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.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Typical Application</th>
<th>24 Vac 10°F Night Depression</th>
<th>Control* Dial Range</th>
<th>Throttling Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-1011</td>
<td>General Purpose</td>
<td>Standard</td>
<td>55-85°F</td>
<td>4°F</td>
</tr>
<tr>
<td>TP-1011-116</td>
<td></td>
<td></td>
<td>13-29°C</td>
<td>2.2°C</td>
</tr>
<tr>
<td>TP-1031</td>
<td>Cooling</td>
<td>None</td>
<td>55-85°F</td>
<td>4°F</td>
</tr>
<tr>
<td>TP-1031-116</td>
<td></td>
<td></td>
<td>13-29°C</td>
<td>2.2°C</td>
</tr>
</tbody>
</table>

*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

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.)
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.
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.

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.

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

7. 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.

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Figure-6 Dial Adjustment and Test Terminal Identification.

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**Figure-7** Schematic Wiring Diagram.

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

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

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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