

**Electric Proportional Room Thermostats**  
**General Instructions**

**APPLICATION**

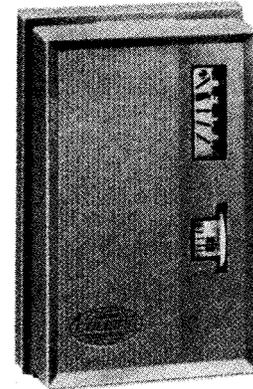
For proportional temperature control of electric actuated valves, damper actuators and sequence controllers.

**SPECIFICATIONS**

Bimetal operated SPDT switch with silver contacts. Built-in circuitry conditions the actuator feedback voltage for proportional control. Coded screw terminals. Differential approximately 1°F. TP-1011 and TP-1011-116 are general purpose thermostats. TP-1031 and TP-1031-116 are cooling models, typically used in conjunction with TP-1011 for summer-winter control. Units have plastic covers as standard. Mounts on flush or surface switch box or directly to wall.

**Switch Rating:** 1.0 amps at 24 Vac.

**Dimensions:** 4-3/8" high x 2-3/4" wide x 1-5-8" deep



**Table-1 SPECIFICATIONS.**

Part Number	Typical Application	24 Vac 10°F Night Depression	Control* Dial Range	Throttling Range
TP-1011	General Purpose	Standard	55-85°F	4°F
TP-1011-116			13-29°C	2.2°C
TP-1031	Cooling	None	55-85°F	4°F
TP-1031-116			13-29°C	2.2°C

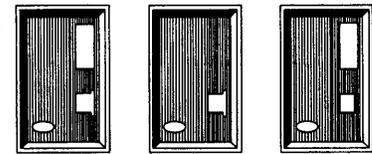
\*Dial stop pins included to limit dial range.

**ACCESSORIES**

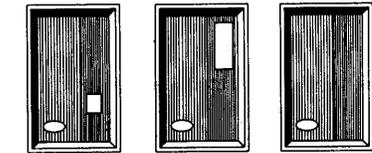
- AT-101 Lock cover kit
- AT-104 Dial stop pins (note: pins included with each unit)
- AT-136 Title plates (day, night, heat, cool)
- AT-504 Plaster hole cover kit (small)
- AT-505 Surface mounting base
- AT-546 Auxiliary mounting plate
- AT-602 Selector switch sub-base DP4T
- AT-603 Selector switch sub-base one DP4T, one DPDT
- AT-1103 Wire guard
- AT-1104 Cast aluminum guard
- AT-1105 Plastic guard
- AT-1155 Plastic guard
- AT-1165 Plastic guard
- TOOL -11 Calibration wrench
- TOOL-13 Contact burnishing tool

**COVER OPTIONS**

For replacement covers or other cover options, order AT-14-XXX as required.



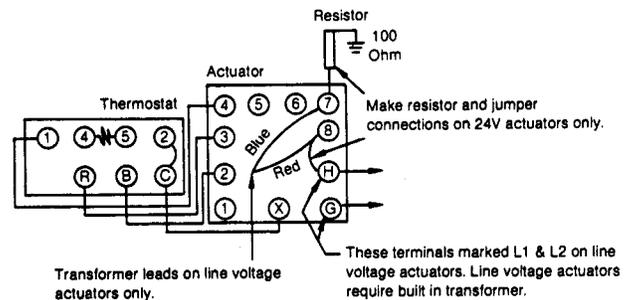
Replacement Cover: AT-14      AT-14-400      AT-14-401



Replacement Cover: AT-14-402      AT-14-403      AT-14-404

\*Inserts provided with units to obtain this cover style.

**Typical of TP-1011 for Heating and TP-1031 for Cooling**



- R — Closes on temperature drop (rise for TP-1031) and rotates actuator CCW
  - B — Closes on temperature rise (drop for TP-1031) and rotates actuator CW
  - C — Common
  - 1 — Feedback
  - 4 & 5 — 10°F, 24 Vac night depression resistor on TP-1011
- Typical Actuators:  
 MP-361, MP-371, MP-381, MP-382,  
 MP-475, MP-485, MP-486,  
 MP-2113-500, MP-2150-500

Figure-1 Typical Application.

## PRE-INSTALLATION

### Inspection

Inspect the carton for damage. If damaged, notify the appropriate carrier immediately. If undamaged, open the carton and inspect the device for obvious damage. Return damaged 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 accessories

## INSTALLATION

### Caution:

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

### Mounting

#### LOCATION

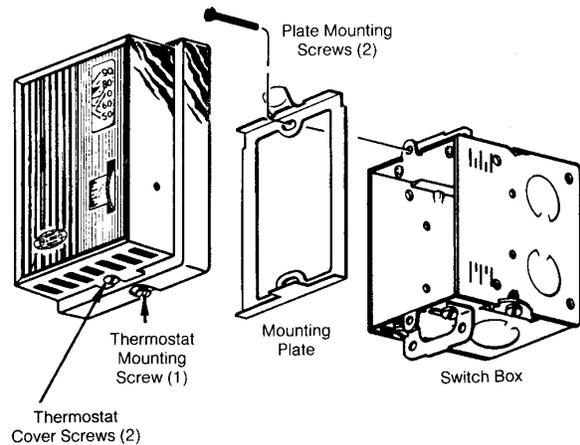
Locate the thermostat on a wall where it will be exposed to unrestricted air circulation, at a minimum of 15 ft./min. (4.6 m/min.), which represents the average temperature of the sensed space. Normally, the thermostat is located 5-1/2 to 6-1/3 ft. (1.7 to 2.0 m) from floor level. The thermostat is designed for service in any normally encountered human environment.

**Caution:** Do not locate the thermostat near sources of heat or cold, such as lamps, 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.

## PROCEDURE

1. Pull all wires.
2. Fasten mounting plate to box or wall.
3. Make electrical connections to thermostat screw type terminals. Make all connections in accordance with the job wiring diagram and in compliance with national and local electrical codes. Class I wiring is required unless all circuits to contacts are powered from a Class II source. (See Figures 7 through 9 for typical wiring diagrams.)

4. Hook thermostat on top of mounting plate and swing down into place.
5. Tighten thermostat mounting screw.



Use Allen head screw and wrench provided with units to replace slotted head screw for tamper resistant cover.

Figure-2 Thermostat Mounting.

## OPTIONS

### Tamper Resistant Cover

Replace slotted cover screw with Allen screw.

### Concealed Setpoint

### Knurled Dial Removal

See Figure 3.

1. Remove thermostat cover.
2. Secure the setpoint dial with hand so that the dial will not rotate.
3. Place needle nose pliers at knurled ring of the setpoint dial at the points where the knurled ring is attached to the setpoint dial.
4. Twist the pliers at each knurled ring attachment point until the entire knurled ring of the setpoint dial is removed.

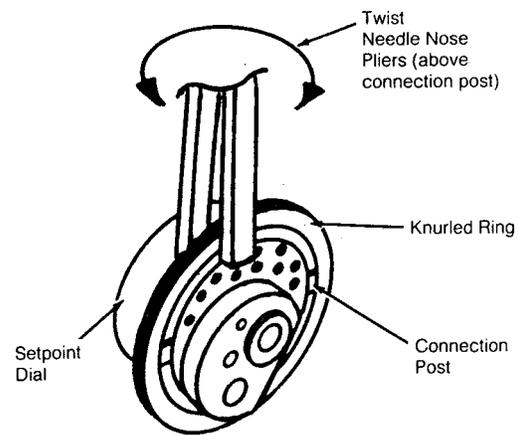


Figure-3 Knurled Dial Removal.

## Limit Setpoint Dial Range

### Dial Stop Pin Insertion - Included with Mounting Plate

See Figure 4.

1. Remove thermostat cover.
2. Secure the setpoint dial with hand so that the dial will not rotate.
3. Place a dial stop pin in the jaws of a needle nose pliers.
4. Insert the dial stop pin in the appropriate hole on either (or both) side(s) of the setpoint dial to restrict dial rotation.

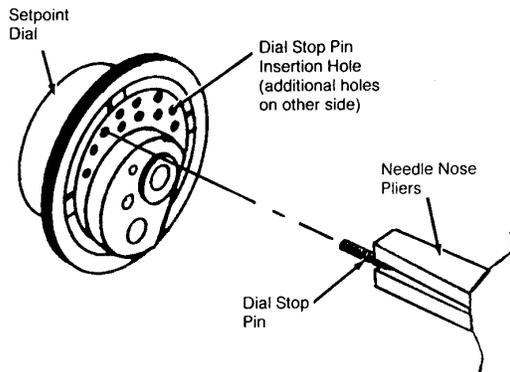


Figure-4 Dial Stop Pin Insertion.

### Cover Insert Installation

See Figure 5.

1. Select appropriate cover insert.

**Note:** If blank insert is used, the knurled ring must be removed from the setpoint dial. See Knurled Dial Removal above. Also, remove dial window by sliding and /or pressing window from front of cover.

2. Remove protective backing and protective skin on face of cover insert.
3. Press insert uniformly on thermostat with logo in lower left-hand corner.

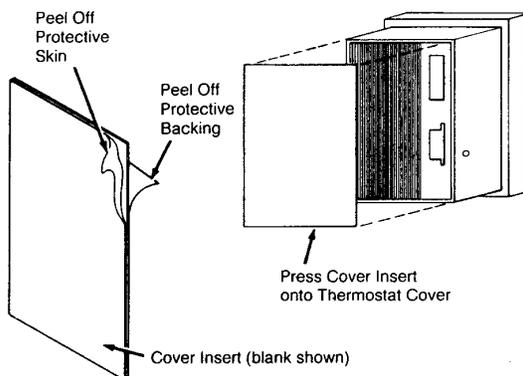


Figure-5 Cover Insert Installation.

## CHECKOUT

After installing the thermostat, make an initial check of the switching action. Verify the switch action by watching the switch contacts, or by using a volt-ohm meter between the proper sides of the switch, or observing the controlled device.

1. Move the setpoint dial to a temperature above ambient. On TP-1011 the "R" contact will make. On TP-1031 the "B" contact will make.
2. Turn the setpoint dial to temperature below ambient. On TP-1011 the "B" contact will make. On TP-1031 the "R" contact will make.

## THEORY OF OPERATION

The fast responding temperature sensitive element in the thermostat makes and breaks the control contacts as required to maintain room temperature. A proportional feedback magnet exerts a compensating force on the element in direct relation to the position of the controlled actuator. Thus, the resultant control action is based on both room temperature variations and changes in actuator position [the latter being indicative of increases or decreases in the amount of heat (or cooling) that is being supplied to the room].

## CALIBRATION

All thermostats are calibrated at the factory and normally will not require any such attention. Due to self-heat from internal components, power to the thermostat must be on for at least one hour before checking calibration. If recalibration is necessary for any reason, proceed as follows:

1. Set adjusting dial to approximately 2°F below the actual room temperature as determined by an accurate thermometer near the thermostat.
2. Remove thermostat cover (loosen cover mounting screw, swing cover at bottom up and away from the wall, then unhook at top). Be careful not to affect the bimetal element with heat from your hands or breath.
3. Remove contact cover.
4. Allow controlled actuator to run to either end of travel. Actuator position may be determined by means of a DC voltmeter placed across the proportional magnet coil at test terminals. The DC voltage across this coil varies from 14 to 28 volts as the actuator travels between limits. Mid-position is 21 Vdc.
5. If contact blade is made to the left (R) contact, use TOOL-11 (3/16" open end wrench) and very slowly turn the calibration screw out (CCW) until blade just makes to right (B) contact.

Controlled actuator will now run toward the mid-position; when it reaches this point (21 volts across coil), slowly turn calibration screw in (CW) until right contact just breaks (actuator stops). (Each complete turn of the screw changes the calibration about 30°.)

Thermostat is properly calibrated when contact blade floats (does not make either contact with 21 volts across the coil) at approximately 1 to 2°F below actual room temperature (by dial) with the cover removed.

6. If contact blade is originally made to the right (B) contact, turn calibration screw slowly in (CW) until right contact just breaks (actuator stops).

Controlled actuator will now run toward mid-position (21 Vdc across coil); when it reaches this point, slowly back calibration screw out (CCW) until blade just makes the left (R) contact.

Thermostat is now properly calibrated.

**Note:** Correct contact gap is 0.003. It may be checked with a feeler gauge.

- Replace contact cover and thermostat cover; then recheck calibration about 30 minutes later.

## MAINTENANCE

Open areas at bottom and around base of thermostat should be kept clean and free from obstructions to allow proper flow of air. If switch contacts need cleaning, this may be done with a TOOL-13 contact burnishing tool.

## REPAIR

Do not field repair. If the system is not operating correctly and the reason is traced to the thermostat, it should be replaced.

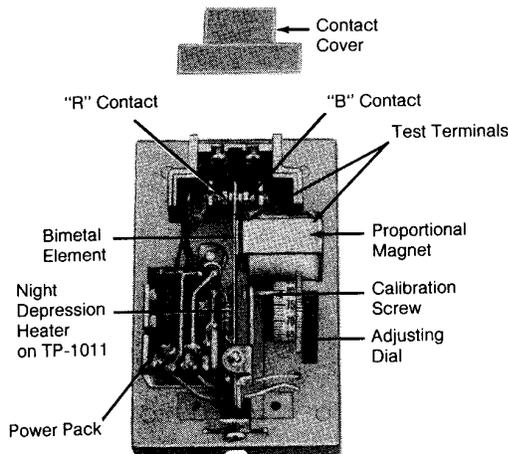


Figure-6 Dial Adjustment and Test Terminal Identification.

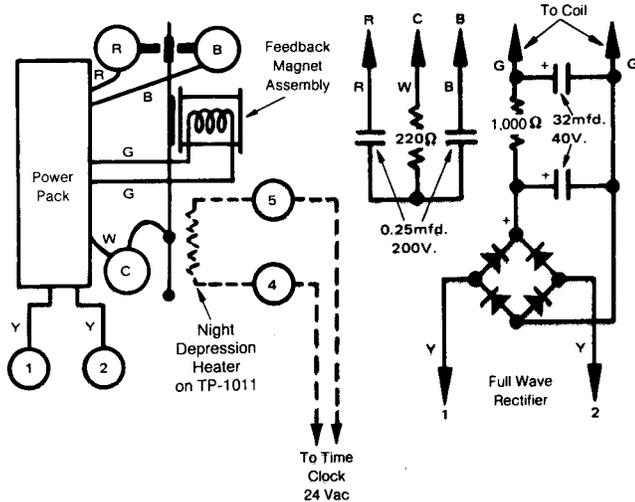
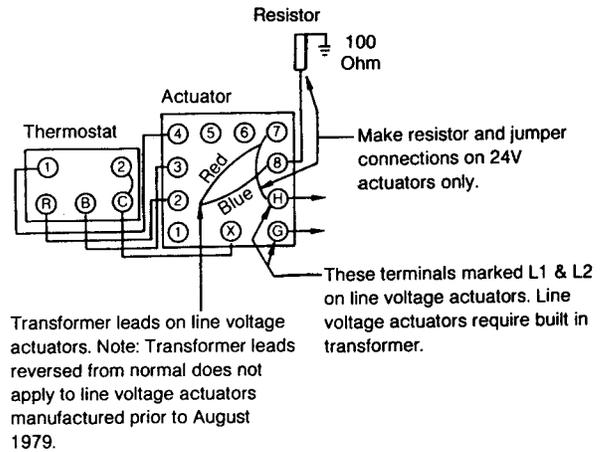


Figure-7 Schematic Wiring Diagram.



- R — Closes on temperature drop and rotates actuator CW (closing cooling valve).
- B — Closes on temperature rise and rotates actuator CCW (opening cooling valve).
- C — Common
- 1 — Feedback

Typical Actuators: MP-361, MP-371, MP-381, MP-382, MP-475, MP-485, MP-486, MP-2113-500, MP-2150-500.

Figure-8 Typical Wiring of TP-1011 for Cooling.

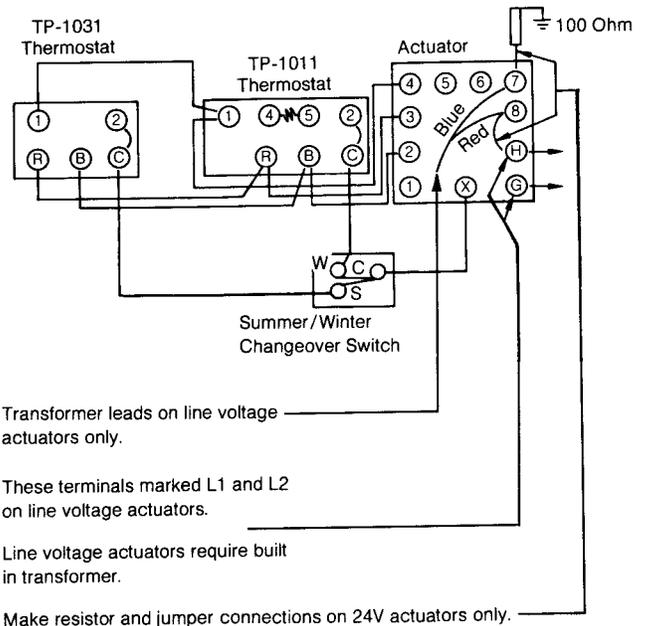


Figure-9 Typical Wiring of TP-10X1's for Summer/Winter.

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