

TEC260x-4 and TEC260x-4+PIR Series BACnet® MS/TP Networked Thermostat Controllers

Product Bulletin

Code No. LIT-12011585
Issued December 1, 2009

TEC2601-4, TEC2601-4+PIR, TEC2602-4, TEC2602-4+PIR,
TEC2603-4, TEC2603-4+PIR, TEC2604-4, TEC2604-4+PIR

The TEC260x-4 and TEC260x-4+PIR Series Thermostat Controllers are BACnet® Master-Slave/Token-Passing (MS/TP) networked devices that provide control of rooftop units (with or without economizers), heat pumps, and single- and multi-stage heating/cooling equipment. The TEC260x-4+PIR Series Thermostat Controllers have occupancy sensing capability built into the device. These devices provide energy savings in high-energy usage light commercial buildings such as schools and hotels. The devices maximize these energy savings by using additional setpoint strategies during occupied times.

The technologically advanced TEC260x-4 and TEC260x-4+PIR Series Thermostat Controllers feature a Building Automation System (BAS) BACnet MS/TP communication capability that enables remote monitoring and programming for efficient space temperature control.



Figure 1: TEC260x-4 +PIR Series BACnet MS/TP Networked Thermostat Controller

The TEC260x-4 and TEC260x-4+PIR Series Thermostat Controllers feature an intuitive user interface with backlit display that makes setup and operation quick and easy. The thermostats also employ a unique, Proportional-Integral (PI) time-proportioning algorithm that virtually eliminates temperature offset associated with traditional, differential-based thermostats.

Table 1: Features and Benefits

Features	Benefits
BACnet MS/TP Communication	Provides compatibility with a proven communication network; BACnet MS/TP is widely accepted by Heating, Ventilating, and Air Conditioning (HVAC) control suppliers.
Onboard Occupancy Sensor (Passive Infrared [PIR] Models)	Provides energy savings without additional installation time and cost.
Password Protection Option	Protects against unwanted thermostat controller tampering.
Backlit Liquid Crystal Display (LCD)	Offers real-time control status of the environment in easy-to-read, English 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 of the thermostat, and eliminate the need for DIP switches.
Two Configurable Digital Inputs	Provide additional inputs for advanced functions such as remote night setback, occupancy override, and service or filter alarms.
Over 20 Configurable Parameters	Enable the thermostat to adapt to any application, allowing installer parameter access without opening the thermostat cover.
Optional Discharge Air Sensor	Monitors unit efficiency.
Economizer Output (TEC2604-4 and TEC2604-4+PIR Models)	Provides control of economizer operation for single- and multi-stage unitary rooftop equipment.

Product Overview

The TEC260x-4 and TEC260x-4+PIR Series Thermostat Controllers are specifically designed for networked control of common commercial heating and cooling equipment. The TEC260x-4+PIR Series Thermostat Controllers include an additional occupancy sensing capability that provides energy savings in high-energy usage light commercial buildings. In addition to superior temperature control, occupancy sensing capabilities, and application flexibility, the TEC260x-4 and TEC260x-4+PIR Series feature BACnet MS/TP communication capability, allowing the user to view operation or make adjustments from a remote workstation. Plain text menus, backlit display, and five interface keys make setup and operation quick and easy.

IMPORTANT: The TEC260x-4 and TEC260x-4+PIR Series Thermostat Controllers are intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the thermostat 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.

Additional Features

The TEC260x-4 and TEC260x-4+PIR Series Thermostat Controllers offer many other features, including:

- **Stationary or Scrolling Display**
Offers the option of having the display continuously scroll the parameters.
- **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 powerup of the thermostat. Can be used for equipment protection or to sequence startup of multiple units in one location.
- **Frost Protection Enable/Disable**
Provides a minimum heating setpoint of 42.0°F/5.5°C to prevent freezing in the zone controlled by the thermostat, regardless of its mode.
- **Adjustable Maximum Heating/Minimum Cooling Setpoints**
Establish the maximum heating setpoint and minimum cooling setpoint that can be entered through the user interface.
- **Adjustable Anti-Short Cycle Timer**
Adjusts the minimum on/off times for heating and cooling stages from 0 to 5 minutes.
- **Adjustable Heating/Cooling Cycles per Hour (On/Off Control)**
Configurable for 3 to 8 heating cycles and 3 or 4 cooling cycles in a 1-hour period, balancing temperature control and equipment cycling.
- **Adjustable Heating/Cooling Deadband**
Adjusts the minimum heating/cooling deadband from 2.0F°/1.0C° to 4.0F°/2.0C°.
- **Fan Control**
Provides 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**
Sets desired room or outside air temperature calibration (offset).
- **System Mode Lockout**
Allows the heating and cooling modes to be locked out based on the outdoor air temperature when an outdoor air sensor is connected.
- **Unoccupied Timer**
Sets the time delay between Occupied mode to Unoccupied mode after air movement is detected (PIR models only.)
- **Progressive Recovery**
Ensures the correct temperature is reached at the programmed occupied time.
- **Smart Fan**
Enables the fan to operate continuously during the occupied times and cycle with the equipment during the unoccupied times.
- **Remote Indoor and Outdoor Sensing**
Accommodates remote indoor and outdoor sensors. Up to three indoor sensors can be averaged.

- **Nonvolatile Electrically Erasable Programmable Read-Only Memory (EEPROM)**
Prevents loss of adjusted parameters during a power failure.
- **Heating and Cooling Stage Enable/Disable (TEC2602-4, TEC2602-4+PIR, TEC2603-4, TEC2603-4+PIR, TEC2604-4, and TEC2604-4+PIR Models)**
Reverts the operation of two-stage thermostats to a single-stage thermostat when the second heating or cooling stage is not needed.
- **High and Low Balance Point Adjustments (TEC2602-4 and TEC2602-4+PIR Models)**
Allows more precise control of heat pump operation based on the outdoor air temperature.
- **Heat Pump Compressor Stage Enable/Disable (TEC2602-4 and TEC2602-4+PIR Models)**
Allows operation of the second-stage compressor to be disabled, reverting the thermostat controller to single-stage compressor operation on heat pump thermostats.
- **Three Light-Emitting Diodes (LEDs)**
Provide fan, heating, and cooling status at a glance.
- **Auxiliary Contact**
Provides 24 VAC control for reheat, lighting, and other auxiliary functions.
- **Network Addressing and Viewing**
Allows network addressing via the menu-driven user interface.
- **Remote Access**
Allows the user to read/write and access the parameters of the thermostat via a supervisory controller.

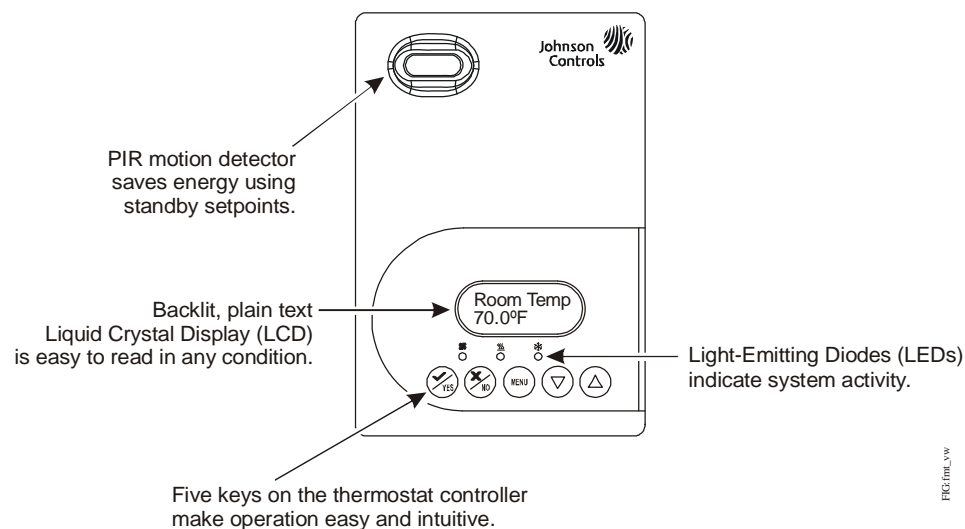


Figure 2: Front Cover of Thermostat Controller (TEC260x-4+PIR Model Shown)

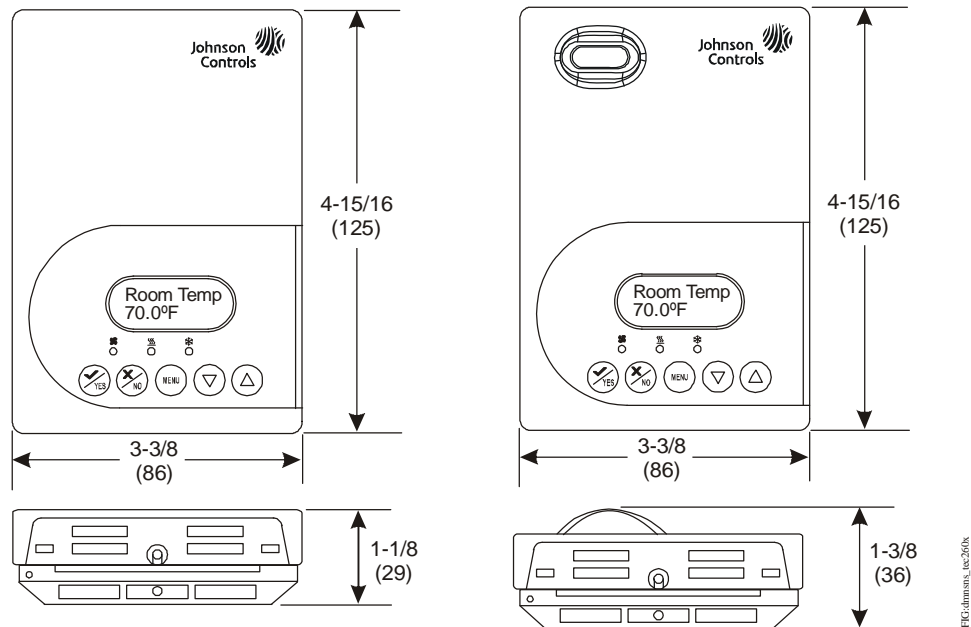


Figure 3: Thermostat Controller Dimensions, in. (mm)

Table 2: BACnet MS/TP Networked Thermostat Controller Models

Code Number	Description	Applications
TEC2601-4	Single-Stage	Fan Coil Units, Unit Heaters, and Single-Stage Packaged Heating/Cooling Equipment
TEC2601-4+PIR	Single-Stage with Onboard Occupancy Sensor	
TEC2602-4	Heat Pump	One or Two Heat Pump Stages with Optional Auxiliary Heat Stage
TEC2602-4+PIR	Heat Pump with Onboard Occupancy Sensor	
TEC2603-4	Multi-Stage	Multi-Stage Packaged Heating/Cooling Equipment
TEC2603-4+PIR	Multi-Stage with Onboard Occupancy Sensor	
TEC2604-4	Multi-Stage Economizer	Economizer Operation for Single- and Multi-Stage Unitary Rooftop Equipment
TEC2604-4+PIR	Multi-Stage Economizer with Onboard Occupancy Sensor	

Table 3: 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-6363P-1	Outdoor Air Temperature Sensor
TE-6361M-1	8 in. (203 mm) ¹ Duct Mount Air Temperature Sensor
TEC-3-PIR ²	Cover with Occupancy Sensor

1. Other probe lengths available.

2. The TEC-3-PIR Accessory Cover can replace the existing cover on a non-PIR TEC260x-4 Series Thermostat Controller to provide occupancy sensing.

Thermostat Controller User Interface Keys

The TEC260x-4 and TEC260x-4+PIR Series Thermostat Controllers user interface consists of five keys on the front cover (as illustrated in 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:** When the thermostat is left unattended for 45 seconds, the thermostat 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 Installer Configuration Menu section.)
- Use the **UP/DOWN** arrow keys to change the configuration parameters and to activate a setpoint adjustment.

Backlit LCD

The TEC260x-4 and TEC260x-4+PIR Series Thermostat Controllers include a 2-line, 8-character backlit display. Low-level backlighting is present during normal operation, and it brightens when any user interface key is pressed. The backlight returns to low level when the thermostat 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 – TEC260x-4+PIR Series Thermostat Controllers

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

There are three menus available to view, program, and configure the TEC260x-4 and TEC260x-4+PIR Series Thermostat Controllers:

Status Display Menu

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

- Room Temperature
- System Mode
- Occupancy Status – Occupied/Unoccupied/Override
- Outdoor Temperature – An outdoor air temperature sensor must be 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

The **Main User Menu** is used to access and change the basic operating parameters of the thermostat. During normal thermostat operation, press the **MENU** key once to access the Main User Menu.

Installer Configuration Menu

The Installer Configuration Menu is used to set up the thermostat for an 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 Setting
- MS/TP Communication Address
- DI1 and DI2 Input Configuration
- Menu Scroll
- Three Keypad Lockout Levels
- Power Delay on Power Up
- Frost Protection
- Maximum Heating Setpoint/Minimum Cooling Setpoint
- Proportional Band
- Anti-Short Cycle Times
- Heating Stage Cycles per Hour
- Cooling Stage Cycles per Hour
- Heating/Cooling Minimum Deadband
- Heating/Cooling Fan Control
- End-of-Cycle Fan Delay
- Temporary Occupancy Time
- Room Air Sensor Calibration
- Outdoor Air Sensor Calibration
- Number of Heating Stages (TEC2603-4, TEC2603-4+PIR, TEC2604-4, and TEC2604-4+PIR Models)

- Number of Cooling Stages (TEC2603-4, TEC2603-4+PIR, TEC2604-4, and TEC2604-4+PIR Models)
- Number of Heat Pump Stages (TEC2602-4 and TEC2602-4+PIR Models)
- Outdoor Air Temperature Heating Lockout
- Outdoor Air Temperature Cooling Lockout
- Unoccupied Timer Value (when occupancy sensor is used)
- Two or Four Events per Day Configuration
- Auxiliary Output Configuration
- Enable/Disable Progressive Recovery

The following parameters are for the **TEC2602-4 and TEC2602-4+PIR models only:**

- High Balance Point
- Low Balance Point
- Comfort/Economy Auxiliary Heat
- Reversing Valve Operation
- Heat Pump Compressor/Auxiliary Heat Interlock

The following parameters are for the **TEC2604-4 and TEC2604-4+PIR models only:**

- Outdoor Air Temperature Changeover Setpoint
- Outdoor Air Damper Minimum Position
- Mechanical Cooling On/Off during Economizer Operation
- Mixed Air Temperature Setpoint
- Mixed Air Temperature

Repair Information

If the TEC260x-4 or TEC260x-4+PIR Series Thermostat Controller fails to operate within its specifications, replace the unit. For a replacement thermostat, contact the nearest Johnson Controls® representative.

Technical Specifications

TEC260x-4 and TEC260x-4+PIR Series BACnet MS/TP Networked 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)
Economizer Output Rating (TEC2604-4 and TEC2604-4+PIR Models)		0 to 10 VDC into 2k ohm Resistance (Minimum)
Relay/Triac Contact Rating		19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A In-Rush, Class 2 or SELV
Digital Inputs		Voltage-Free Contacts across Terminal C to Terminals DI1 and DI2
Wire Size		18 AWG (1.0 mm Diameter) Maximum, 22 AWG (0.6 mm Diameter) Recommended
MS/TP Network Guidelines		32 Devices Maximum; 4,000 ft (1,219 m) Maximum Cable Length
Thermostat Measurement Range		-40.0°F/-40.0°C to 122.0°F/50.0°C
Sensor Type		Local 10k ohm Negative Temperature Coefficient (NTC) Thermistor
Resolution		±0.2°F/±0.1°C
Control Accuracy		±0.9°F/±0.5°C at 70.0°F/21.0°C Typical Calibrated
Temperature Range	Backlit Display	-40.0°F/-40.0°C to 122.0°F/50.0°C
	Heating Control	40.0°F/4.5°C to 90.0°F/32.0°C in 0.5° Increments
	Cooling Control	54.0°F/12.0°C to 100.0°F/38.0°C in 0.5° Increments
Minimum Deadband		2°F/1°C 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
Compliance	United States	UL Listed, File E27734, CCN XAPX, Under UL 873, Temperature Indicating and Regulating Equipment
		FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	Canada	UL Listed, File E27734, CCN XAPX7, Under CAN/CSA C22.2 No. 24, Temperature Indicating and Regulating Equipment
		Industry Canada, ICES-003
	Europe	CE Mark, EMC Directive 2004/108/EC
	Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant
Shipping Weight	BACnet International	BACnet Testing Laboratories™ (BTL) 135-2001 Listed BACnet Application Specific Controller (B-ASC)
Shipping Weight	TEC260x-4 Models	0.75 lb (0.34 kg)
	TEC260x-4+PIR Models	0.77 lb (0.35 kg)

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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.



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. © 2009 Johnson Controls, Inc.*