



TM-21x1 Series Room Temperature Module

Installation Instructions

Part No. 24-10225-12, Rev. C
Issued March 2016

Applications

The TM-21x1 Series of Room Temperature Modules are designed for use with the Facility Explorer Series of field controllers. The setpoint dial enables the room occupant to adjust the working setpoint of the controller. On scaled models, the marked adjustment range is 55 to 85°F; the controller determines the actual setpoint temperature. On Warmer/Cooler models, the adjustment range is marked +/- from midpoint of the dial; the controller determines the equivalent setpoint temperature.

With the occupancy button, the occupant can switch the controller's operating mode between occupied and standby. In addition, the TM-21x1 Series offers the option of a temporary occupied mode during unoccupied mode.

The TM-21x1 Series Room Temperature Module also features a Light-Emitting Diode (LED) that indicates the current operating mode.

IMPORTANT: The TM-21x1 Series Room Temperature Modules are intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the TM-21x1 Temperature Module could lead to personal injury or property damage to the controlled equipment or other property, other 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 TM-21x1 Temperature Module.

Installation

Parts Included

Two #6-32 x 7/8 in. (22 mm) wallbox mounting screws are included with the TM-21x1 Module.

Special Tools Needed

For tightening and loosening the TM-11x1 Series Room Temperature Module security screw, order the optional Allen-head tool (T-4000-119) from the nearest Johnson Controls® representative.

Dimensions

TM-2141 Modules

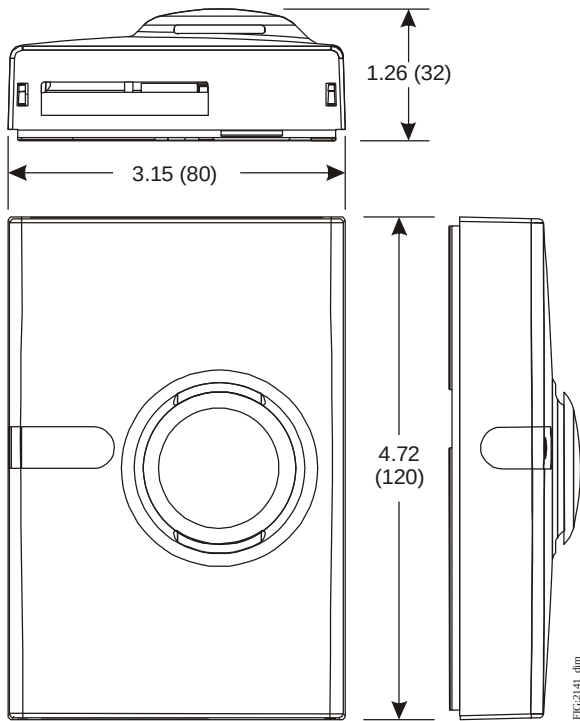


Figure 1: TM-2141 Dimensions, in. (mm)

TM-2161 Modules

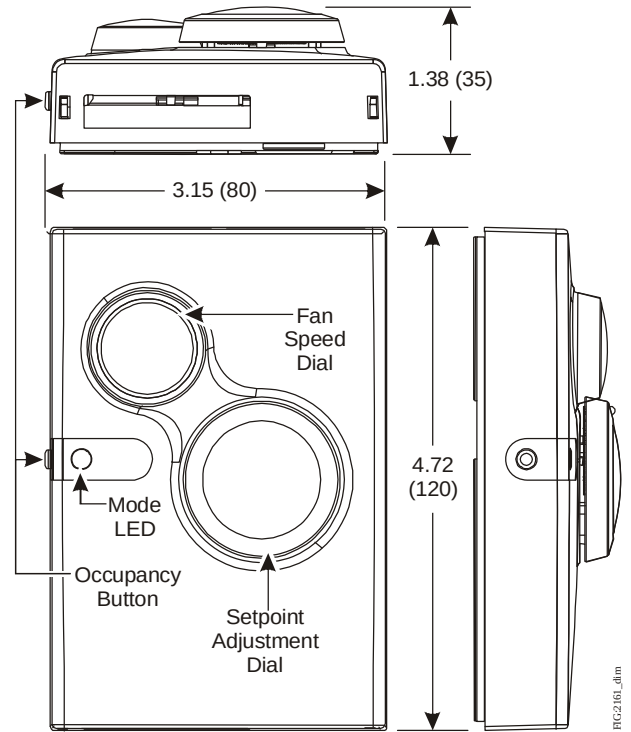


Figure 3: TM-2161-0002 and TM-2161-0007 Dimensions, in. (mm)

TM-2151 Modules

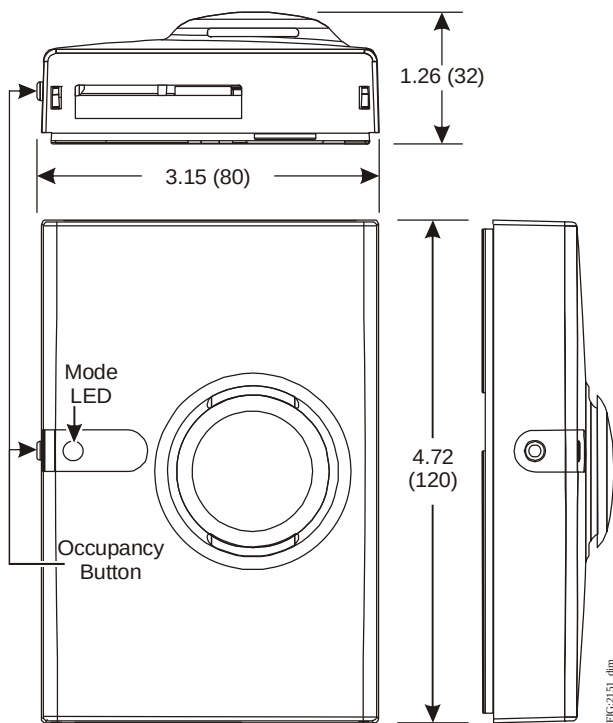


Figure 2: TM-2151 Dimensions, in. (mm)

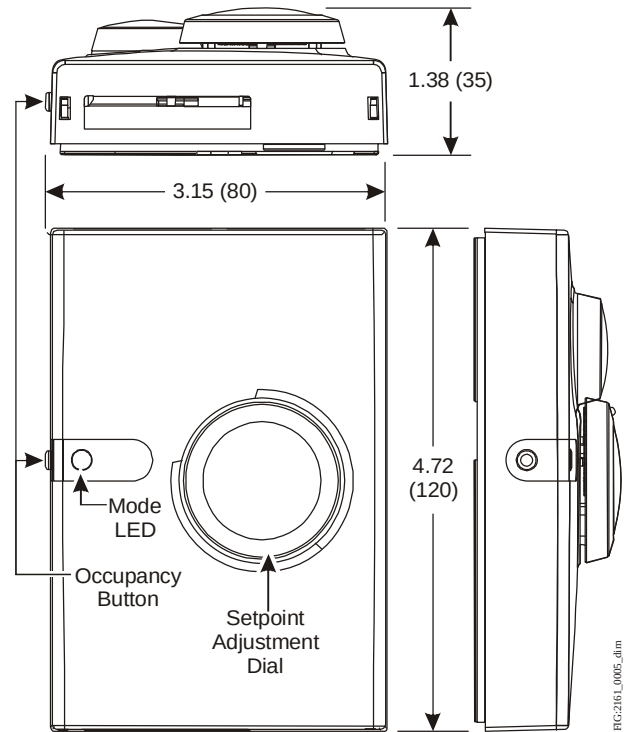


Figure 4: TM-2161-0000 and TM-2161-0005 Dimensions, in. (mm)

TM-2191 Modules

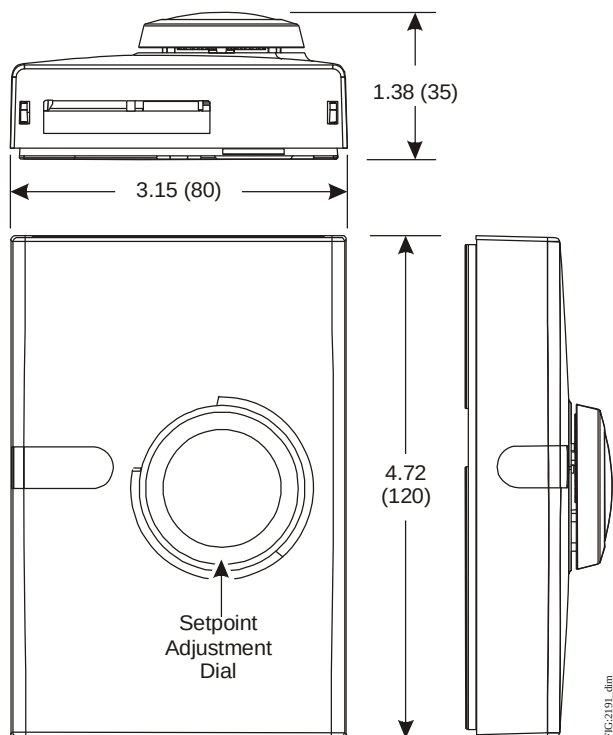


Figure 5: TM-2191 Dimensions, in. (mm)

Installing the TM-21x1

To install the TM-21x1 Series Room Temperature Module:

1. Use the Allen-head tool to loosen the security screw located at the top center of the housing.
2. Insert a screwdriver blade or coin into the slot on the top of the housing.
3. Press down gently, and pry the housing away from the base. As the two parts separate, remove the blade or coin and continue to pull the housing away from the base until the housing is free.
4. Pull the wires through the base. Locate the green terminal blocks in the upper right of the base and position the module on the wallbox with the terminal numbers right-side up.
5. Mount the base to the wallbox using the two #6-32 mounting screws (included).
6. Wire the controller to the module. See the [Wiring](#) section for correct wiring.

7. Attach the housing to the base and tighten the security screw with the allen-head tool.

Mounting

Location Considerations

Mount the TM-21x1 Series Room Temperature Module on a wall in the room to be controlled where the occupant can easily read and adjust the setpoint dial or fan speed override adjustment dial. Consider these additional guidelines in determining the best mounting location:

- Avoid areas subject to excessive vibration, electrical noise, direct sunlight, or the effects of radiant heat.
- Keep electrical wiring as short as possible to minimize temperature error.
- Install modules in areas where the temperature is representative of the general room conditions.

Wiring

To wire a controller to the TM-21x1 Series Room Temperature Module, see the appropriate wiring diagram (Figure 6 to Figure 10).

Note: Use 22 AWG (0.65 mm diameter) wire minimum. Do not exceed 164 ft (50 m) between the controller and the temperature module.

Table 1: Nominal Values for 10k ohm Sensors

Temperature		Resistance
°F	°C	ohm
20	-7	48,525
30	-1	34,919
40	4	27,550
50	10	19,898
60	16	12,246
70	21	11,993
80	27	9,222
90	32	7,510
100	38	5,874
110	43	4,871
120	49	3,956
130	54	3,277

TM-2141-0000

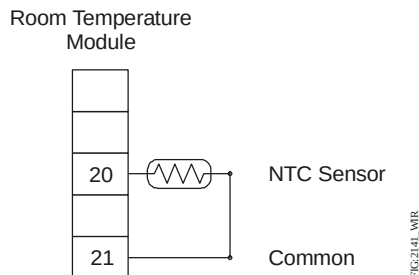


Figure 6: Wiring to an NTC Room Sensor

TM-2151-0000

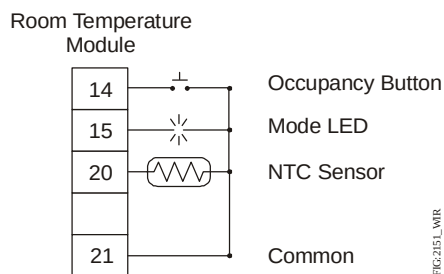


Figure 7: Wiring to a Room Temperature Module Featuring an NTC Sensor with Occupancy Override

TM-2161-0000 and TM-2161-0005

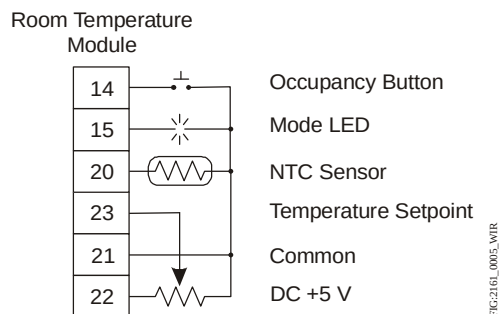


Figure 8: Wiring to a Room Temperature Module Featuring an NTC Sensor with Temperature Setpoint Adjustment, and Occupancy Override

TM-2161-0002 and TM-2161-0007

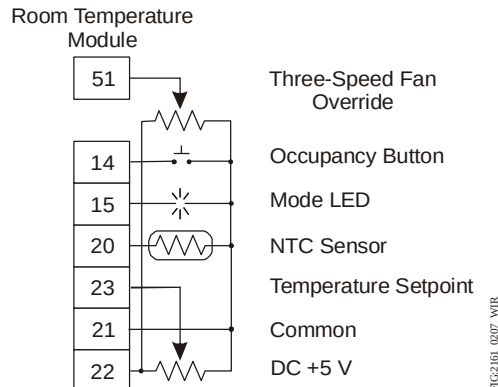


Figure 9: Wiring to a Room Temperature Module Featuring an NTC Sensor with Temperature Setpoint Adjustment, Occupancy Override, and Three Speed Fan Override

TM-2191-0000 and TM-2191-0005

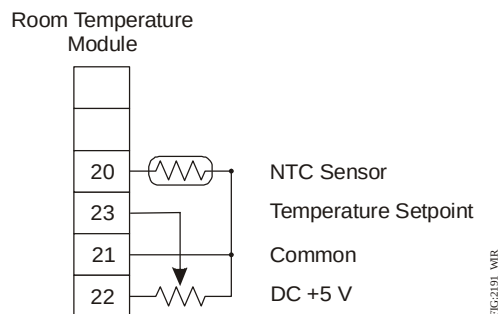


Figure 10: Wiring to a Room Temperature Module Featuring an NTC Sensor without Occupancy Override

The following messages apply to wiring this product.



CAUTION: Risk of Electric Shock.

Disconnect power supply before making electrical connections to avoid electric shock.

Mise En Garde: Risque de décharge électrique. Débrancher l'alimentation avant de réaliser tout raccordement électrique afin d'éviter tout risque de décharge électrique.



CAUTION: Risk of Property Damage.

Do not run low voltage cable in the same conduit or wiring troughs with high voltage wires. Running low and high voltage wires in the same conduit or wiring troughs may damage the equipment or cause system malfunction.

MISE EN GARDE : Risque de dégâts matériels.

Ne pas faire courir un câble basse tension dans les mêmes gaines ou goulottes électriques que des câbles haute tension. L'installation de fils basse tension et haute tension dans les mêmes gaines ou goulottes électriques risque d'endommager l'équipement ou de provoquer des dysfonctionnements du système.



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.

Mise En Garde: Risque de dégâts matériels. Ne pas mettre le système sous tension avant d'avoir vérifié tous les raccords de câblage. Des fils formant un court-circuit ou connectés de façon incorrecte risquent d'endommager irrémédiablement l'équipement.

IMPORTANT: Use copper conductors only. Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the Temperature Module electrical ratings.

Setup and Adjustments

Make temperature or fan speed adjustments using the rotating dial, shown in Figure 3 and Figure 5.

Repair Information

Do not field repair the TM-21x1 Series Room Temperature Module. As with any electrical device, keep the air vents clean and free from dust and obstruction. To order replacement parts, contact the nearest Johnson Controls representative.

Technical Specifications

TM-21x1 Series Room Temperature Module (Part 1 of 2)

Models	TM-2141-0000	Temperature Output Only
	TM-2151-0000	Temperature Output with Occupancy Override
	TM-2161-000x	Temperature Output with Setpoint Adjustment and Occupancy Override and Optional Fan Speed Adjustment
	TM-2191-000x	Temperature Output with Setpoint Adjustment
Power Requirements	5 VDC	
Power Consumption	N/A: Refer to individual component specification.	
Inputs	None	
Adjustments	Temperature Setpoint, Fan Speed (Optional by Model)	
Mode Indicator	Green LED (5 V, 4 mA)	
Occupancy Button	Momentary Contact Switch, 5 V at 1 mA	
Output	Temperature Sensing Element	Resistance Temperature Device (RTD) Thermistor Negative Temperature Coefficient (NTC) 10k ohm at 77°F (25°C)
	Fan Speed	10k ohm potentiometer, with mechanically guided positions at 0, 25, 50, 75, 100% for Auto, Off, I (low speed), II (medium speed), and III (high speed)

TM-21x1 Series Room Temperature Module (Part 2 of 2)

Setpoint Range	TM-2141-0000 TM-2151-0000	No setpoint range
	TM-2161-0000 TM-2191-0000	10k ohm potentiometer marked for 55 to 85°F
	TM-21x1-0002	10k ohm potentiometer marked for 55 to 85°F Fan Speed Adjustment: Auto, Off, I, II, and III
	TM-21x1-0005	10k ohm potentiometer marked for +/- (5F°)
	TM-21x1-0007	10k ohm potentiometer marked for +/- (5F°) Fan Speed Adjustment: Auto, Off, I, II, and III
Accuracy	±0.9°F (±0.5°C)	
Field Connection	18 to 22 AWG (1.00 to 0.65 mm diameter) recommended	
Mounting	Wallbox Mount	
Housing Material	ABS + PC, Self-Extinguishing HB UL94	
Protection	IP30 (EN 60529)	
Ambient Operating Conditions	32 to 122°F (0 to 50°C) 10 to 90% RH, noncondensing	
Ambient Storage Conditions	-40 to 158°F (-40 to 70°C) 5 to 95% RH, noncondensing	
Dimensions (H x W x D)	TM-2141 TM-2151	4.72 x 3.15 x 1.26 in. (120 x 80 x 32 mm)
	TM-2161 TM-2191	4.72 x 3.15 x 1.38 in. (120 x 80 x 35 mm)
Shipping Weight	0.44 lb (0.2 kg)	
Compliance	Europe	CE Mark: EMC Directive, EN-61000-6-2

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.

European Single Point of Contact:

JOHNSON CONTROLS
WESTENDHOF 3
45143 ESSEN
GERMANY

NA/SA Single Point of Contact:

JOHNSON CONTROLS
507 E MICHIGAN ST
MILWAUKEE WI 53202
USA

APAC Single Point of Contact:

JOHNSON CONTROLS
C/O CONTROLS PRODUCT
MANAGEMENT
NO. 22 BLOCK D NEW DISTRICT
WUXI JIANGSU PROVINCE 214142
CHINA



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. © 2016 Johnson Controls, Inc.