

TE-6700 Series 2nd Generation Temperature Elements

Installation

Refer to the *Mounting* section for a complete list of tools required for installation of both surface and wallbox mounting styles.

Parts Included

- mounting base for U.S. wallbox or surface mounting
- No. 6-32 x 7/8 in. (22 mm) oval-head screw (2)
- No. 4-40 x 1/4 in. (6.4 mm) hex-head cover screw (comes installed)
- drywall clip mounting kit (includes two each No. 6-20 x 1-1/4 in. (32 mm) pan-head, tapping screws, spring clips, and spacers)

IMPORTANT: Use this TE-6700 Series 2nd Generation Temperature Element only to provide input to equipment under normal operating conditions. Where failure or malfunction of the TE-6700 Series element 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 TE-6700 Series element.

IMPORTANT: Do not remove the Printed Circuit Board. Removing the Printed Circuit Board voids the product warranty.

Accessories

Table 1: Accessories

Product Code Number	Description
ACC-DWCLIP-0	Drywall Mounting Clip Kit (10 per package)
ACC-INSL-0*	Foam Pad Kit for Wallbox Mounting (10 per package)
ACC-INSL-1*	Foam Pad Kit for Surface Mounting (10 per package)
GRD10A-608	Plastic Guard with Baseplate and Mounting Ring
T-4000-119	Allen-head Adjustment Tool (order in multiples of 30)
TE-67L-600	Fahrenheit Label Replacement Kit
TE-67L-601	Celsius Label Replacement Kit
TE-67MB-600	Mounting Base Kit (order in multiples of 10)
TE-67D0-601**	Door Replacement Kit with Johnson Controls® logo (order in multiples of 10)
TE-67D0-602**	Door Replacement Kit without logo (order in multiples of 10)

* These foam pads help prevent drafts from entering the unit through the wall and make installation easier when mounting on an uneven surface.

** Contains 1 original style and 1 new style door.

Mounting

The TE-6700 is shipped with one mounting base for both surface and wallbox mounting. To mount the TE-6700, release the cover from the base as described in Figure 1.

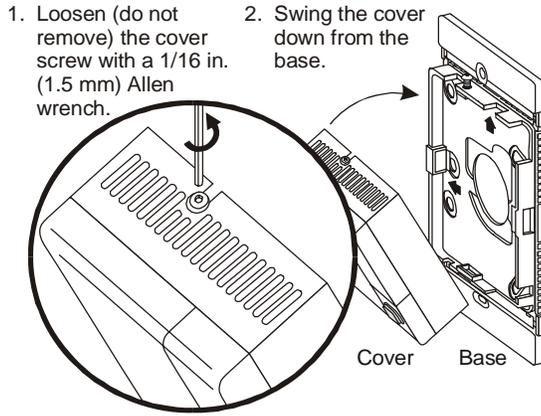


Figure 1: Removing the Cover from the Base

Location Considerations

Mount the TE-6700 on an inside wall, free from drafts, and out of direct sunlight. The TE-6700 is shock and vibration resistant; however, be careful not to drop the unit or mount it where it could be exposed to excessive vibration. The following ambient operating conditions apply:

- Temperature: 32 to 131°F (0 to 55°C)
- Humidity: 0 to 100% Relative Humidity (RH), noncondensing; 85°F (29°C) maximum dew point

Wallbox

Special Tools Needed

Use a 1/16 in. (1.5 mm) Allen wrench or T-4000-119 Allen-Head adjustment tool for mounting.

To mount the TE-6700 to a wallbox:

1. Pull the cable or wiring through the wallbox and base.

IMPORTANT: Seal the drilled hole or use an ACC-INSL-0 Foam Pad Kit for Wallbox Mounting (ordered separately) to keep drafts from causing false temperature readings.

2. Rotate the mounting base, so that one of the arrows on the base points up.
3. Fasten the base to the wallbox with the No. 6-32 x 7/8 in. (22 mm) screws provided. (See Figure 2)

Note: These instructions apply to use of a standard 2 x 4 in. (51 x 102 mm) U.S. wallbox.

4. Proceed to the *Wiring* section for the appropriate connections.

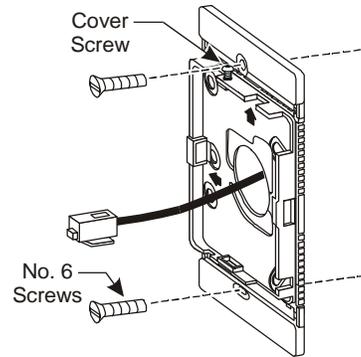


Figure 2: Wallbox Mounting

5. Place the bottom edge of the cover against the bottom lip of the base, and rotate it up onto the base as shown in Figure 3.

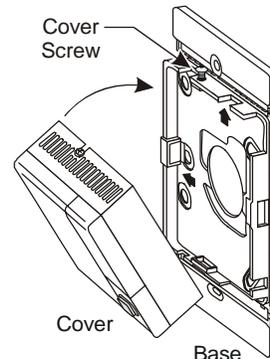


Figure 3: Attaching the Cover to the Base

6. Tighten the cover screw.

Once installed, removing the cover of the TE-6700 from the wall requires loosening the cover screw, as described in Figure 1.

Surface

Special Tools Needed

- hole saw with 1-3/8 in. (35 mm) diameter blade
- 1/16 in (1.5 mm) Allen wrench or T-4000-119 Allen-Head adjustment tool
- drill with 1/8 in. (3 mm) drill bit

Procedure

To mount the surface model to drywall, refer to Figure 5 and proceed as follows:

1. Bend the top and bottom edges of the mounting base at the perforations until they break off. (See Figure 4.)

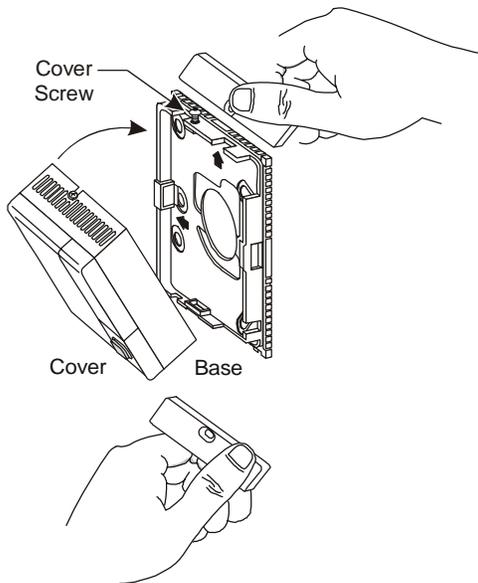


Figure 4: Removing the Breakaway Tabs

2. Drill a 1-3/8 in. (35 mm) hole in the surface where the TE-6700 will be mounted, and pull the wiring through the drilled hole.

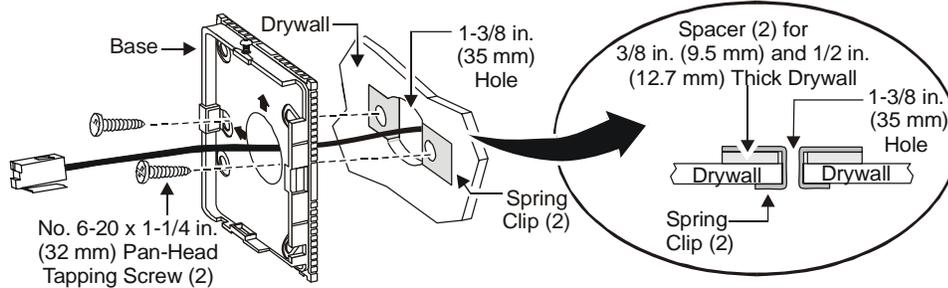


Figure 5: Surface Mounting to Drywall

IMPORTANT: Seal the drilled hole or use an ACC-INSL-1 Foam Pad Kit for Surface Mounting (ordered separately) to keep drafts from causing false temperature readings.

3. Use the base as a template to mark the location of the two mounting screws, then drill the holes, using the 1/8 in (3 mm) drill bit.
4. Insert the spring clips on each side of the drilled 1-3/8 in. (35 mm) hole, with the long leg of the spring clip inside the wall. Use the spacers if needed, as shown in Figure 5. Do not use the spacers for 5/8 in. (16 mm) drywall.
- Note:** For replacement spring clips, spacers, and screws, order the ACC-DWCLIP-0 Drywall Clip Mounting Kit. (See Table 1.)
5. Pull the wiring through the base of the TE-6700.
6. Rotate the mounting base so that one of the arrows on the base points upward.
7. Center the two holes in the base over the two drilled holes and fasten the base to the drywall using the No. 6 x 1—1/4 in. (32 mm) screws provided.
8. Proceed to the *Wiring* section for the appropriate connections.
9. Place the bottom edge of the cover against the bottom lip of the base, and rotate it up onto the base as shown in Figure 3.
10. Tighten the cover screw.

Once installed, removing the cover of the TE-6700 from the base on the wall requires loosening the cover screw, as described in Figure 1.

IMPORTANT: Do not overtighten the mounting screws. Overtightening the mounting screws can damage the drywall.

Wiring



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.

IMPORTANT Use copper conductors only. Make all wiring connections in accordance with local, national, and regional regulations.

Keep wires as short as possible to minimize sensor error. Each 250 ft (76 m) run of 18 AWG wire, or 50 ft (15 m) of 24 AWG wire, creates 1F° (0.56C°) error for a nickel sensor or 1.5F° (0.83C°) error for a platinum sensor due to wire resistance. To maintain less than 1F° (0.56C°) error for nickel or 1.5 F° (0.83C°) error for platinum, hold the total resistance of all sensor wiring below 3 ohms. When wiring the TE-6700, do not run low-voltage wiring in the same conduit as line-voltage wiring or other conductors supplying highly inductive loads.

Terminal Block Wiring (TE-67xT Models)

Internal wiring diagrams are shown in Figure 6 and Figure 7. Terminal block designations are shown in Figure 8. The terminals are identified in Table 2 for a single setpoint model. See the *Setup and Adjustments* section and Figure 10 for an explanation of the Light Emitting Diode (LED) and Pushbutton (PB) modes. Make connections pairing the following wires:

- sensor (Terminal 1 and Terminal 2)
- setpoint (Terminal 3 and Terminal 4)
- Zone Bus and Common (COM) (Terminals 6 and 7)

Shielding is not required. If used, follow the system controller's recommendations for grounding the shield.

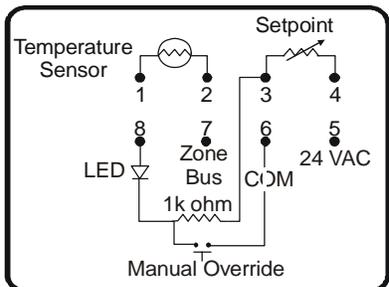


Figure 6: Terminal Block Wiring Designations (LED On Mode (Factory Default) and Manual Override Pushbutton (PB) Enabled)

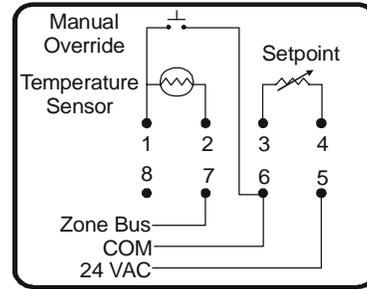


Figure 7: Terminal Block Wiring Designations (LED Off Mode and Manual Override PB Enabled)

Note: The Manual Override PB does not respond when the DIP switch positions are all down (LED mode NO PB, as shown in Figure 10).

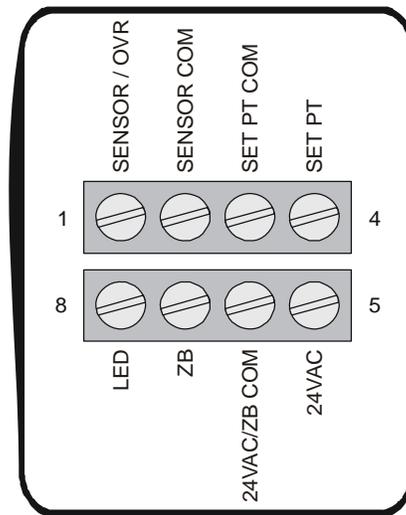


Figure 8: Circuit Board Wiring

Table 2: Terminal Block Wiring

Terminal	Signal Designation
1	Temperature Sensor and Manual Override
2	Temperature Sensor Common
3	Setpoint Common and LED Common
4	Setpoint
5	24 VAC (+15 VDC – VMA only)
6	Common (for Power, Zone Bus, or Manual Override)
7	Zone Bus
8	LED and Manual Override

Notes: Manual Override is selected for either Terminals 1 and 6 to short sensor (with DIP switch set for LED Off) or Terminal 6 and Terminal 8 to short LED (with DIP switch set for LED On).

A dual (heating/cooling) setpoint is not available with a terminal block.

Phone Jack Wiring (TE-67xP Models)

The phone jack connection is shown in Figure 9. Make electrical connections to the rear-facing 8-pin RJ-45 connector, using eight conductor standard or plenum-rated telephone cables. Terminals are identified in Table 3. Insert the phone jack connector with the proper polarity (not reversed). Misalignment can cause damage. Refer to the controller documentation to determine the appropriate cable assembly.

IMPORTANT: Do not insert a 6-pin connector or anything other than an **RJ-45 8-pin connector** into the 8-pin jack on the back of the TE-67xP Temperature Element to prevent damaging the phone jack.

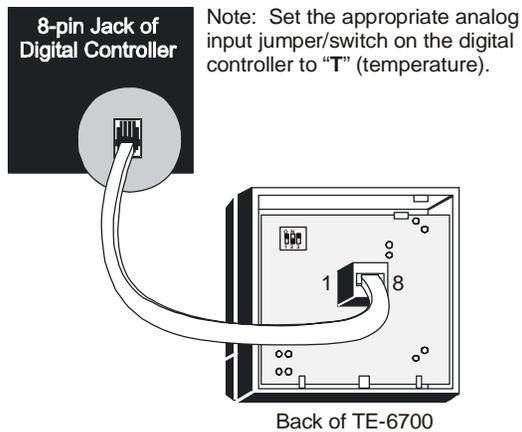


Figure 9: 8-Pin Phone Jack Connection

Table 3: Phone Jack Pin Designations

Phone Jack Pin Number	Signal Designation
1	Heating Setpoint or LED and Manual Override
2	Setpoint (Cooling)
3	Temperature Sensor and Manual Override
4	Temperature Sensor Common
5	24 VAC (+15 VDC – VMA only)
6	Common (for Power, Zone Bus, or Manual Override)
7	Setpoint Common
8	Zone Bus

Setup and Adjustments

Controller Configuration Switch

A DIP switch configures the TE-6700 for use with the desired controller by enabling or disabling the manual override PB and the LED, in appropriate models.

To change the controller mode, use the three-position DIP switch located on the back of the Printed Circuit Board (PCB). A DIP switch setting chart appears on the PCB for easy reference when setting the three switch positions. For Single and No Setpoint models, see Figure 10 and consult Table 4 to determine controller compatibility. For Dual Setpoint models, see Figure 11.

CAUTION: Risk of Property Damage. Do not use switch settings other than those shown in Figure 10 or Figure 11. Using other switch settings may cause incorrect controller operation or damage to the element, controller, and/or controlled equipment.

Single and No Setpoint Models

For the Single and No Setpoint models, the factory default is the **LED Mode: ON** as described below. The switch positions enable/disable the following functions:

- LED Mode: OFF** (LED Disabled, but Sensor and PB Enabled) Switch positions are down, up, and down. The LED remains off at all times.
- LED Mode: ON** (LED, Sensor, and PB Enabled) Switch positions are factory set up, down, and up. The controller determines the LED mode.
- LED Mode: NO PB** (LED and PB Disabled, but Sensor Enabled) Switch positions are all down. LED is off, and the PB does not function.

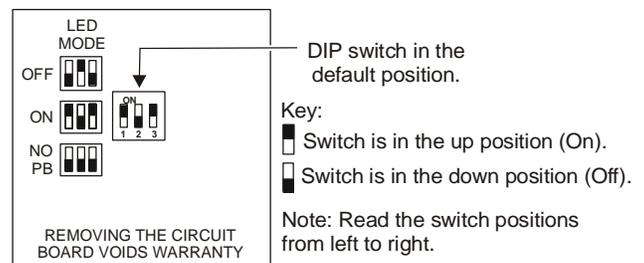


Figure 10: DIP Switch Positions Single and No Setpoint Models

Table 4: Controller Compatibility with LED Mode and PB

Type of TE-6700	LED Mode (Figure 1)	Features Enabled on TE-6700	Features Recognized by Controller				
			AHU	UNT1100 Series	VAV1xx or UNT1xx	VMA1200 Series**	VMA1400 Series**
Single Setpoint	LED Off*	Sensor and Manual Override	No	Yes	Yes	Yes	Yes
	LED On	Sensor, Manual Override, and LED	No	No	No	Yes	Yes
	No PB	Room Sensor Only	Yes	Yes	Yes	Yes	Yes
Dual Setpoint	PB*	Sensor and Manual Override	No	Yes	Yes	No	No
	No PB	Room Sensor Only	Yes	Yes	Yes	No	No

* Holding the manual Override PB for more than two seconds may affect the sensor reading.

** For these controllers, the LED appears brighter when the manual override PB is pushed.

Dual Setpoint models

The Dual Setpoint models do not have an LED. The factory default is the PB mode, (see the following description). The switch positions enable/disable the following functions:

PB Mode Switch Positions are down, up, and down. The PB Enabled (Sensor and PB Enabled)

No PB Mode Switch Positions are all down. The PB does not function. (PB disabled and Sensor Enabled)

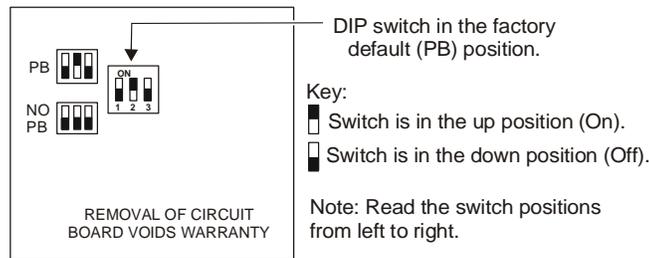


Figure 11: DIP Switch Positions Dual Setpoint Models

To change the controller configuration, use the three-position DIP switch located on the back of the PCB. A DIP switch setting chart appears on the PCB for easy reference when setting the three switch positions. (See Figure 10.)

Temperature Setpoint

Adjust the setpoint using the setpoint adjustment lever shown in Figure 12.

Note: To prevent unauthorized adjustment of the setpoint, lock the setpoint or install an optional plastic guard. Refer to the appropriate controller literature for specific instructions.

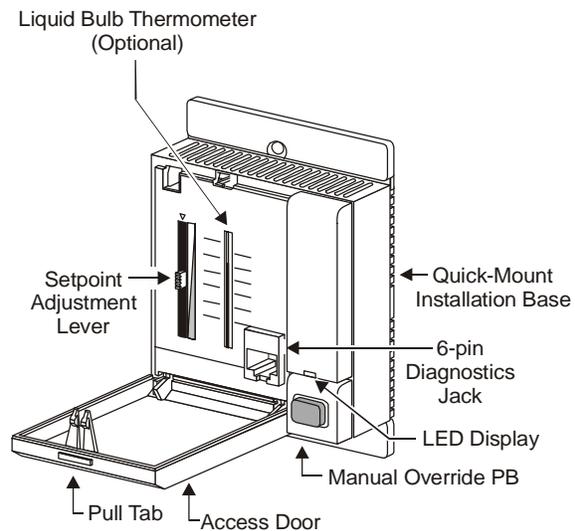


Figure 12: Accessing the Setpoint Adjustment Lever

To open the access door, push down on the pull tab and pull the door open. Adjust the setpoint as follows:

- **For a TE-6700 with a single setpoint:**
Slide the adjustment lever upward to increase the setpoint (raise the space temperature) and downward to decrease the setpoint (lower the space temperature).
- **For a TE-6700 with a dual setpoint:**
Use the lever on the right to adjust the cooling setpoint, and the lever on the left to adjust the heating setpoint.

Note: Adjust the setpoint for greater energy savings. For example, the heating setpoint can be adjusted to 70°F (21°C), while the cooling setpoint can be 74°F (23°C). (The thermostat mechanically maintains a minimum deadband of 1F° [0.56C°] between the heating and cooling setpoints.)

Troubleshooting

TE-6700 Series Temperature Elements are recommended for use only with Johnson Controls® digital controllers. If the TE-6700 is not functioning properly, use the following procedure to identify the problem and determine a solution:

1. Check that the TE-6700 is mounted in a location indicative of the space temperature (for example, away from drafts or sunlight).
2. Check the wiring:
 - Verify that the wiring is correct. The phone jack connector must be inserted with the proper polarity (not reversed). Misalignment can cause damage.
 - Check all supply voltage connections. Refer to Figure 6, Figure 7, or Figure 8 if necessary.

3. Check the settings:

- Verify that any scaling modifications, setpoint adjustments, and overrides have been saved and downloaded to the controller.
- Check the override status (Temporary Occupancy mode vs. Unoccupied mode) at the controller.
- Check the setpoint settings

4. Confirm DIP switch positions if:

- the LED remains on or is dim
- room sensor reading is outside of the normal range for the space being sensed

Note: Make sure the DIP switch setting is correct for the controller used with the TE-6700.

5. Replace the TE-6700 if the troubleshooting suggestions fail to remedy the problem.

Repairs and Replacement

Do not field repair the TE-6700 temperature elements. As with any electrical device, keep the air vents clean and free from dust or obstruction. To order replacement parts, contact the nearest Johnson Controls representative.

Technical Specifications

Product	TE-6700 Series 2nd Generation Temperature Elements	
Nickel Sensor	Temperature Sensor:	1,000 ohm thin-film nickel
	Temperature Coefficient:	Approximately 3 ohms per F° (5.4 ohms per C°)
	Reference Resistance:	1,000 ohms at 70°F (21°C)
	Accuracy:	±0.34F° at 70°F (±0.18C° at 21°C)
Platinum Sensor	Temperature Sensor:	1,000 ohm thin-film platinum
	Temperature Coefficient:	Approximately 2 ohms per F° (3.9 ohms per C°)
	Reference Resistance:	1,000 ohms at 32°F (0°C)
	Accuracy:	±0.73F° at 70°F (±0.41C° at 21°C)
Temperature Indicator	Type:	Liquid filled bulb thermometer
	Range:	40 to 90°F or 5 to 30°C
	Resolution:	Fahrenheit scale graduated at 10F° intervals Celsius scale graduated at 5C° intervals
Setpoint Range	Single Adjustment:	Warmer/cooler, red/blue visual scale, or temperature - scaled °F/°C
	Dual Adjustment:	Heating and cooling, graduated scale 65 to 85°F, (19 to 29°C)
	Resistance:	Nominal 1.5 k ohm
	Resolution:	Fahrenheit scale graduated at 5F° intervals Celsius scale graduated at 2C° intervals
Sensor Response Time	One time constant:	8 ±2 minutes at 10 feet per minute airflow rate
Field Connections	Phone Jack:	8-pin connector for 8-conductor 24 AWG phone cable
	Terminal Block:	Screw type terminals for 18 to 24 AWG wire
Zone Bus Access	6-pin connector with front access for a laptop with HVAC PRO™ software, a Palm™ compatible handheld device with VAV Balancing Tool (VBT) software, or a Zone Terminal (ZT)	
Manual Override	Integral momentary pushbutton (DIP switch selectable)	
LED Display	Red LED indicates various modes of operation (Single and No Setpoint models only)	
Ambient Operating Conditions	32 to 131°F (0 to 55°C) 0 to 100% RH, non-condensing; 85°F (29°C) maximum dew point	
Ambient Storage Conditions	-40 to 160°F (-40 to 71°C) 0 to 100% RH, non-condensing; 85°F (29°C) maximum dew point	
Mounting Style	Includes base and hardware for surface or standard U.S. wallbox mounting	
Materials	White thermoplastic	
Dimensions (H x W x D)	3.2 x 3.2 x 1.4 in. (81 x 81 x 36 mm)	
Shipping Weight	1 lb (0.5 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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