

TM-9100 Series Room Command Module

The TM-9100 Series Room Command Modules are designed for use with the TC-9100 series of DDC (Direct Digital Control) terminal unit controllers. The setpoint dial enables the room occupant to adjust the setpoint of the controller within the range of 55 to 85°F, +/-5°F, 12 to 28°C, or +/-3°C. The Temporary Occupancy button enables the occupant to change the controller mode manually. The status of the controller is indicated by an LED (Light-Emitting Diode) indicator on the TM-9100.

There are four room command modules with a 3-speed fan selector. Refer to Ordering Information at the end of this bulletin for details of all models available.



Figure 1: TM-9100 Series Room Command Module Shown with and without Setpoint Dial

Features and Benefits	
<input type="checkbox"/> High Accuracy Thermistor Sensor	Provides a low-cost alternative to expensive metal alloy sensors
<input type="checkbox"/> Choice of Setpoint Dials	Provides aesthetic flexibility
<input type="checkbox"/> Adjustable Setpoint Limits	Provides limits to user setpoint adjustment range
<input type="checkbox"/> Temporary Occupancy Button	Enables the user to adjust room comfort by selecting the controller's mode
<input type="checkbox"/> Optional Fan Speed Selector	Allows manual control of the speed of the fan to ensure comfort
<input type="checkbox"/> External LED Mode Indicator	Shows the controller's current operating status
<input type="checkbox"/> Choice of Wallbox Mounting Base (included with all models)	Makes the TM-9100 adaptable for most installations

Product Overview

The TM-9100 Room Command Module is available with a setpoint dial, and must be connected to a TC-9100 series controller with the corresponding remote setpoint range. The 55 to 85°F or 12 to 28°C range model provides remote adjustment of the setpoint of the controller, while the +/-5°F or +/-3°C range model provides remote offset adjustment (deviation to the room temperature setpoint programmed into the controller).

The LED, located directly above the Temporary Occupancy button on the TM-9100, indicates the current operating mode of the TC-9100 controller as follows:

LED on: Occupied mode (Comfort)

LED off: Unoccupied mode (Night)

LED flashing: Standby mode

Refer to the *Facilitator TC-9102 Terminal Controller Technical Bulletin (LIT-1628340)* for more information.

The TM-9100 Temporary Occupancy button provides a means to circumvent day/night programming and turn the HVAC system on or off manually. If pressed for about a second, the controller mode is changed. Refer to the *TC-9102 Applications Application Note (LIT-6375130)*, Tables 3, 4, and 5 for more information.

When connected to a TC-9102 controller, which has a 3-speed fan control auxiliary output, the fan selector allows manual control of the fan speed. The positions of the selector are as follows:

AUTO Automatic fan speed set by the TC-9102 controller.

OFF Fan off (except when controller is in the low limit protection mode).

LO Fan is low speed.

MED Fan is medium speed.

HI Fan is high speed.

Dimensions

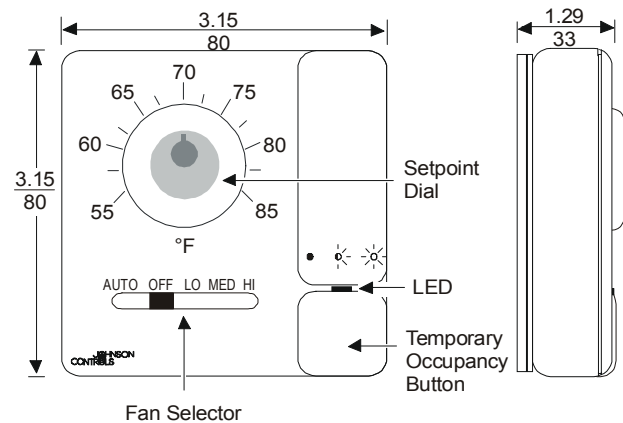


Figure 2: TM-9100 Cover Dimensions, in. (mm)

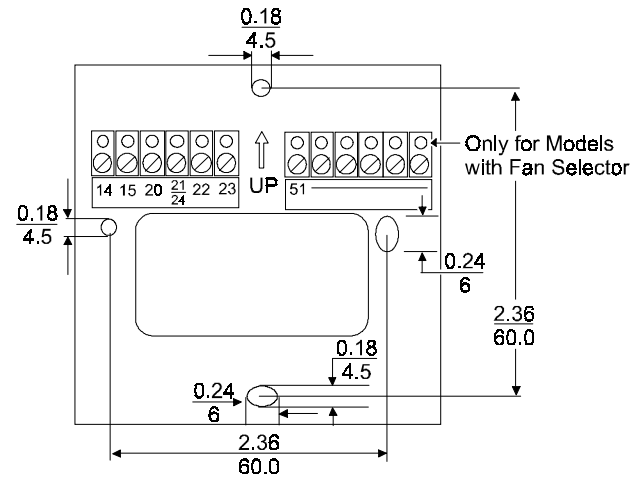


Figure 3: TM-9100 Base Dimensions, in. (mm)

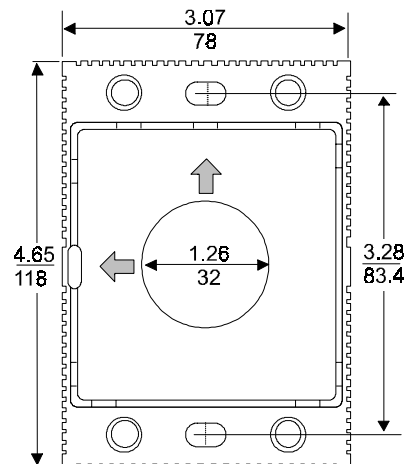


Figure 4: TM-9100 Wallplate Dimensions, in. (mm)

Installation

Install the TM-9100 where the occupant can easily read and adjust the setpoint dial or fan speed selector. Locate the module where the temperature is representative of the general room conditions. Avoid mounting the TM-9100 near cold or warm air drafts, radiant heat, or direct sunlight.

IMPORTANT: Do **not** mount the module on an exterior wall. All wiring connections must be made in accordance with the National Electrical Code and all local regulations.

Parts Included

- room command module with attached surface mounting base
- separate wallplate for wallbox mounting
- wallplate endcaps (2)
- serrated setpoint dial (attached)
- smooth setpoint dial (separate)
- dial-stop self-tapping screws (2)
- hollow plastic wall anchors (2)
- No. 8 x 1-1/4 in. slotted pan-head sheet metal screws (2)
- No. 6-32 x 1/2 in. flat-head machine screws (2)

Tools Needed

- 1/16 in. (1.5 mm) Allen wrench or stat adjustment tool
- screwdrivers, flat-blade, 1/4 in. and 3/16 in. tip
- screwdriver, Phillips, No. 1 tip
- 5/16 in. drill bit and drill
- hammer

Mounting

The TM-9100 series allows for two mounting methods: surface mount and wallbox mount.

For surface mounting, follow the instructions for removing the cover and proceed to the *Surface Mounting Procedure* section.

For wallbox mounting, follow the instructions for removing the cover and proceed to the *Wallbox Mounting Procedure* section.

Note: All TM-9100 models include the U.S. Wallbox Mounting Base Kit. Discard the kit if surface mounting the module.

Removing the Cover

To remove the cover from the base, insert a 1/16 in. (1.5 mm) Allen wrench or T-4000-119 Stat Adjustment Tool into the small hole located in the center of the top of the cover. While pressing down gently on the tool, pull the cover away from the base until it is free. (See Figure 5.)

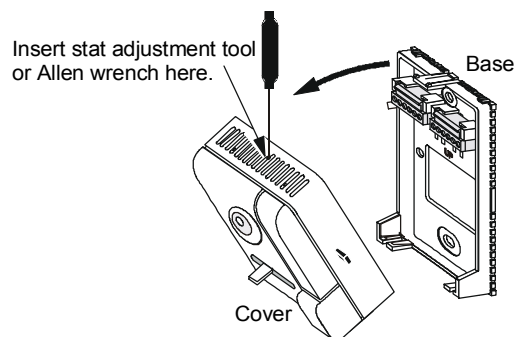


Figure 5: Removing the Cover from the Base

Surface Mounting Procedure

To surface mount the TM-9100:

1. Pull the wiring through the wall. (See Figure 6.)
2. Place the base against the wall, and mark the screw holes using the base as a template.
3. Drill two 5/16 in. (8 mm) holes, insert anchors, position base, then drive the screws.
4. Wire to appropriate terminals as shown in Figures 16 and 17.

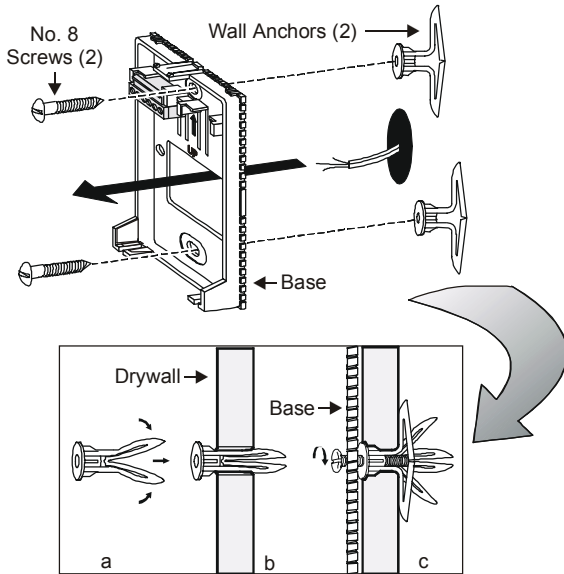


Figure 6: Installing a Surface-Mounted TM-9100

Reassembling the Surface-Mounted TM-9100

If using the dial-stop screws, proceed to the *Dial-Stop Screws* section.

To reassemble the TM-9100, place the cover against the bottom edge of the base, and push the upper part of the cover until it clicks firmly into place. (See Figure 7.)

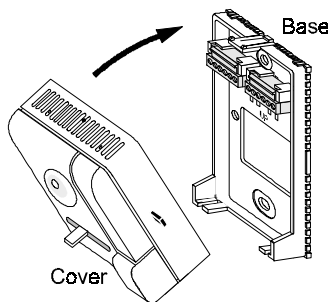


Figure 7: Reattaching the Cover to the Base

Wallbox Mounting Procedure

To wallbox mount the TM-9100:

1. Loosen the cover screw installed in the wallplate.
2. Pull the wiring through the wallbox. (These instructions assume a standard 2 x 4 in. [51 x 102 mm] wallbox is used.)
3. Rotate the wallplate so one of the arrows on the wallplate points up.
4. Fasten the wallplate to the wallbox using the No. 6 screws provided. (See Figure 8.)

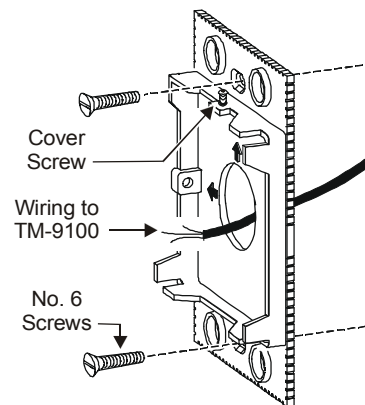


Figure 8: Installing a TM-9100 Using a Wallplate

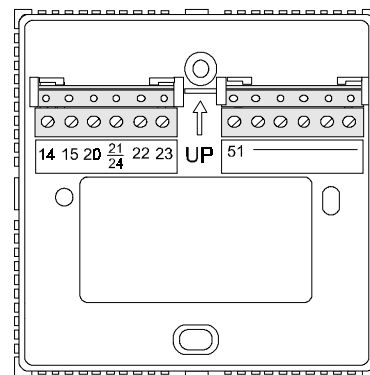


Figure 9: Terminal Locations Shown on Inside of TM-9100 Surface-Mount Base

Note: The terminal locations on the back of the TM-9100 cover are opposite of those marked on the base. (See Figure 9.) Terminal 14 will be located in the farthest right position of the right terminal block when viewing the inside of the TM-9100 cover as shown in Figure 11.

5. Remove terminal block(s) from the TM-9100 base by lifting the plastic fingers on the back of the base and sliding the terminal block down and out of the retainer. (See Figure 10.) Discard this base.

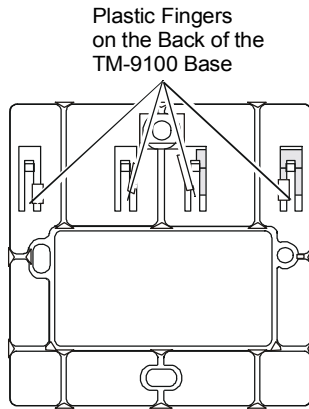


Figure 10: Removing the Terminal Block(s) from TM-9100 Surface-Mount Base

6. Push the terminal blocks onto the pins located inside the TM-9100 cover with screw heads toward the board and the wire leads exiting the terminal blocks from the bottom as shown in Figure 11.

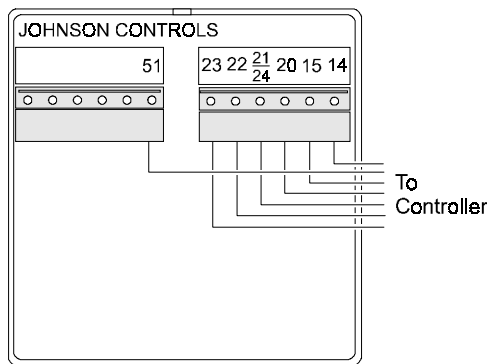


Figure 11: Inside View of TM-9100 Cover Shown with Terminal Blocks Positioned for Wallplate Mounting

7. Wire to appropriate terminals as shown in Figures 16 and 17.

Reassembling the Wallbox-Mounted TM-9100

If using the dial-stop screws, proceed to the *Dial-Stop Screws* section.

To replace the TM-9100 cover onto the installed wallplate:

1. Place the bottom edge of the cover against the bottom edge of the wallplate.
2. Rotate the cover up onto the wallplate, and tighten the cover screw using the stat tool or Allen wrench. (See Figure 12.)

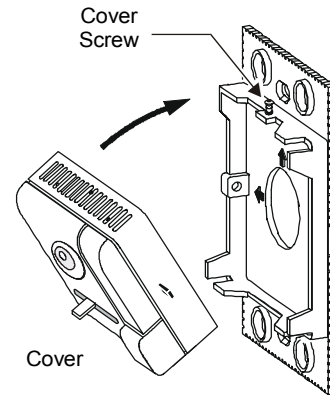


Figure 12: Reattaching the Cover to the Wallplate

3. Install the endcaps provided by snapping them onto the wallplate. (See Figure 13.)

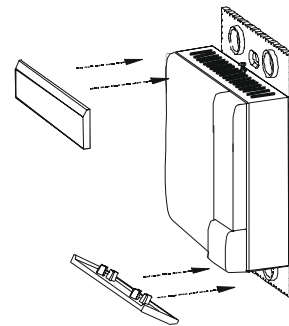


Figure 13: Installing Endcaps in Wallbox Applications

Dial-Stop Screws

A pair of self-tapping screws can be installed to mechanically limit the range of the TM-9100 setpoint dial. (See Table 1.)

1. Remove the base of the module from the cover by inserting a 1/16 in. (1.5 mm) Allen wrench or T-4000-119 Stat Adjustment Tool into the small hole located in the center of the top of the cover. While pressing down gently on the tool, pull the cover away from the base until it is free.
2. Set the dial to the center top position, with the pointer (indentation) at the 70°F (20°C) mark.
3. Insert the stat adjustment tool through the hole in the back of the cover (1) and push gently until the dial knob is released (2).

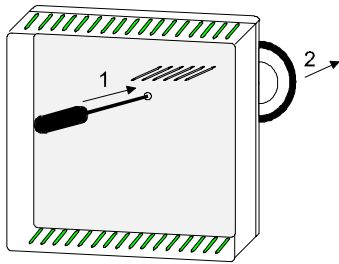


Figure 14: Removing the Setpoint Dial

- On the front of the module cover, there is a series of seven holes on either side of the setpoint dial pivot, which had been hidden by the knob.

To limit travel of the dial, choose the desired range, and insert screws in the corresponding holes. (See Table 1.) For example, for a limitation of $\pm 4.2^\circ\text{F}$, insert one screw each in the holes marked (A) in Figure 15.

Note: For an asymmetrical range, insert screws into differently lettered holes on each side.

Table 1: Dial Range Limits

Holes	55-85°F	$\pm 5^\circ\text{F}$	12-28°C
A	57.5/82.5	± 4.2	13.3/26.7
B	59.3/80.7	± 3.6	14.3/25.7
C	61.2/78.8	± 3	15.3/24.7
D	63/77	± 2.3	16.3/23.7
E	65/75	± 1.7	17.3/22.7
F	66.8/73.2	± 1	18.3/21.7
G	68.6/71.4	± 0.4	19.3/20.7

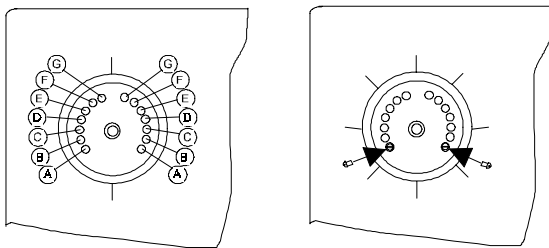


Figure 15: Dial-stop Screws

- Press the dial back in place on the cover, making sure the pointer (indentation) is aligned with the 70°F (or 20°C) mark at the top of the circle. Then place the cover over the lower edge of the TM-9100 base and push the upper part of the cover until it clicks firmly into place.

Setpoint Dial

To replace a serrated setpoint dial with a smooth dial, follow Steps 1, 2, 3, and 5 in the *Dial-Stop Screws* section, substituting a smooth dial for the serrated dial in Step 5.

Wiring

CAUTION: Equipment Damage Hazard. Disconnect the power supply before wiring connections are made to avoid electrical shock or possible equipment damage.

Make wiring connections to the terminal blocks in the base of the TM-9100 module using 24-14 AWG wire. Follow the wiring diagrams shown in Figures 16 and 17.

IMPORTANT: All wiring to the module is low voltage (Class 2) and must be separated from the power line voltage wiring. Do **not** run wiring close to transformers or high frequency generating equipment. Complete and verify all wiring connections before applying power to the controller.

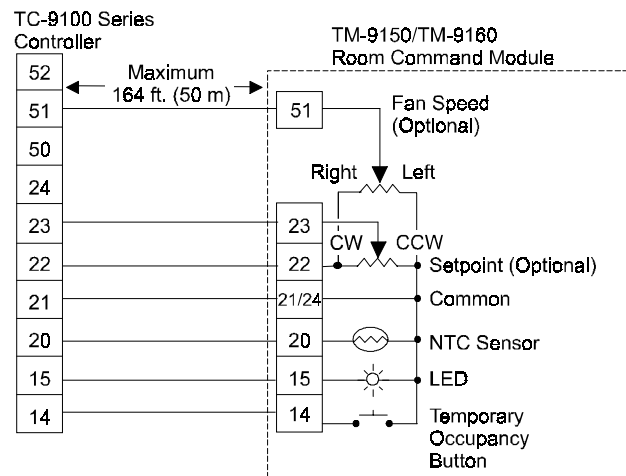


Figure 16: Wiring to a Room Command Module Using an Internal NTC (Negative Temperature Coefficient) Sensor

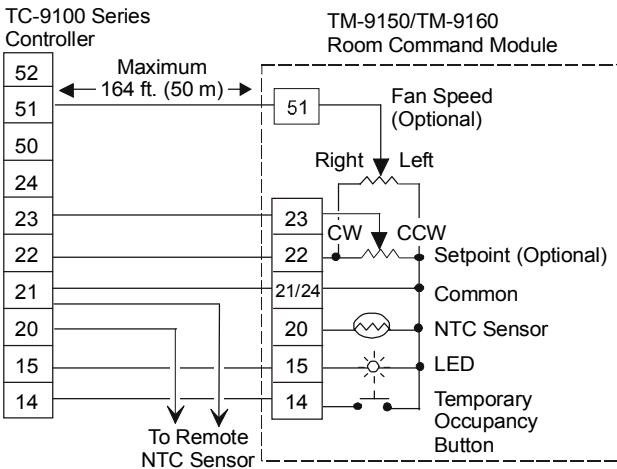


Figure 17: Wiring with Remote NTC Sensor

Table 2: Nominal Temperature vs. Resistance for Thermistor Sensor

Temperature		Resistance (ohms)
°F	°C	Thermistor
30	-1	7784
40	4	5880
50	10	4484
60	16	3450
70	21	2678
80	27	2095
90	32	1652
100	38	1313
110	43	1051

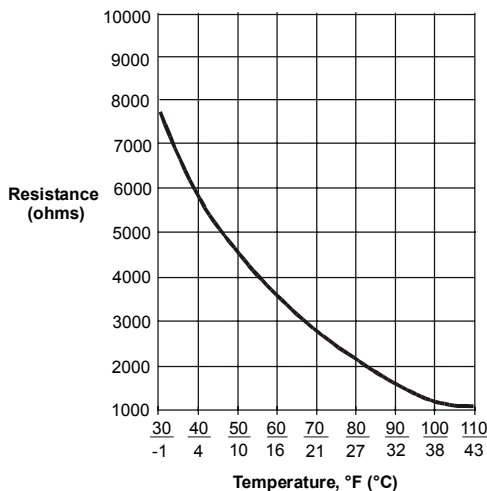


Figure 18: Temperature vs. Resistance for Thermistor Sensor

Replacement and Repair

Field repairs must not be made. To order a replacement, refer to the *Ordering Information* section for the desired product code number, and contact your Johnson Controls representative.

Ordering Information

Table 3: Room Command Modules

Ordering Code	Setpoint Scale	Fan Switch
TM-9151-0000	None	None
TM-9161-0000	12 to 28°C	
TM-9161-4005	+/-3°C	
TM-9161-5000	55 to 85°F	
TM-9161-5005	+/-5°F	
TM-9161-0002	12 to 28°C	3-speed Fan Override
TM-9161-4007	+/-3°C	
TM-9161-5002	55 to 85°F	
TM-9161-5007	+/-5°F	

Note: All TM-9100 series models include an NTC sensor, a Temporary Occupancy button, and a wallplate for wallbox mounting.

Table 4: Replacement Parts and Accessories

Ordering Code	Description
TE-6300-607	3 in. Thermistor Probe for remote NTC temperature sensing (Refer to the <i>TE-6300 Series Temperature Sensors Product/Technical Bulletin [LIT-216320]</i> for more information.)
TE-6400-603	End Caps (2)
TM-9100-8901	Dial-Stop Screws Kit (bag of 100 self-tapping screws)
TM-9100-8902	Serrated Knob Kit (bag of 10 knobs)
T-4000-119	Stat Adjustment Tool (to open module)
ACC-INSL-0	Wallbox Mounting Pad (bag of 10)
ACC-INSL-1	Surface Mounting Pad (bag of 10)

Specifications

Product	TM-9100 Series Room Command Module
Ambient Operating Conditions	32 to 122°F (0 to 50°C); 10 to 90% RH non-condensing
Ambient Storage Conditions	-4 to 158°F (-20 to 70°C); 100% RH non-condensing
Terminations	Terminal block accommodates 24 to 14 AWG (maximum) wire
Thermistor Sensor	Temperature Coefficient: Nonlinear, negative temperature coefficient Reference Resistance: 2.25k ohms at 77°F (25°C) Accuracy: ±0.36°F (±0.2°C) in the range of 32 to 158°F (0 to 70°C)
Remote Setpoint	10k ohm, 3-wire potentiometer marked for 55 to 85°F, 12 to 28°C, -5 to +5°F, or -3 to +3°C
Fan Speed Selector	10k ohm, 3-wire potentiometer: AUTO, OFF, LO, MED, HI
Temporary Occupancy Button	Momentary contact
Mode Indicator	Red LED
Mounting	Direct surface mount or wallbox mounting base
Housing	Material: Flame-resistant thermoplastic, self-extinguishing UL94 VO
Dimensions (H x W x D)	3.2 x 3.2 x 1.3 in. (80 x 80 x 33 mm)
Shipping Weight	0.33 lb (0.15 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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