



Electronic Room Temperature Sensors General Instructions

APPLICATION

Balco resistance electronic sensing of room temperature at wall locations.

SPECIFICATIONS

Sensing Element: Temperature sensitive Balco resistance. 1000 ohms $\pm 0.1\%$ at 70°F (21°C); changes 2.2 ohms per 1°F (0.5%) at 70°F (21°C).

Environment:

Ambient Temperature Limits,

Shipping and Storage -40 to 160°F (-40 to 71°C).

Operating 40 to 140°F (4 to 60°C).

Humidity, 5 to 95% RH, non-condensing.

Locations, NEMA Type 1 indoor only.

Connections: Coded screw terminals or wire leads.

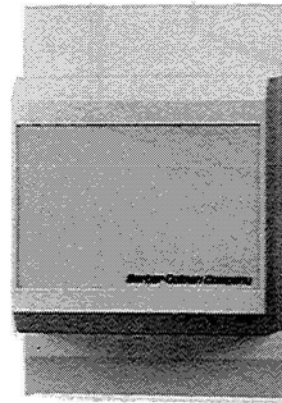
Cover: Shadow white plastic, except TS-81031 beige aluminum.

Mounting: Wall; TS-81031 mullion.

Dimensions: 4-13/16" high x 3-1/4" wide x 1-31/64" deep (122.2 mm x 82.6 mm x 37.5 mm). TS-81031, 2" high x 2" wide x 1-1/4" deep (51 mm x 51 mm x 32 mm).

ACCESSORIES

- AD-8969-951 Wall plates (6 per pkg.)
- AD-8969-952 Base plates (6 per pkg.)
- AT-80 Replacement cover kit (for TS-81011 only)
- AT-90 Series Digital thermometer cover kit (for TS-81011 only)
- AT-504 Plaster hole cover kit
- AT-1 155 Plastic guard
- AT-1 163 Wire guard (requires AT-504)
- PKG-1093 Digital thermometer battery replacement kit for digital thermometer
- TOOL-69 Cover screw wrench (for TS-81031 only)



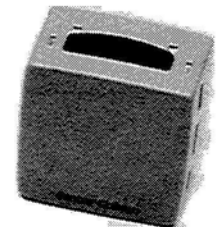
TS-81011



TS-81011
Shown with Digital
Thermometer Cover
Kit Installed



TS-81011-4X3



TS-81031

Table-1 Specifications.

Part Number	Cover Thermometer	
	Range	Display
TS-81011	None	
TS-81011-403	50-90°F	Analog
TS-81011-413	10-30°C	
TS-81031	None	

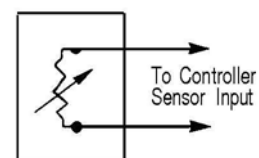


Figure-1 TS-81011 Series Sensor Wiring.

PRE-INSTALLATION

Inspection

Visually inspect the carton for damage. If damaged, notify the appropriate carrier immediately. If undamaged, open the carton and visually inspect the device for obvious defects. Return damaged or defective products.

Required Installation Items

- Wiring diagram
- Tools (not provided):
 - Digital volt-ohm meter (DVM)
 - Room temperature thermometer in °F or °C
 - Appropriate screwdriver(s) for cover, terminals and mounting screws
 - Appropriate drill and drill bit for mounting screws
- Appropriate screws for mounting to European 1/4 DIN standard electrical box or mullion mounting (not provided)
- Appropriate accessories

INSTALLATION

Caution:

- Installer must be a qualified, experienced technician.
- Disconnect power supply before installation to prevent electrical shock and equipment damage.
- Make all connections in accordance with electrical wiring diagrams, and in compliance with national and local codes. *Use copper conductors only.*
- Do not exceed ratings of the device.
- Avoid locations where excessive moisture, corrosive fumes or vibrations are present.

Mounting

Location

Locate the sensor on a wall where it will be exposed to unrestricted air circulation, at a minimum of 15 ft./min (4.6 m/min.), which represents the average temperature of the sensed space. Normally, the sensor is located 5-1/2 to 6-1/2 ft. (1.7 to 2.0 m) from floor level.

Caution: Do not locate the sensor near sources of heat or cold, such as lamps, motors, sunlight, or concealed ducts or pipes. Avoid locations where excessive vibration, moisture, corrosive fumes or vapors are present. NEMA Type 1 covers are intended to provide a degree of protection against contact with the enclosed equipment.

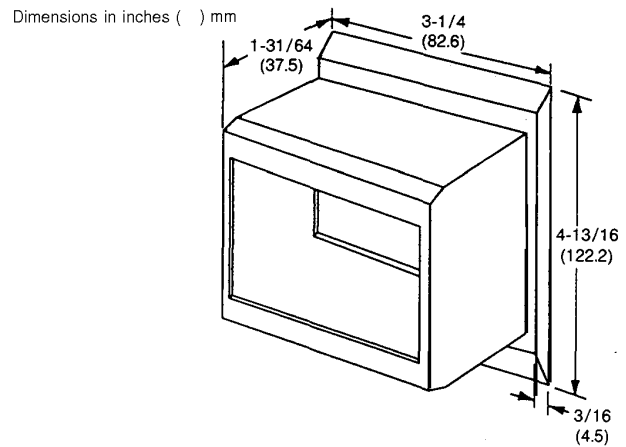


Figure-2 TS-81011 Series Overall Dimensions American Standard Mounting.

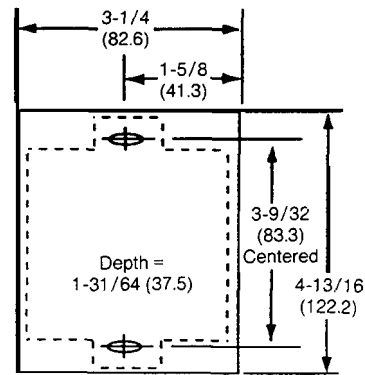


Figure-3 TS-81011 Series Mounting Dimensions American Standard Mounting.

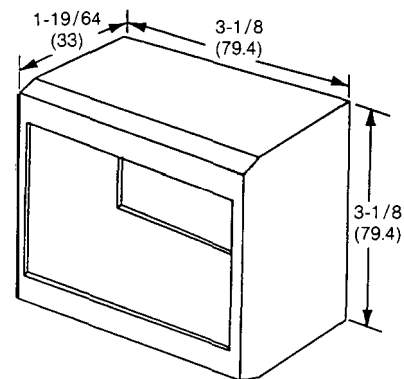


Figure-4 TS-81011 Series Overall Dimensions European 1/4 DIN Standard Mounting.

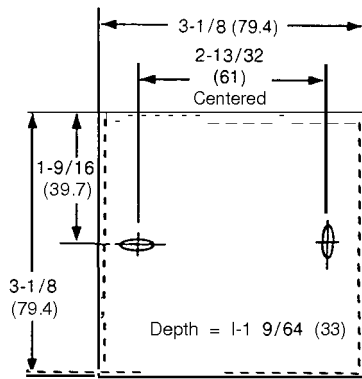


Figure-5 TS-81011 Series Mounting Dimensions European 1/4 DIN Standard Mounting.

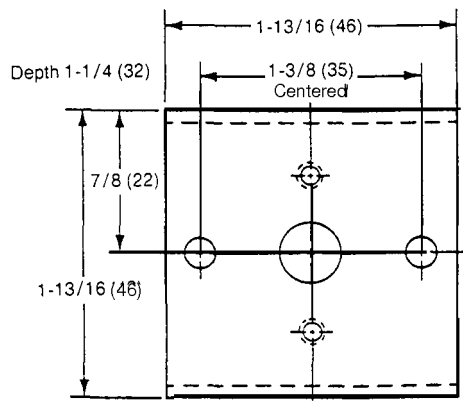


Figure-6 Mounting Plate Dimensions of TS-81031.

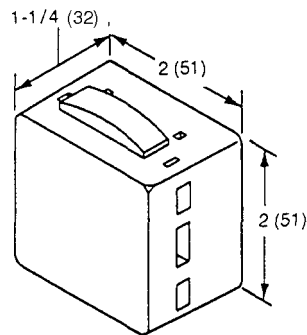


Figure-7 Overall Dimensions for TS-81031 Mullion Cover.

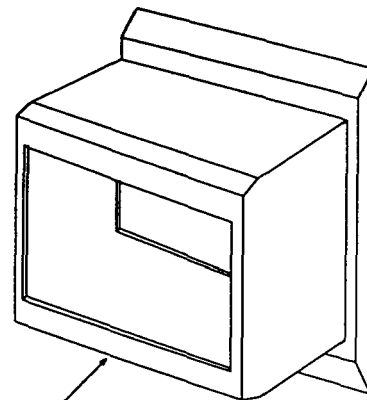
TS-81011 Series Mounting Procedure for American Standard Electrical Box

1. Remove sensor cover (see Figure 8).
2. Feed the two (2) wires from the electrical box through the sensor base assembly feedthrough.
3. Using the two (2) 6-32 x 5/8" flat head screws provided, mount the sensor base assembly to the electrical box.
4. Strip 1/4" (6 mm) of insulation from end of wires.

5. Connect wires to appropriate marked terminals. See wiring diagram (Figure 1). When installing wire, insert from top side of terminal and secure by tightening screw located on front side.

Caution: Do not use excessive force.

6. Dress wires down and inside the perimeter of the sensor base assembly.
7. Attach wall plate by snapping onto the sensor base assembly.
8. Replace cover by inserting top inside edge of cover over tab on top of sensor base assembly and rotating cover downward and snap on.



- A. Using a *small* blade screwdriver, insert blade into cover latch slot on bottom of stat.
- B. Gently push upward on the screwdriver releasing the cover latch.
- C. Rotate the cover forward as the screwdriver is removed,

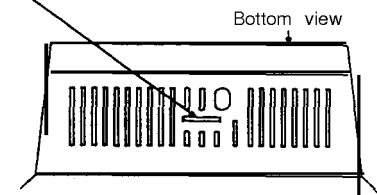


Figure-8 Removing Sensor Cover.

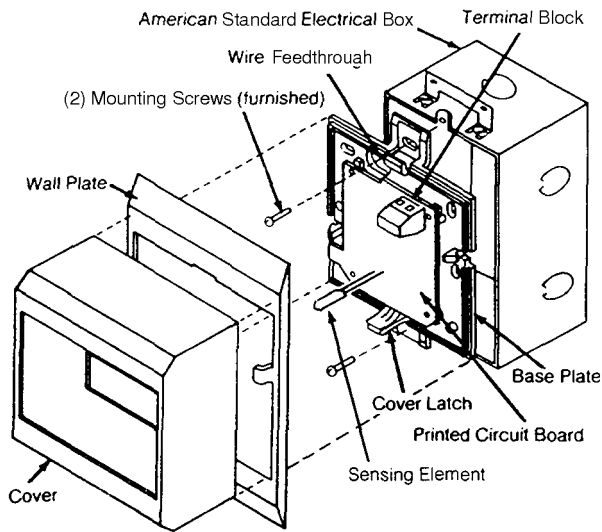


Figure-9 Mounting Procedure for American Standard Electrical Box.

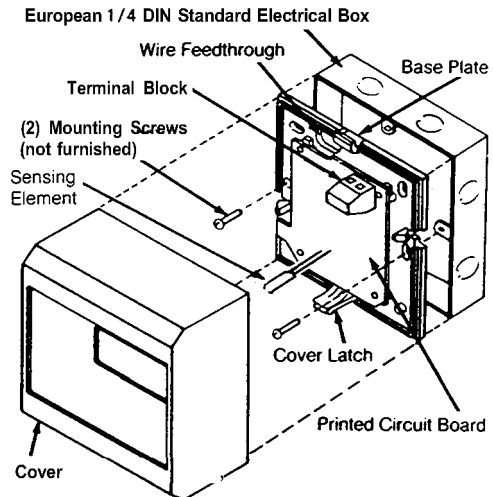


Figure-11 Mounting Procedure for European 1/4 DIN Electrical Box.

TS-81011 Series Mounting Procedure for European 1/4 DIN Standard Electrical Box

1. Remove sensor cover (see Figure 10).
2. Using diagonal wire cutters, cut mounting tabs off top and bottom of sensor base assembly (see Figure 12).
3. Feed the two (2) wires from the electrical box through the sensor base assembly feedthrough.
4. Using two (2) appropriate screws (not provided), mount the sensor base assembly to the 1/4 DIN standard electrical box.
5. Strip 1/4" (6 mm) of insulation from end of wires.
6. Connect wires to appropriate marked terminals. See wiring diagram (Figure 1). When installing wire, insert from top side of terminal and secure by tightening screw located on front side.

Caution: Do not use excessive force.

7. Dress wires down and inside the perimeter of the sensor base assembly.

Note: No more than 6" (152 mm) of wire should remain under the cover.

8. If used, attach wall plate by snapping on to sensor base assembly.
9. Replace cover by inserting top inside edge of cover over tab on top of sensor base assembly and rotating cover downward and snap on.

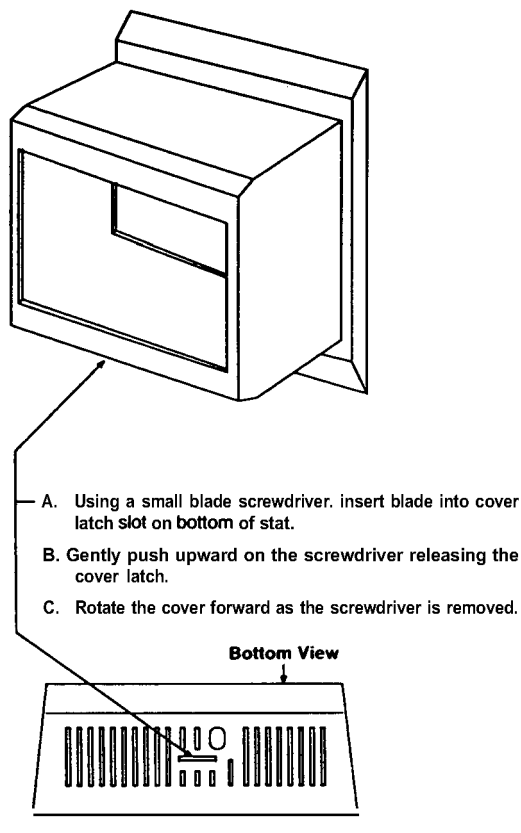
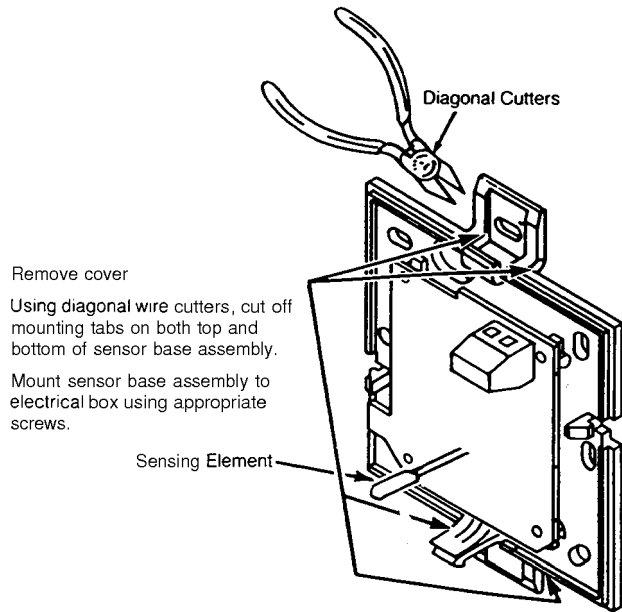


Figure-10 Removing Sensor Cover.

Mounting Procedure for TS-81031 Mullion (See Figure 13)



1. Screw cover set screw (using 0.062" Allen wrench, TOOL-69) into the base plate and remove sensor cover.
2. Pull all wires to the sensor.
3. Connect the two (2) wires from the sensor to the field wiring. (See wiring diagram, Figure 1).
4. Dress wires down and into the mounting location.
5. Remove the two (2) hex nuts (and save for later re-assembly) from the base plate studs that secure the printed circuit board to the base plate.
6. Remove the printed circuit board from the base plate.
7. Use two (2) #6 screws (field supplied) to secure the mounting plate to the mounting location.
8. Place the printed circuit board over the base plate studs.
9. Secure the printed circuit board to base plate studs with the two (2) hex nuts.
10. Place tabs of cover into holes on the top of base plate and back out set screw to secure cover to base plate.

Figure-12 Removing Mounting Tabs.

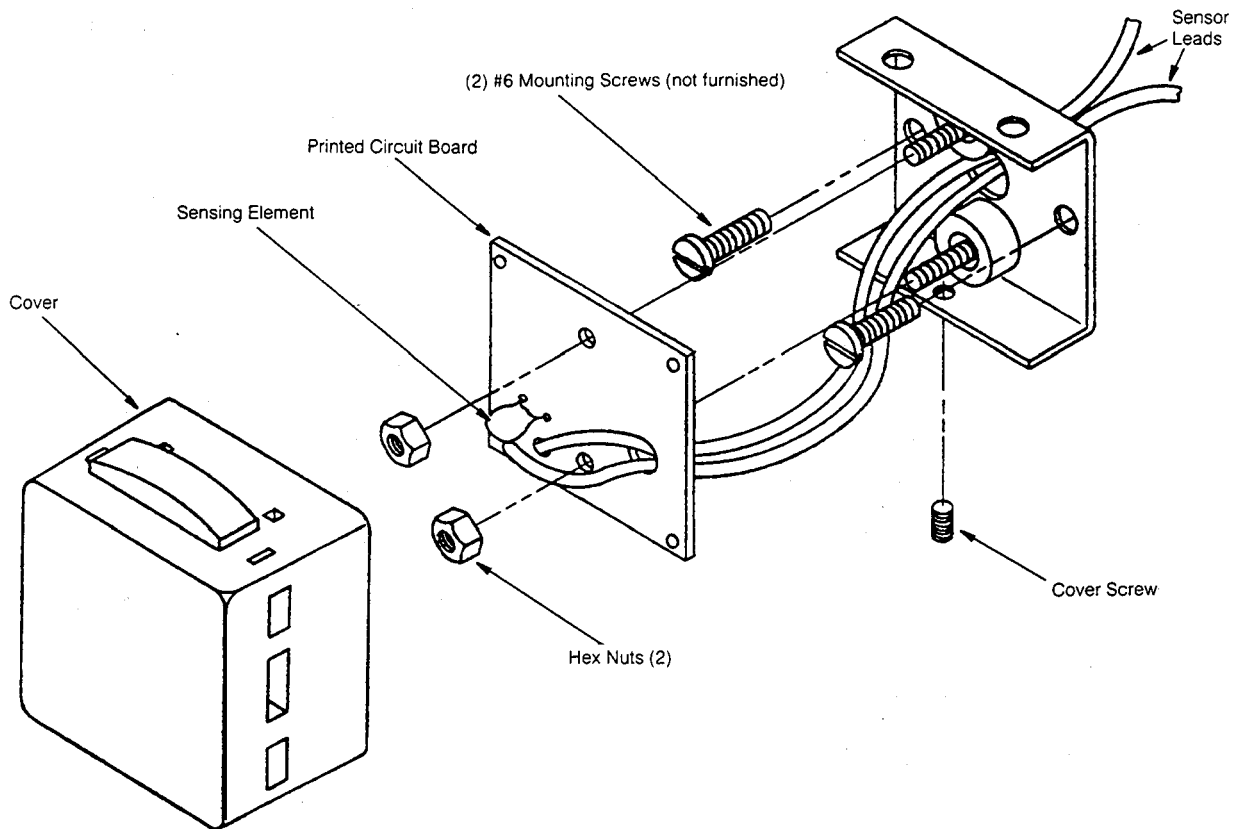


Figure-13 Mounting Procedure for TS-81031 Mullion Cover.

Wiring

Two conductor twisted pair wires (six turns per foot), Class II, low voltage, are suitable for the sensor leads except as stated in the caution below.

Caution: Shielded cable must be used when it is necessary to install the sensor lead in the same conduit with power wiring, or when it is known that high RFI/EMI generating devices are near. System Ground and shield at the controller only on the COM (-) terminal or Blue (-) lead. Do not use an earth ground.
Do not use inside of the sensor cover as a junction box for other control circuits.

Restrict element lead to shortest length practical (see Table 2).

Table-2 Maximum Sensor Wiring Run.

Wire Gage	Length of Run in ft. (m)	
	TS-810X1 Sensor to Controller (Except TP-810X or "TSP" Transmitter)	TS-810X1 Sensor to TP-81 OX
22	150 (46)	125 (38)
18	1000 (305)	300 (91)
16	2250 (686)	-
14	4000 (1219)	-

CHECKOUT

Measure the resistance between terminals 1 and 2 (see Figure 1). 1000 ohms $\pm 0.1\%$ at 70°F (21°C); changes 2.2 ohms per 1 F° (0.5 C°) at 70°F (21°C).

MAINTENANCE

Regular maintenance of the total system is needed to ensure sustained optimum performance. Sensors should be periodically inspected for dirt or blockage of air over the elements.

FIELD REPAIR

These sensors are not field repairable. Replace a defective sensor with a functional unit.

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