

TEC2601-4 and TEC2601-4+PIR BACnet® MS/TP Networked Single-Stage Thermostat Controllers

Installation Instructions

TEC2601-4 and TEC2601-4+PIR

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

Applications

The TEC2601-4 and TEC2601-4+PIR Thermostat Controllers are BACnet® Master-Slave/Token-Passing (MS/TP) networked devices that provide control of single-stage heating/cooling equipment. The TEC2601-4+PIR thermostat controller provides 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 – TEC2601-4+PIR Thermostat Controller](#) section for more information.

The technologically advanced TEC2601-4 and TEC2601-4+PIR Thermostat Controllers feature a Building Automation System (BAS) BACnet MS/TP communication capability that enables remote monitoring and programming for efficient space temperature control.

The TEC2601-4 and TEC2601-4+PIR 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 controllers.

Note: For information on installing a TEC2601-4 thermostat controller in a Commercial Comfort System (CCS) application, refer to the *CCS TEC2601-4 BACnet MS/TP Networked Single-Stage Thermostat Controller Installation Instructions (LIT-12011621)*.

IMPORTANT: The TEC2601-4 and TEC2601-4+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.

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 TEC2601-4 or TEC2601-4+PIR 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, outside doors, air discharge grills, or stairwells, and from behind doors
- away from steam or water pipes, warm air stacks, unconditioned areas (not heated or cooled), or sources of electrical interference

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 TEC2601-4 or TEC2601-4+PIR Thermostat Controller.

To install the thermostat controller:

1. Use a Phillips-head screwdriver to remove the security screw if it is installed 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.**

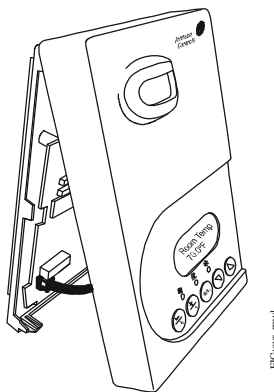


Figure 1: Removing the Thermostat Controller Cover (TEC2601-4+PIR Model Shown)

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.

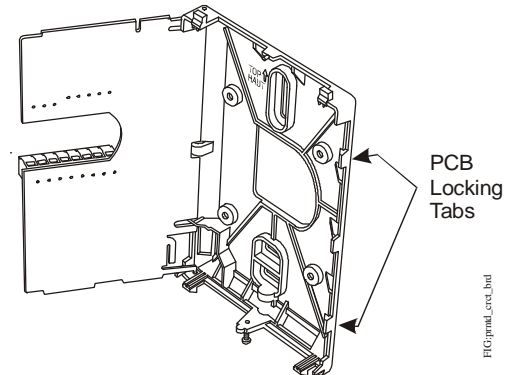


Figure 2: Opening the Thermostat Controller PCB

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.
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) square or 3 x 2 in. (76 x 51 mm) boxes. This procedure ensures 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.

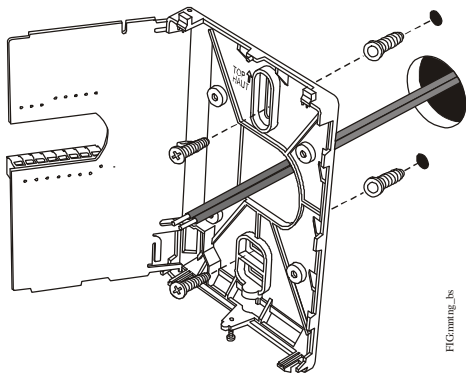


Figure 3: Securing the Thermostat Controller Mounting Base to the Wall

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

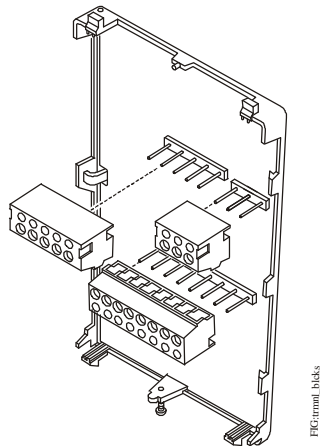


Figure 4: Removing the Screw Terminal Blocks

Wiring

When an existing thermostat controller is replaced, remove and label the wires to identify the terminal functions. When a TEC2601-4 or TEC2601-4+PIR Thermostat Controller is replaced, simply remove the old screw terminal blocks and reinsert them onto the PCB of the replacement thermostat controller.

IMPORTANT: Because some of the objects may not directly correlate to a previous version (TEC26xx-2), you must rediscover all point objects for the TEC2601-4 or TEC2601-4+PIR version. For detailed information on this mapping, refer to the *TEC BACnet® MS/TP Network Series Thermostat Controllers Technical Bulletin (LIT-12011592)*.



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 TEC2601-4 and TEC2601-4+PIR Thermostat Controllers.

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 Figure 5.

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.

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

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.

- 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.

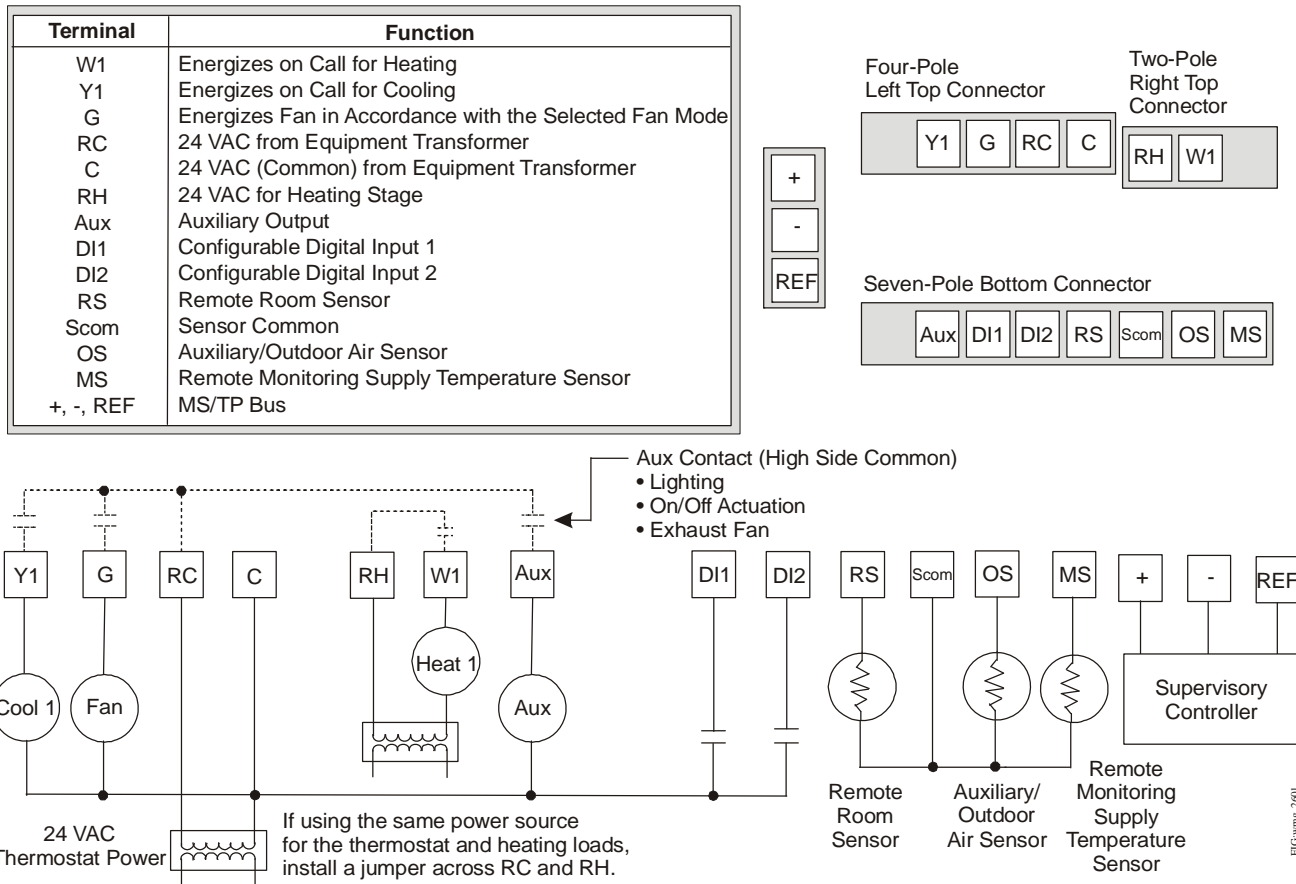


Figure 5: Wiring the TEC2601-4 or TEC2601-4+PIR Thermostat Controller

Connecting the MS/TP Bus

To connect the MS/TP Bus:

- Set the MS/TP address of the TEC BACnet MS/TP Network Series Thermostat Controller per the engineering drawings and test for bus voltage, polarity, and isolation prior to wiring the MS/TP Bus. Use the **Com addr** parameter to set the MS/TP address for the thermostat controller.

Note: The wiring rules for the MS/TP Bus differ from the wiring rules for the N2 Bus. For more details on wiring the MS/TP Communications Bus, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.

- Observe the polarity when connecting the bus wires to the thermostat controller.
- After the bus wires are connected to the first thermostat controller, continue in a daisy-chained fashion to the next thermostat controller.

Note: The bus wiring must be twisted-pair lines. Do not run the 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).

The MS/TP Bus requires proper termination and biasing at each end of a segment (a segment is a physically continuous length of wire). Because the rooftop controller is not equipped with end-of-line termination, a Johnson Controls® MS-BACEOL-0 End-of-Line Terminator (see Table 4; ordered separately) or similar device is recommended to provide this end-of-line termination. An end-of-line terminator is required if a supervisory controller is not at the end of the segment. If a supervisory controller is at the end of the segment, then the end-of-line terminator switch on the supervisory controller must be set in the ON position.

The thermostat controller has automatic baud rate detection. Do not exceed the maximum number of devices allowed on a field bus. Be sure that the wiring terminations are set correctly and that all communication wiring is daisy-chained with no taps.

A small green light under the thermostat controller cover (on the left edge when facing the thermostat controller) indicates the communications mode when the thermostat controller is operating.

The following blink codes may be seen:

- **Short-Short-Long:** Indicates that the baud rate is known and that communication is active.

- **Short-Short:** Indicates that the thermostat controller is scanning for the correct baud rate and that there is no communication.
- **Off:** Indicates that there is no power to the thermostat controller or that the MS/TP wiring polarity is reversed.
- **Long:** Indicates that the MS/TP communication daughter board is the wrong type for the main board.

MS/TP Thermostat Controller Mapping

For detailed information on MS/TP Bus objects and thermostat controller mapping, refer to the *TEC BACnet MS/TP Network Series Thermostat Controllers Technical Bulletin (LIT-12011592)*.

Setup and Adjustments

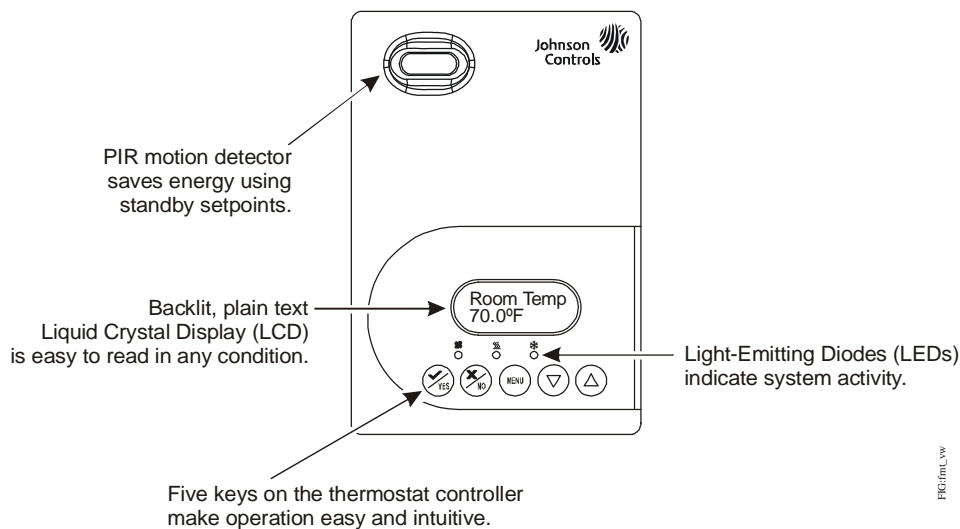


Figure 6: Front Cover of Thermostat Controller (TEC2601-4+PIR Model Shown)

Thermostat Controller User Interface Keys

The TEC2601-4 and TEC2601-4+PIR Thermostat Controller user interface consists of five keys on the front cover (Figure 6). 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 TEC2601-4 and TEC2601-4+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 TEC2601-4 and TEC2601-4+PIR 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 – TEC2601-4+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.

Programming Overview

Three menus are used to view, program, and configure the TEC2601-4 and TEC2601-4+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
- System Mode
- Schedule Status
(Occupied/Unoccupied/Override [PIR Models])
- 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 – TEC2601-4+PIR Thermostat Controller

A TEC2601-4+PIR Thermostat Controller (or a TEC2601-4 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 7 for an example of increasing room temperature setpoints.

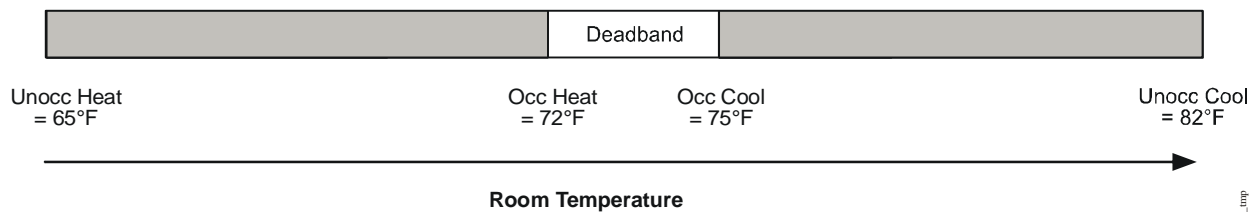


Figure 7: Increasing Room Temperature Setpoints

Configuring the TEC2601-4 and TEC2601-4+PIR Thermostat Controller

The TEC2601-4 and TEC2601-4+PIR Thermostat Controllers ship from the factory with default settings for all configurable parameters. The default settings are shown in Table 1. To reconfigure the parameters via the thermostat controller, follow the steps in this section.

To access the Installer Configuration Menu, press and hold the **MENU** key for approximately 8 seconds. Once the Installer Configuration Menu begins, press the **NO** key to scroll through the parameters listed in Table 1. When the desired parameter is displayed, use the **YES** key to choose the desired selection option. Press the **YES** key and then the **NO** key to continue scrolling through the parameters.

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 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.

Both inputs can be configured to the Selection Options included in Table 1.

Table 1: 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
Com addr	MS/TP address at the thermostat controller; coincides with the address assigned at the supervisory controller. Default: 254	Range: 004 to 127

Table 1: Installer Configuration Menu (Part 2 of 5)

Parameter Appearing on Display	Description and Default	Selection Options
DI1	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>
DI2	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 1: Installer Configuration Menu (Part 3 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)
		Resume/Override Scheduling	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		
Pwr del¹	Sets the delay time period at thermostat controller powerup, or 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. Default: off	(on): Enabled (off): Disabled			
Heat max²	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 min²	Sets the Occupied and Unoccupied minimum Cooling setpoint values. Default: 54.0°F/12.2°C	Range: 54.0°F/12.2°C to 100.0°F/37.7°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 1: Installer Configuration Menu (Part 4 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. Default: 2.0 min Note: Set the anti-short cycle timer to 0.0 min for equipment that already has its own anti-short cycle timer.	Range: 0.0 to 5.0 min adjustable in 1-minute increments
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. Default: on Note: The Fan cont parameter applies to W1 when the fan is in the Auto mode only. The Fan cont parameter does not affect fan operation on a call for cooling (Y1).	(off): The thermostat controller does not activate the fan in response to a call for heating. The fan is activated by the equipment fan and limit control. (on): Enables the thermostat controller to activate the fan in response to a call for heating.
Fan del	Fan delay extends fan operation after a heating or cooling cycle has ended. Default off Note: The fan delay is only active when the fan is in the Auto mode.	(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.
TOccTime	Sets the duration of the Temporary Occupancy Time (when the thermostat controller is in the Unoccupied mode) when a Schedule Override Function is enabled using either the Main User Menu or DI1 or DI2 configured as a temporary override remote contact (RemOVR). Sets the effective duration of the Temporary heating or cooling setpoints set using the UP/DOWN arrow keys. 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

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

Parameter Appearing on Display	Description and Default	Selection Options
Cal OS	Sets the desired outside 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
H lock	Disables heating stage(s) operation when the outside air temperature is greater than the configured value. If the fan mode is set to Auto or Smart, the fan output is also disabled. Requires that an outside 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 lock	Disables cooling stage(s) operation when the outside air temperature is less than the configured value. If the fan mode is set to Auto or Smart, the fan output is also disabled. Requires that an outside 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
Aux cont	Energizes peripheral devices (lighting equipment, exhaust fans, and economizers). Default: n.o. Note: The contact toggles with the internal Occupied/Unoccupied schedule (or the NSB contact on one of the digital inputs, if used).	(n.c.): Contact open = Occupied; contact closed = Unoccupied (n.o.): Contact closed = Occupied; contact open = Unoccupied

1. When adjusting the numeric value, press the **UP/DOWN** arrow key to change the value by single increments; press and hold the **UP/DOWN** arrow key to change the numeric value in increments of ten.
2. When adjusting the temperature, press the **UP/DOWN** arrow key to change the value in 0.5F°/0.5C° increments; press and hold the **UP/DOWN** arrow key to change the value in 5.0F°/5.0C° increments.

Operation

Programming/Operating the TEC2601-4 and TEC2601-4+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 TEC2601-4 and TEC2601-4+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 override mode.

To resume the schedule while in the Main User Menu:

1. Press the **NO** key to all prompts until the Resume Schedule prompt appears. If the thermostat controller is in the 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 2. 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 2: Entering Permanent Temperature Setpoints (Part 1 of 2)

Thermostat 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.

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

Thermostat Display	Description
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.
°F/°C set? Y/N	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.
Exit? Y/N	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
- **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.

Troubleshooting

See Table 3 for display messaging. See Table 5 for troubleshooting details.

Accessories

All the accessories in Table 4 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 the TEC2601-4 or TEC2601-4+PIR Thermostat Controller fails to operate within its specifications, replace the unit. For a replacement thermostat controller, contact the nearest Johnson Controls representative.

Table 3: Alarm Messages

Display	Function
Frost	Indicates that the heating is energized by the low limit frost protection room temperature setpoint 5.6°C (42°F).
Fan Lock	Indicates that the heating and cooling action are locked out due to a defective fan operation.
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.

Table 4: 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-1¹	Duct Mount Air Temperature Sensor
TE-6363P-1¹	Outside Air Temperature Sensor
TEC-3-PIR²	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 TEC2601-4 Thermostat Controller to provide occupancy sensing capability.

Table 5: Troubleshooting Details¹ (Part 1 of 2)

Symptom	Probable Causes
Multiple Symptoms	Excessive bus errors may be occurring.
	A device may have been added or changed with a duplicate address (may not be the same address as some devices having problems, and may have happened sometime before the problem was noticed).
	Wiring errors or wire problems may exist.
	The baud rate may have been changed on some devices on the network but not all devices.
	Max_Master may have been changed incorrectly (may have happened sometime before the problem was noticed).
	A download may be in progress.
	There may be a fault at a device.
	A repeater may be needed or may be configured incorrectly.
Poor Performance	See the probable causes listed previously in the <i>Multiple Symptoms</i> section of this table.
	Excessive bus traffic may exist (bus overload).
	The baud rate may be set too low.
	There may be too many devices on the network.
	There may be unaccounted devices on the network (not mapped to the NAE).
	There may be unusually slow devices on the network or devices that are slow to respond.

Table 5: Troubleshooting Details¹ (Part 2 of 2)

Symptom	Probable Causes
Thermostat Goes Offline	See the probable causes listed previously in the <i>Multiple Symptoms</i> section of this table.
	A power failure or other failure may have occurred at the thermostat.
	Communication may have been disabled at the thermostat controller.
Thermostat Does Not Come Online	See the probable causes listed previously in the <i>Multiple Symptoms</i> section of this table.
	A thermostat controller may be connected to the wrong bus.
	A baud rate may be specified in the new thermostat controller that is incompatible with the running network.
	No device on the network is configured to use a specific baud rate (normally the NAE), but all devices are set to use auto baud. At least one device, typically the bus supervisor (NAE), must have an assigned baud rate. Set the baud rate in the bus supervisor and set all other devices to auto baud.

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

Technical Specifications

TEC2601-4 and TEC2601-4+PIR Thermostat Controllers

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, G, W1, and AUX)	19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A Inrush, Class 2 or SELV	
Digital Inputs	Voltage-Free Contacts across Terminal C to Terminals DI1 and DI2	
Analog Inputs	Resistive Inputs (RS and UI3) for 10k ohm Johnson Controls Type II Negative Temperature Coefficient (NTC) Thermistor Sensors	
Wire Size	18 AWG (1.0 mm Diameter) Maximum, 22 AWG (0.6 mm Diameter) Recommended	
Temperature Sensor Type	Local 10k ohm Johnson Controls Type II Negative Temperature Coefficient (NTC) Thermistor Sensor	
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
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

TEC2601-4 and TEC2601-4+PIR Thermostat Controllers

CE	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 – Johnson Controls, Inc., declares that the BACnet Thermostats are in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.
	Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant
	BACnet International	BACnet Testing Laboratories™ (BTL) 135-2001 Listed BACnet Application Specific Controller (B-ASC)
	Shipping Weight	TEC2601-4 Model: 0.75 lb (0.34 kg) TEC2601-4+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.



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