information

If a TEC22x2-4 or TEC22x2-4+PIR Thermostat Controller fails to operate within its specifications, replace the unit. For a replacement thermostat controller, contact the nearest Johnson Controls representative.

Table 8: 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-6363P-1 ¹	Outside Air Temperature Sensor
TEC-3-PIR ²	Cover with Occupancy Sensor

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-3-PIR Accessory Cover can be used to replace the existing cover on a non-PIR TEC22x2-4 Thermostat Controller to provide occupancy sensing capability.

Table 9: Display Messages

Display	Function
Service	Indicates that there is a service alarm in accordance with a programmable Digital Input.
Filter	Indicates that the filter(s) is dirty in accordance with a programmable Digital Input.
Frost ON	Indicates that the heating is energized by the low limit frost protection room temperature setpoint.
Fan Lock	Indicates that the heating and cooling action are locked out due to a defective fan operation.
SetClock	Indicates that there has been a power failure greater than 6 hours and the clock needs to be reset.

Table 10: Troubleshooting Details (Part 1 of 3)

Symptom	Cause	Solution(s)
No display on the thermostat controller	Absent or incorrect supply voltage	1. Check power supply voltage between RC and C to be from 19-30 VAC. 2. Check for tripped fuse or circuit breaker.
	Overloaded power transformer	Verify that the transformer used is powerful enough (enough VAs) to supply all controlled devices including the thermostat controller.
Keyboard menu does not access all functions	Keyboard locked	Run the Johnson Controls TEC22xx-4 Configuration Plug-in and modify the Keypad Lockout field by setting it to NO_LOCKOUT or LEVEL_1 . You can also make the changes directly from the Configuration Parameter (CP) using LN Browser.
Temperature setpoints revert to original value after a certain time	Temporary setpoint active for a period of time set by parameter TOccTime	To do a permanent change to the setpoints you must enter the menu RoomTemp Set and modify the setpoints at desired temperature.
Thermostat Controller does not call for heating	Wrong mode selected	Select heating mode.
	Thermostat Controller in Unoccupied mode	Select Override to force the thermostat controller Occupied heating setpoint.
	Anticycle delay active	Wait, the anticycling period must end before the equipment can start.
	Heating setpoint is satisfied	Raise the Heating setpoint.
	Heating lockout attained	Mode is locked out based on outside air temperature. Change configuration parameter H Lock to value 120°F (49°C) to by-pass lockout.
	Wiring error	Start the fan by forcing the Fan ON mode. Put a jumper across terminals RH & W1. The heating should come ON. If it does not, verify wiring and check if a jumper is required between RC & RH.

Table 10: Troubleshooting Details (Part 2 of 3)

Symptom	Cause	Solution(s)
Thermostat Controller does not call for cooling	Wrong mode selected	Select cooling mode.
	Thermostat Controller in Unoccupied mode	Select Override to force the thermostat controller Occupied cooling setpoint.
	Anticycle delay active	Wait, the anticycling period must end before the equipment can start.
	Cooling setpoint is satisfied	Lower the cooling setpoint.
	Cooling lockout attained	Mode is locked out based on outside air temperature. Change configuration parameter C Lock to value -40°F (-40°C) to by-pass lockout.
	Wiring error	Start the fan by forcing the Fan ON mode. Put a jumper across terminals RC & Y1. The cooling should come ON. If it does not, verify wiring.
The thermostat controller does not turn on the fan	Wiring error	Start the fan by forcing the Fan ON mode. Put a jumper across terminals RC & G. The fan should come ON. If it does not, verify wiring.
Digital display shows missing digits or erratic segments	Defective display	Replace the thermostat controller.
Auxiliary heat does not operate	Wrong mode selected	Select Emergency Heat mode.
	Thermostat Controller in Unoccupied mode	Select Override to force the thermostat controller Occupied heating setpoint.
	Heating setpoint is satisfied	Raise the Heating setpoint.
	Anticycle delay active	Wait, the anticycling period must end before the equipment can start.
	High balance point attained	Mode is locked out based on outside air temperature. Change configuration parameter High BP to value 90°F (32°C) to by-pass lockout.
	Heating lockout attained	Mode is locked out based on outside air temperature. Change configuration parameter H Lock to value 120°F (49°C) to by-pass lockout.
	Wiring error	Start the Fan by forcing the Fan ON mode. Put a jumper across terminals RH & W1. The heating should come ON. If it does not, verify wiring and check if a jumper is required between RC & RH.
	Wrong reversing valve configuration	Wrong selection of parameter Re Valve . Select O to energize the valve in cooling operation. Valve is normally heat. Select B to energize the valve in heating operation. Valve is normally cool.

Table 10: Troubleshooting Details (Part 3 of 3)

Symptom	Cause	Solution(s)
Heat Pump does not operate in heating mode	Wrong mode selected	Select Heating mode.
	Thermostat Controller in Unoccupied mode	Select Override to force the thermostat controller Occupied heating setpoint.
	Heating setpoint is satisfied	Raise the Heating setpoint.
	Anticycle delay active	Wait, the anticycling period must end before the equipment can start.
	Heating setpoint satisfied	Raise the heating setpoint.
	Low balance point attained	Mode is locked out based on outside air temperature. Change configuration parameter Low BP to value -12°F (-24°C) to by-pass lockout.
	Heating lockout attained	Mode is locked out based on outside air temperature. Change configuration parameter H Lock to value 120°F (49°C) to by-pass lockout.
	Wiring error	Start the Fan by forcing the Fan ON mode. Put a jumper across terminals RH & W1. The heating should come ON. If it does not, verify wiring and check if a jumper is required between RC & RH.
	Wrong reversing valve configuration	Wrong selection of parameter Reversing Valve. Select O to energize the valve in cooling operation. Valve is normally heat. Select B to energize the valve in heating operation. Valve is normally cool.

Technical Specifications

TEC22x2-4 and TEC22x2-4+PIR LONWORKS Networked Heat Pump Thermostat Controllers (Part 1 of 2)

Power Requirements		19 to 30 VAC, 50/60 Hz, 2 VA (Terminals RC and C) at 24 VAC Nominal, Class 2 or Safety Extra-Low Voltage (SELV)
Relay Contact Rating (Y1, Y2, G, W1, AUX, O/B)		19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A In-Rush, Class 2 or SELV
Analog Inputs		Resistive Inputs (RS and UI3) for 10k ohm Johnson Controls Type II Negative Temperature Coefficient (NTC) Thermistor Sensors
Digital Inputs		Voltage-Free Contacts across Terminal C to Terminals DI1 and DI2
Wire Size		Unshielded Twisted Pair - 22 AWG (0.6 mm Diameter) Minimum, 18 AWG (1.0 mm Diameter) Recommended
LONWORKS Network Standard		64 Devices Maximum without repeater, 128 Devices Maximum with repeater; 6,250 ft (1,905 m) Maximum Length (Bus Topology)
Temperature Sensor Type		Local 10k ohm NTC Thermistor
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	±0.9°F/±0.5°C° at 70.0°F/21.0°C Typical Calibrated
Minimum Deadband		2°F/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

**TEC22x2-4 and TEC22x2-4+PIR LONWORKS Networked Heat Pump Thermostat Controllers
(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 LONMARK® Certification 3.4
	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		TEC22x2-4 Model: 0.75 lb (0.34 kg) TEC22x2-4+PIR Model: 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.



Building Efficiency

507 E. Michigan Street, Milwaukee, WI 53202

*Metasys® and Johnson Controls® are registered trademarks of Johnson Controls, Inc.
All other marks herein are the marks of their respective owners. © 2010 Johnson Controls, Inc.*