

TEC2613-4 and TEC2613-4+PIR BACnet® MS/TP Network Multi-Stage Temperature and Humidity Controllers

Product Bulletin

TEC2613-4 and TEC2613-4+PIR

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The TEC2613-4 and TEC2613-4+PIR Temperature and Humidity Controllers are BACnet® Master-Slave/Token-Passing (MS/TP) network devices that provide control of multi-stage heating and cooling equipment, such as rooftop or self-contained units with a humidifier and/or dehumidifier.

The TEC2613-4+PIR Controller has Passive Infrared (PIR) occupancy sensing capability built into the device. This controller maximizes energy savings in high-energy usage light commercial buildings, such as schools and hotels, during occupied times by using additional setpoint strategies.

The TEC2613-4 and TEC2613-4+PIR Controllers provide exceptional temperature control in an easy-to-use and flexible package. Both models have over 20 configurable parameters, enabling the controllers to adapt to a variety of applications. The controllers also employ an embedded complete humidity solution with a unique, Proportional-Integral (PI) time-proportioning algorithm that virtually eliminates temperature offset associated with traditional, differential-based controllers.



Figure 1: TEC2613-4 and TEC2613-4+PIR BACnet MS/TP Network Temperature and Humidity Controllers

Table 1: Features and Benefits

Features	Benefits
Embedded Humidification Sequence (0 to 10 VDC Output) and Dehumidification Sequence (Dry Contact)	Simplifies installation and reduces installation costs.
Onboard Occupancy Sensor (PIR Model)	Provides energy savings without additional installation time and cost.
Password Protection Option	Protects against unwanted controller tampering.
Backlit Liquid Crystal Display (LCD)	Offers real-time control status of the environment in easy-to-read, English plain text messages with constant backlight that brightens during user interaction.
Simplified Setpoint Adjustment	Enables the user to change the setpoint by simply pressing the UP/DOWN arrow keys.
Five Easy-to-Use Interface Keys	Allow for easy commissioning and adjustment of the controller, and eliminate the need for DIP switches.
Three Light-Emitting Diodes (LEDs)	Provide fan, heating, and cooling status at a glance.
One Configurable Digital Input	Provides additional input for advanced functions such as remote night setback, occupancy override, and service or filter alarms.
Over 20 Configurable Parameters	Enable the controller to adapt to any application, allowing installer parameter access without opening the cover.
Configurable Auxiliary Output	Provides 24 VAC control for exhaust fans, lighting, and other auxiliary functions.

Product Overview

The TEC2613-4 and TEC2613-4+PIR Temperature and Humidity Controllers are specifically designed for control of the most common commercial heating and cooling equipment with humidifiers and/or dehumidifiers. A number of configurable parameters enable the controller to effectively and efficiently control various types of equipment in nearly any application. Configuration, setup, and operation of the controller is extremely intuitive and accomplished through the user interface.

IMPORTANT: The TEC2613-4 and TEC2613-4+PIR Temperature and Humidity Controllers are intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the 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 controller.

Additional Features

The TEC2613-4 and TEC2613-4+PIR Temperature and Humidity Controllers offer many other features, including:

- **Local Relative Humidity (RH) Display**
Enables the display of humidity beneath the room temperature on the controller LCD.
- **Stationary or Scrolling Display**
Provides the option of having the display continuously scroll the parameters within the Installer Configuration Menu.
- **Three Levels of Keypad Lockout**
Provide three levels of keypad lockout that can be set up through the Installer Configuration Menu.
- **Adjustable Power Delay on Startup**
Enables a delay before any operation is authorized upon controller powerup. This feature can be used for equipment protection or to sequence startup of multiple units in one location.
- **Frost Protection Enable/Disable**
Turns the heat on when the zone temperature drops below 42°F (6°C), regardless of the mode of the controller.
- **Adjustable Maximum Heating/Minimum Cooling Setpoints**
Establish the maximum heating setpoint and minimum cooling setpoint that can be entered through the user interface.
- **Adjustable Proportional Band**
Adjusts the proportional band used by the controller PI control loop from 2.0F°/1.1C° to 8.0F°/4.4C°.
- **Adjustable Anti-Short Cycling Timer**
Adjusts the minimum on and off times for the equipment from 0 to 5 minutes.
- **Adjustable Heating/Cooling Cycles per Hour**
Balance temperature control and equipment cycling through the configurable maximum number of heating and cooling cycles (3 to 8 heating cycles maximum and 3 or 4 cooling cycles maximum) in a 1-hour period.
- **Adjustable Heating/Cooling Deadband**
Adjusts the minimum heating/cooling deadband from 2.0F°/1.1C° to 4.0F°/2.0C°.
- **Fan Control**
Provides the option for equipment fan control.
- **Fan Delay Control**
Enables the user to select how the fan operates on a call for heating, and the delay at the end of the heating or cooling cycle.
- **Adjustable Temporary Occupancy Time**
Adjusts the temporary occupancy time from 0 to 12 hours.
- **Sensor Offset Adjustments**
Set the desired room or outside air temperature calibration (offset).
- **System Mode Lockout**
Allows the heating and cooling modes to be locked out based on the outside air temperature when an outside air temperature sensor is connected.
- **Unoccupied Timer (TEC2613-4+PIR)**
Sets the time delay between the occupied and unoccupied modes after motion is detected.
- **Smart Fan**
Enables the fan to operate continuously during the occupied times, and cycle with the equipment during the unoccupied times.

- **Minimum/Maximum Outside Air Temperature for RH Setpoint Reset**
Sets the outside air temperature setpoints for when the humidity setpoint is reset (an outside air sensor must be connected).
- **Dehumidification Outside Air Temperature Lockout**
Sets the outside air temperature setpoint for when dehumidification operation is disabled (an outside air sensor must be connected).
- **Dehumidification Lockout Functions**
Enable or disable the lockout functions for dehumidification control output.
- **Dehumidification Hysteresis**
Sets the dehumidification control hysteresis used during dehumidification operation.
- **Reset Humidity Setpoint**
Serves as setpoint value when the minimum outside air temperature for RH Setpoint reset is reached.
- **Room Humidity Calibration**
Functions as offset that is added to, or subtracted from, the actual displayed humidity by $\pm 15\%$ RH.
- **High Limit Sensor Value Display**
Serves as a diagnostic tool to help troubleshoot sensor/humidifier operation.
- **Nonvolatile Electrically Erasable Programmable Read-Only Memory (EEPROM)**
Prevents loss of adjusted parameters in the Installer Configuration Menu, in the event of power failure.

Table 2: BACnet MS/TP Network Temperature and Humidity Controller Models

Code Number	Description	Applications
TEC2613-4	Multi-Stage Temperature and Humidity Controller	Multi-Stage Packaged Heating/Cooling Equipment with Humidifier and/or Dehumidifier
TEC2613-4+PIR	Multi-Stage Temperature and Humidity Controller with Onboard Occupancy Sensor	

Table 3: Accessories (Order Separately)

Code Number	Description
Hx-67 Series ¹	Duct- or Wall-Mount Humidity Sensor
SEN-600-1	Remote Inside Air Temperature Sensor
SEN-600-4	Remote Inside Air Temperature Sensor with Occupancy Override and LED
TE-6361M-1 ²	Duct-Mount Air Temperature Sensor
TE-636S-1 ²	Strap-Mount Temperature Sensor
MS-BACEOL-0	RS485 End-of-Line Terminator
TE-6363P-1 ²	Outside Air Temperature Sensor
TEC-3-PIR ³	Cover with Occupancy Sensor

1. The humidity sensor must have a 0 to 10 VDC output. Remote wall-mounted versions may be used for remote return or room air humidity sensing, with the sensor mounted on the wall. A remote duct-mounted humidity sensor may be used for remote return air humidity sensing, with the sensor mounted on the return air duct or as a supply air humidity sensor used as a high limit protection.
2. 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.
3. The TEC-3-PIR Accessory Cover can be used to replace the existing cover on a non-PIR TEC2613-4 Temperature and Humidity Controller to provide occupancy sensing capability.

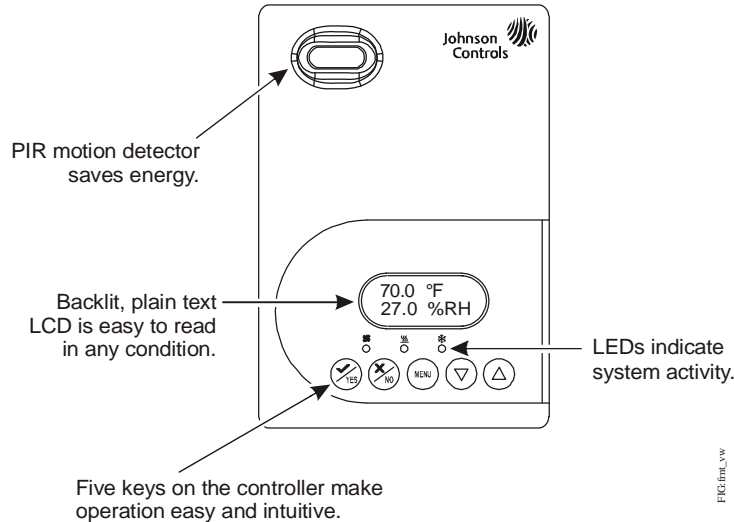


Figure 2: Front Cover of Controller (TEC2613-4+PIR Model Shown)

Controller User Interface Keys

The TEC2613-4 and TEC2613-4+PIR Temperature and Humidity Controller user interface consists of five keys on the front cover (Figure 2). 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: Scrolling resumes when the controller is left unattended for 45 seconds.


- 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.
 - access the Installer Configuration Menu or to exit the menu.
- Use the **UP/DOWN** arrow keys to change the configuration parameters, and to activate a setpoint adjustment.

Backlit LCD

The TEC2613-4 and TEC2613-4+PIR Temperature and Humidity Controllers include a 2-line, 8-character backlit display. Low-level backlighting is present during normal operation, and the display brightens when any user interface key is pressed. The backlight returns to low level when the controller is left unattended for 45 seconds.

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 – TEC2613-4+PIR 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.

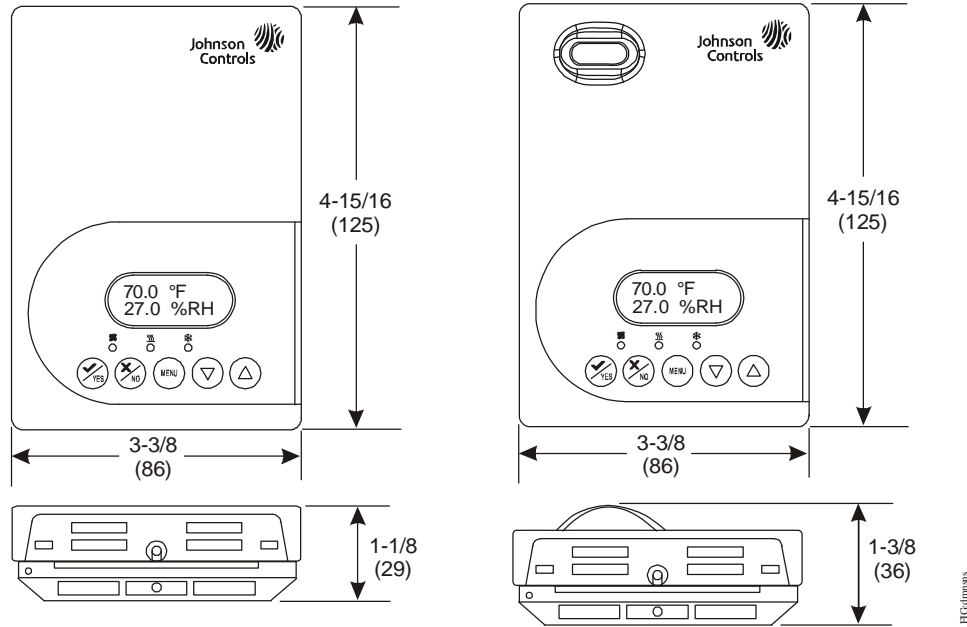


Figure 3: TEC2613-4 (Left) and TEC2613-4+PIR (Right) Controller Dimensions, in. (mm)

Menu Overview

Three menus are available to view and configure the TEC2613-4 and TEC2613-4+PIR Temperature and Humidity Controllers:

- Status Display Menu
- Main User Menu
- Installer Configuration Menu

The following sections outline the functions and contents of each menu.

Status Display Menu

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

- Room Temperature
- System Mode
- 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 controller. Access the menu by pressing the **MENU** key during normal controller operation.

Installer Configuration Menu

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

The Installer Configuration Menu includes the following parameters that are accessed by pressing the same **MENU** key:

- Password
- Communication Address
- % RH Display
- Digital Input (DI) Configuration
- Menu Scroll
- Three Keypad Lockout Levels
- Power Delay on Powerup
- Frost Protection
- Maximum Heating Setpoint/Minimum Cooling Setpoint

- Proportional Band
- Anti-Short Cycle Timer
- Heating Stages Cycles per Hour
- Cooling Stages Cycles per Hour
- Minimum Deadband
- Fan Control
- End-of-Cycle Fan Delay
- Temporary Occupancy Time
- Room Air Temperature Sensor Calibration
- Outside Air Temperature Sensor Calibration
- Heating Stage
- Cooling Stage
- Heating Stage Operation Lockout Based on Outside Air Temperature
- Cooling Stage Operation Lockout Based on Outside Air Temperature
- Unoccupied Timer Value (TEC2613-4+PIR)
- Auxiliary Output Configuration
- Minimum/Maximum Outside Air Temperature for RH Setpoint Reset
- High RH Limit Setpoint
- Dehumidification Outside Air Temperature Lockout
- Dehumidification Lockout Functions
- Dehumidification Hysteresis
- Reset Humidity Setpoint
- Room Humidity Calibration
- Display High Limit Sensor Value

Repair Information


If either the TEC2613-4 or TEC2613-4+PIR Temperature and Humidity Controller fails to operate within its specifications, replace the unit. For a replacement controller, contact the nearest Johnson Controls representative.

Technical Specifications

TEC2613-4 and TEC2613-4+PIR BACnet MS/TP Network Multi-Stage Temperature and Humidity 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, W2, AUX, and DEHUM)		19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A Inrush, Class 2 or SELV
Digital Input		Voltage-Free Contact across Terminals C and DI
Humidification Analog Output Rating		0 to 10 VDC Half-Wave Power Supply into 2k ohm Resistance Minimum
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
	Humidity	±5% RH from 30 to 70% RH at 50 to 90°F (10 to 32°C)
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

TEC2613-4 and TEC2613-4+PIR BACnet MS/TP Network Multi-Stage Temperature and Humidity Controllers (Part 2 of 2)

	BACnet International	BACnet Testing Laboratories™ (BTL) 135-2001 Listed BACnet Application Specific Controller (B-ASC)
	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 this product is 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	
Shipping Weight		TEC2613-4 Model: 0.75 lb (0.34 kg) TEC2613-4+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.

United States Emissions Compliance

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.

Canadian Emissions Compliance

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.



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