

## Series 1000 Room Temperature Sensors, 10KΩ Thermistor (TEC and LTEC)

### Product Description

These sensors work with the Terminal Equipment Controller (TEC) and LONMARK® compliant Terminal Equipment Controller (LTEC). The sensors use a 10K ohm thermistor to detect temperature. The effective sensing range is 55°F to 95°F (13°C to 35°C).

Sensors that are compliant with LONWORKS® technology are distinguishable by the LTEC name next to the MMI jack at the bottom of the unit.



#### CAUTION:

TEC and LTEC sensors and cable assemblies are not interchangeable.

**NOTE:** Either sensor can be mounted on electrical boxes, stud-type mounting brackets, or drywall. Obtain the necessary mounting hardware and follow the appropriate mounting procedures for the type of installation required.

### Product Numbers

Table 1. Product Numbers and Descriptions.

Product Numbers*				Description
TEC **	TEC No Logo	LTEC	LTEC No Logo	
540-660	540-661	550-180	587-550	Sensing only
540-670	540-671	550-184	587-554	Override and setpoint
540-680	—	550-187	587-557	Override, setpoint and temperature display

\* Product number suffixes indicate the sensor color: A = desert beige, B = white.

\*\* On TEC sensors only, the suffix also indicates the display's temperature scale, C = °C, F = °F

(for example, 540-670FA for °F, desert beige).

For LTEC, see *LTEC Temperature Scale Selection*.

### Required Tools

- Phillips size 1 or 2 screwdriver
- 1/16-inch Allen wrench, (Part Number 192-632, package of 5)
- Small and medium flat-blade screwdrivers
- Medium-duty electric drill
- 3/16-inch drill bit
- 1-inch hole saw
- Hammer
- Utility knife
- Wire cutters
- Small level
- Tape measure
- Marker or pencil

If using non-preterminated cables (or if cables are damaged), you also need:

- Room sensor connector tool (RJ-11 crimping tool)
- Room sensor connector kit

### Expected Installation Time

20 minutes

### Prerequisites

- Appropriate field wiring (standard six-conductor room sensor cables, plenum or non-plenum as required), within the maximum wiring run length for the individual field panel or equipment controller must be installed. The maximum recommended length is 100-feet (30.5 m).
- See Table 4 for cable product numbers.
- All wiring must comply with National Electric Code (NEC) and local regulations.

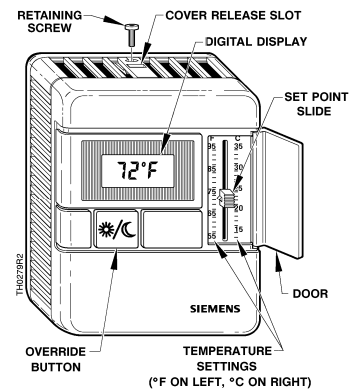


Figure 1. Room Temperature Sensor (Shows All Options).

## Mounting Information

Locate the sensor:

- According to design specifications and local regulations.
- Where the air circulates around it freely (not in recessed areas or behind doors).
- Allowing a minimum of 4-inches (102 mm) free space above and below for proper airflow, the front cover removal tool, and the PC communication cable.
- Away from drafts caused by doors, windows, outside walls, air registers, pipes, return air plenums, etc.
- Away from heat sources such as strong lights, fireplaces, direct sunlight, etc.
- On an inside wall (preferably), about 5-feet (1.5 m) above the finished floor.

**NOTE:** While not recommended, if you must mount the sensor on exterior brick or cement-type walls, see Table 5 for Accessories.

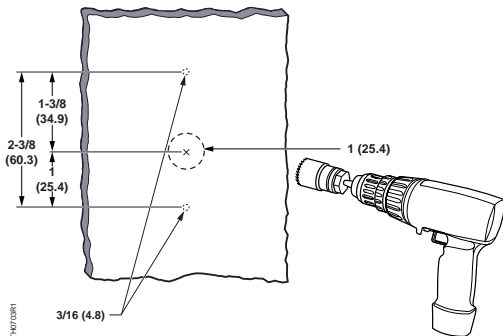
### Drywall Mounting (No Rough-in), Typical

1. Using the sensor base plate as a template, mark the center (cable) hole (use a pencil to press through the rubber insulator) and the mounting hole locations. See Figure 2.



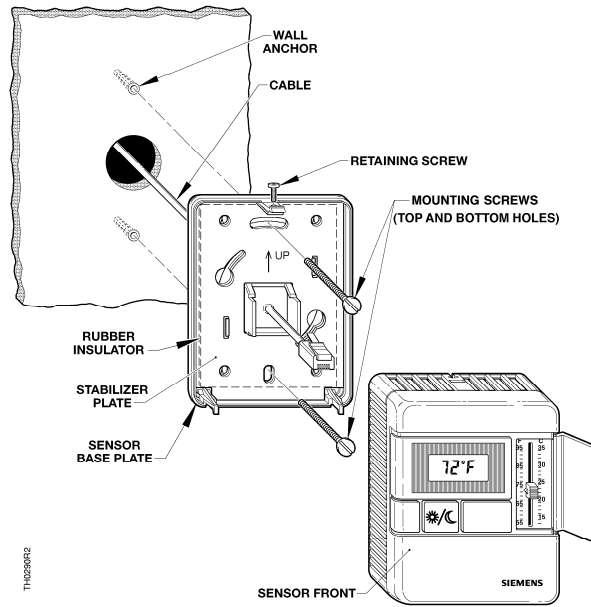
**CAUTION:**

For drywall mounting, only use the top and bottom holes.



**Figure 2. Mounting and Center Hole Locations Dimensions in Inches (Millimeters).**

2. Drill two 3/16-inch (4.8 mm) mounting holes.
3. Cut a 1-inch (25.4 mm) center hole with a hole saw. See Figure 2.
4. If using screws to attach the sensor, insert two plastic wall anchors.
5. If necessary, use a utility knife to cut a slit through the rubber insulator in the center hole of the sensor base plate. Pull about 3 inches (75 mm) of the cable through the mounting hardware in the order shown. See Figure 3.



**Figure 3. Drywall Mounting (No Rough-in), Typical.**

6. Mount the sensor base plate on the wall, noting the UP arrow on the stabilizer plate:
  - a. Install either the two mounting screws provided, the drive rivets provided, or spring clips, but do not tighten.
7. If the cable is terminated, inspect the RJ-11 connector for damage.
8. If the cable is non-terminated or if the RJ-11 was damaged, cut the cable, leaving about 3 inches (75 mm) on the sensor side of the drywall, and attach an RJ-11 connector with an RJ-11 crimping tool. On the RJ-11 connectors, ensure that pin Number 1 connects to the same wire at each end of the cable. See Figure 4.



**CAUTION:**

Pounding too hard or over-tightening may cause the sensor base plate to crack or bend.

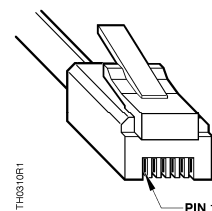
- b. Level the sensor base plate for appearance.
- c. Tighten the two mounting screws to the sensor base plate.



**CAUTION:**

For retrofits: Before cutting the cable, make sure it is disconnected from the Room Temperature Sensor (RTS) port on the TEC/LTEC cable end.

**Figure 4. Terminating the RJ-11 Connector.**



**Table 2. LTEC Wiring Diagram.**

Pin	Wire
1 LONWORKS Net	Twisted Pair
2 LONWORKS Net	
3 Power/ Service	
4 Common	
5 Setpoint/Ovrd	
6 Room Temp	

**Table 3. TEC Wiring Diagram.**

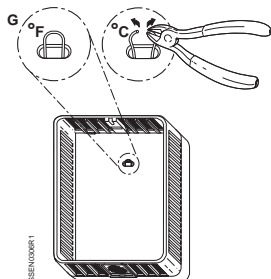
Pin	Wire
1 Not Used	Twisted Pair
6 TX/RX	
3 Room Temp/ Setpoint, Override	
4 Common	
5 TX/RX	
2 GND	

9. Plug the terminated cable into the RJ-11 port on the back of the printed circuit board (PCB).
10. Feed the extra cable back through the hole in the rubber insulator.
11. Snap the sensor front to the sensor base plate:
  - a. Hook the sensor front to the bottom latches.
  - b. Push the top of the sensor front into place until it latches.
12. Tighten the sensor retaining screw with an Allen wrench. See Figure 3.
13. Connect the sensor to the RTS port on the TEC/LTEC.

The installation is now complete.

### LTEC Temperature Scale Selection

LTEC sensors are factory-set for Fahrenheit temperature scale. To display temperature in Celsius degrees, snip the jumper (G) as shown in Figure 5.



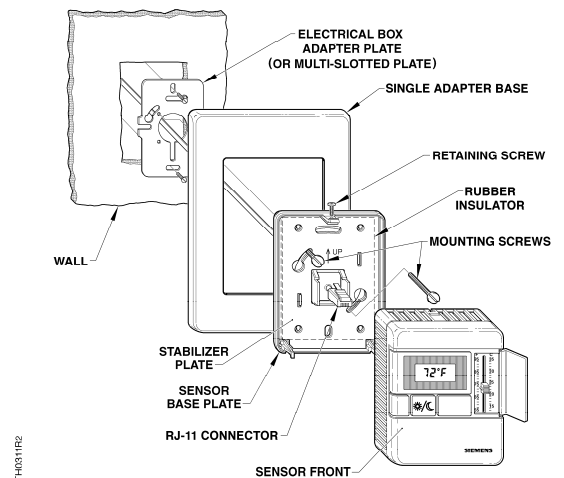
**Figure 5. LTEC Room Sensor Jumper Location.**

### Electrical Box and Rough-in Mounting, Typical

1. If a locator is attached to the rough-in device, remove the locator by removing the two screws and lightly rocking the locator to pull it free.
2. Untie the twist tie and pull about three inches (75 mm) of the sensor cable into the space.
3. If you have a single-sensor electrical box, install the electrical box adapter plate. See Figure 6.

If you have a double-sensor electrical box, install the required mounting plate(s).

If you use a universal adapter kit for a retrofit job, install the multi-slotted plate in place of the electrical box adapter plate. See Figure 6.



**Figure 6. Electrical Box and Rough-in Mounting, Typical.**

4. Pull the cable from the wall, through the required mounting hardware in the order shown.
5. Install the two sensor mounting screws provided but do not tighten.
6. Mount the sensor base plate on the wall, noting the UP arrow on the stabilizer plate:
  - a. Level the sensor base plate for appearance only.
  - b. Tighten the two mounting screws to the sensor base plate.



**CAUTION:**

Over-tightening may cause the sensor base plate to crack or bend.

7. Continue with *Drywall Mounting (No Rough-in, Typical)*, Steps 7 through 13.

The installation is now complete.

## Accessories

**Table 4. Room Sensor Pre-terminated Cables.**

TEC Product Number		LTEC Product Number	Description
Vinyl	Plenum	Plenum Only	
540-130	540-135 or 588-100A	588-100A	25-foot (7.6 m) cable with connections
540-131	540-136 or 588-100B	588-100B	50-foot (15.2 m) cable with connections
540-132	540-137 or 588-100C	588-100C	100-foot (30.5 m) cable with connections

**NOTE:** LTEC cables can be used with either LTEC or TEC sensors and controllers. However, LTEC cables must be used with LTEC sensors and controllers.

Review Table 5 to verify that you have the appropriate mounting hardware. For retrofit installations, normally follow the method used by the pre-existing device. You may need to replace existing mounting hardware. Always mount the sensor vertically.

**Table 5. Mounting Accessories.**

P/N	Description	Used For	Reference
182-621	Gym Guard Kit, desert beige	Gyms and similar environments requiring a guard. (Incompatible with adapter bases and the extender ring.)	155-222P25 (TB 193)
182-621E	Gym Guard Kit, satin chrome	See Part Number 182-621.	155-222P25 (TB 193)
182-683	Metal (and Wood) Stud Mounting Bracket (pkg. 5)	Single-sensor rough-in installations. Kit includes locator.	129-057
182-685	Spring Clips: Finished Drywall Mounting Kit (10 pack)	Drywall mounting.	129-073
192-506	Electrical Box Adapter Plate Assembly Kit (pkg. 5)	Electrical boxes mounted flush with the wall and for gyms and similar environments requiring a guard. (Also see Part Number 544-782.)	Figure 4
192-860	Finish Plate Kit 1 Gang 1 Sensor; stainless steel	Single-sensor, low-cost mounting. Plate is 3.7 x 5.1 inches (9.5 x 12.9 cm).	155-252P25 (TB 238)
536-666	Mounting Strap	Standard light switch plate (field-supplied) to mount sensor on 2 x 4 electrical box.	540-040; 540-237
544-782*	Single Adapter Base Mounting Kit	2 x 4 boxes, all single sensor installations on walls with oversized holes, paint lines, etc., that need to be covered, and on exterior brick/cement-type walls. Kit includes Electrical Box Adapter Plate Assembly (Part Number 192-495. Adapter base is 3-1/2 x 5 inches (8.8 x 12.7 cm).	Figure 4
544-783*	Double Adapter Base Mounting Kit	4 x 6 boxes and all double sensor installations on walls with oversized holes, paint lines, etc., that need to be covered, and on exterior brick/cement-type walls. Kit includes two mounting plates (Part Number 192-720). Adapter base is 5 x 7 inches (12.7 x 18 cm).	Figure 4
544-784	Non-conduit Rough-in Kit, Double	Double-sensor non-conduit rough-in installations. Kit includes locator.	540-784
544-785*	Extender Ring Kit	Exterior brick or cement-type walls; fits to back of sensor base plate.	—
544-800	Universal Adapter Kit	Retrofitting a previous horizontal installation to a vertical one, or when the screw spacing does not fit the electrical box adapter plate. Kit includes multi-slotted adapter plate.	Figure 4
981-344	Electrical Box Cover Plate Kit	2 x 4 box rough-ins. Kit includes locator and connector.	—
—	Various finish plates	Double-sensor, low-cost mounting for a variety of applications.	155-252P25 (TB 238)

\* Product number suffixes indicate color: A = desert beige; B = white (For example, 544-782B)

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