

TEC22x7-4 Series LONWORKS® Network Thermostat Controllers with Two Outputs

Product Bulletin

TEC2227-4, TEC2247-4

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The TEC22x7-4 Series Thermostat Controllers are LONWORKS® network devices that provide control of local hydronic reheat valves, pressure dependent Variable Air Volume (VAV) equipment with or without local reheat, or other zoning equipment using an on/off, floating, or proportional 0 to 10 VDC control input. The technologically advanced TEC22x7-4 Series Thermostat Controllers feature a Building Automation System (BAS) LONWORKS network communication capability that enables remote monitoring and programming for efficient space temperature control.

The TEC22x7-4 Series Thermostat Controllers feature an intuitive User Interface (UI) with backlit display that makes setup and operation quick and easy. The thermostat controllers also employ a unique, Proportional-Integral (PI) time-proportioning algorithm that virtually eliminates temperature offset associated with traditional, differential-based thermostat controllers.



Figure 1: TEC22x7-4 Series LONWORKS Network Thermostat Controller with Two Outputs

Table 1: Features and Benefits

Features	Benefits
LONWORKS Network Communication	Provides compatibility with a proven communication network; LONWORKS network is widely accepted by Heating, Ventilating, and Air Conditioning (HVAC) control suppliers.
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 plain text messages with constant backlight that brightens during user interaction.
On/Off, Floating, or Proportional 0 to 10 VDC Control	Offers additional application flexibility by providing more advanced control signals.
Override Interface Key	Allows easy access for temporarily overriding the unoccupied mode.
Simplified Setpoint Adjustment	Enables the user to change the setpoint by simply pressing the UP/DOWN arrow keys.
Two Configurable Binary Inputs	Provide additional inputs for advanced functions such as remote night setback, service or filter alarms, motion detector, and window status.
Over 20 Configurable Parameters	Enable the thermostat controller to adapt to any application, allowing installer parameter access without opening the thermostat controller cover.
Optional Discharge Air Sensor	Monitors unit efficiency.

Product Overview

The TEC22x7-4 Series Thermostat Controllers are specifically designed for networked control of common zoning equipment using on/off, floating, or proportional 0 to 10 VDC control. In addition to superior temperature control and application flexibility, the TEC22x7-4 Series features BAS LONWORKS network communication capability, allowing the user to view operation or make adjustments from a remote workstation. Plain text menus, backlit display, and three interface keys make setup and operation quick and easy.

IMPORTANT: The TEC22x7-4 Series Thermostat Controllers are intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the thermostat controller could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the thermostat controller.

Additional Features

The TEC22x7-4 Series Thermostat Controllers offer many other features, including:

- **Adjustable Heating/Cooling Deadband**
Adjusts the minimum heating/cooling deadband from 2.0F°/1.0C° to 4.0F°/2.0C°.
- **Remote Indoor Sensing**
Accommodates remote indoor sensors. Up to three indoor sensors can be averaged.
- **Three Easy-to-Use Interface Keys**
Allow for easy commissioning of the thermostat controller, and eliminate the need for DIP switches.
- **Four Levels of Keypad Lockout**
Provide four levels of keypad lockout that can be set up through the Installer Configuration Menu.
- **Accessible Configuration Parameters**
Allow local access to all configurable parameters while limiting unwanted parameter tampering once the thermostat controller is set up.

- **Two Light-Emitting Diodes (LEDs)**
Provide heating and cooling status at a glance.
- **Adjustable Temporary Occupancy Time**
Adjusts the temporary occupancy time from 0 to 24 hours.
- **Auxiliary Contact**
Provides 24 VAC control for reheat, lighting, and other auxiliary functions.
- **Adjustable Heating/Cooling Cycles per Hour (On/Off Control)**
Configurable for the maximum number of heating and cooling cycles (3 to 8 cycles maximum) in a 1-hour period, balancing temperature control and equipment cycling.
- **Nonvolatile Electrically Erasable Programmable Read-Only Memory (EEPROM)**
Prevents loss of adjusted parameters during a power failure.
- **Remote Access**
Allows the user to read/write and access the parameters of the thermostat controller via a supervisory controller.

Table 2: Thermostat Controller Models

Code Number	Control Outputs
TEC2227-4	Two On/Off or Floating
TEC2247-4	Two Proportional 0 to 10 VDC

Table 3: Accessories (Order Separately)

Code Number	Description
TEC-7-PIR ¹	Zone Controller Cover with Occupancy Sensor
SEN-600-1	Remote Indoor Air Temperature Sensor
SEN-600-4	Remote Indoor Air Temperature Sensor with Occupancy Override and LED
TE-6361M-1 ²	Duct Mount Air Temperature Sensor
TE-636S-1	Strap-Mount Temperature Sensor

1. The TEC-7-PIR Accessory Cover can be used to replace the existing cover on a non-PIR TEC22x7-4 Thermostat Controller to provide occupancy sensing capability.
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.

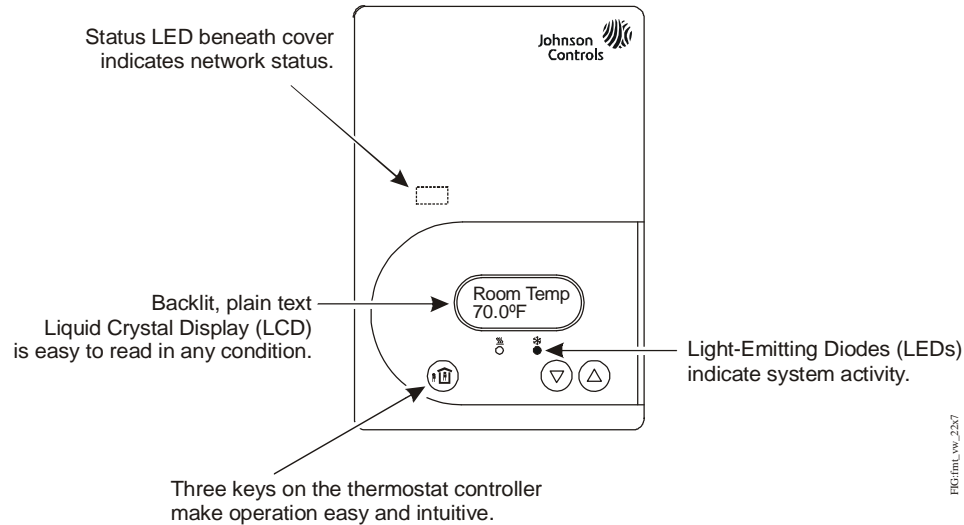


Figure 2: Front Cover of Thermostat Controller

Thermostat Controller User Interface Keys

The TEC22x7-4 Series Thermostat Controllers UI consists of three keys on the front cover (Figure 2). The function of each key is as follows:

- **OVERRIDE** key overrides the unoccupied mode to occupied at the local user interface for the specified TOccTime. (TOccTime is defined by selecting the appropriate time period in the Installer Configuration Menu.) If one of the binary inputs is configured to operate as a remote override contact, this **OVERRIDE** function is disabled.

The **OVERRIDE** key also allows access to the Installer Configuration Menu. (See the [Installer Configuration Menu](#) section.)

- **UP/DOWN** arrow keys change the configuration parameters and activate a setpoint adjustment.

Backlit LCD

The TEC22x7-4 Series Thermostat Controllers include a 2-line, 8-character backlit display. Low-level backlighting is present during normal operation, and it brightens when any user interface key is pressed. The backlight returns to low level when the thermostat controller is left unattended for 45 seconds.

LEDs

Two LEDs are included to indicate a call for heat or call for cooling:

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

Menu Overview

Two menus are available to view and configure the TEC22x7-4 Series Thermostat Controller:

- Status Display 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 thermostat controller operation. This menu continuously scrolls through the following parameters:

- Room Temperature
- Occupancy Status (Occupied/Unoccupied/Override)
- Applicable Alarms (The backlight lights up as an alarm condition is displayed.)

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

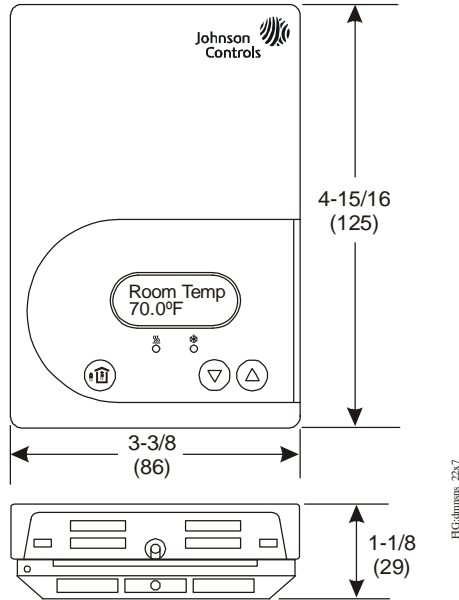


Figure 3: Thermostat Controller Dimensions, in. (mm)

Status LED

The status LED shows the operational status of the thermostat controller. See Table 4. 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 4: 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.

Installer Configuration Menu

The Installer Configuration Menu is used to set up the thermostat controller for an application-specific operation. To access the menu, press and hold the **VERRIDE** 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 **VERRIDE** key to proceed through the Installer Configuration Menu parameters.

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

- B11 and B12 Input Configuration
- UI3 Input Configuration to Locally Monitor Supply Air Temperature or Hot/Cold Water Changeover Switching
- Menu Scroll
- °F and °C Temperature Scales
- Four Keypad Lockout Levels
- Output 1 Configuration
- Control Type (TEC2227-4 Model)
- Sequence of Operation
- Standby Heating Setpoint/Standby Cooling Setpoint
- Unoccupied Heating Setpoint/Unoccupied Cooling Setpoint
- Maximum Heating Setpoint/Minimum Cooling Setpoint

- Proportional Band Adjustment
- Setpoint Type
- Temporary Occupancy Time
- Heating/Cooling Deadband
- Room Air Temperature Calibration
- Auxiliary Configuration
- Floating Time (TEC2227-4 Model)
- Direct/Reverse Acting (TEC2247-4 Model)
- Cycles per Hour (TEC2227-4 Model)
- Reheat Time
- Display UI3 Value

Repair Information

If the TEC22x7-4 Series Thermostat Controller fails to operate within its specifications, replace the unit. For a replacement thermostat controller, contact the nearest Johnson Controls® representative.

Technical Specifications

TEC22x7-4 Series LONWORKS Network Thermostat Controllers with Two Outputs (Part 1 of 2)

Power Requirements		19 to 30 VAC, 50/60 Hz, 2 VA (Terminals 4 and 5) at 24 VAC Nominal, Class 2 or Safety Extra-Low Voltage (SELV)
Relay/Triac Contact Rating	On/Off and Floating Control	19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A In-Rush
Analog Output Rating	Proportional Control	0 to 10 VDC into 2k ohm Resistance (Minimum)
Auxiliary Output Rating	Triac Output	19 to 30 VAC, 1.0 A Maximum, 15 mA Minimum, 3.0 A In-Rush
Analog Inputs		Resistive Inputs (RS and UI3) for 10k ohm Johnson Controls Type II Negative Temperature Coefficient (NTC) Thermistor Sensors
Binary Inputs		Voltage-Free Contacts across Terminal Scom to Terminals BI1, BI2, or UI3
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 a Repeater, 127 Devices Maximum with a Repeater; 6,250 ft (1,905 m) Maximum (Bus Topology)
Thermostat Controller Measurement Range		-40.0°F/-40.0°C to 122.0°F/50.0°C
Temperature Sensor Type		Local 10k ohm NTC Thermistor
Resolution		±0.2F°/±0.1C°
Control Accuracy		±0.9F°/±0.5C° at 70.0°F/21.0°C Typical Calibrated
Control Range	Heating	40.0°F/4.5°C to 90.0°F/32.0°C in 0.5° Increments
	Cooling	54.0°F/12.0°C to 100.0°F/38.0°C in 0.5° Increments
Default Minimum Deadband		2F°/1C° between Heating and Cooling
Ambient Conditions	Operating	32 to 122°F (0 to 50°C); 95% RH Maximum, Noncondensing
	Storage	-22 to 122°F (-30 to 50°C); 95% RH Maximum, Noncondensing

TEC22x7-4 Series LONWORKS Network Thermostat Controllers with Two Outputs (Part 2 of 2)

Compliance	United States	UL Listed, File E27734, CCN XAPX, Under UL 873, Temperature Indicating and Regulating Equipment LONMARK® Certification 3.4
		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		0.75 lb (0.34 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 requirements of the Canadian Interference-Causing Equipment Regulations.

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



Building Efficiency

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