TK-1001-600 and TK-1101-600

Schneider Electric

Aspirated Pneumatic Room Thermostats
General Instructions

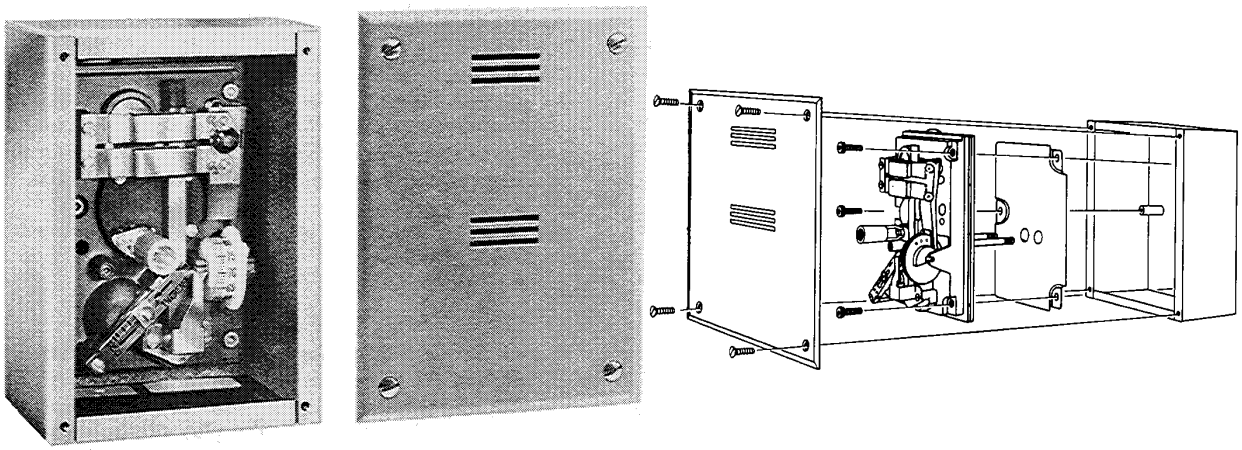

Figure-1

GENERAL INFORMATION

These aspirated pneumatic thermostats are used for proportional control of pneumatically actuated valves, dampers and similar devices in heating, ventilating and air-conditioning systems.

The thermostat is installed in a wall box (Figure 1) and covered by a cover plate.

A sensitive thermal element actuates a piloted relay. Linear pressure output is accomplished by an internal pneumatic feedback circuit.

The TK-1001 is a direct-acting thermostat, normally used in heating applications. The TK-1101 is a reverse-acting thermostat and is normally used in cooling applications. The

Supply Air Pressure: 30 psig maximum; 15 psig nominal for single acting thermostats (TK-1001 and TK-1101.
Throttling Range: Adjustable 2 to 10 F°, for a 10 psi branch line pressure change, nominally 3 to 13 psig. Factory set at 4 F°.
Air Capacity: For sizing compressors; average air consumption is 0.024 standard cubic feet per minute (scfm). The maximum air requirement for sizing air mains is 52 standard cubic inches per minute (scim).
Air Connection: Two plastic tubes reinforced with a coil spring to simplify installation. “M” coding designates supply main, “B” coding designates controlled branch line. Fitting is ordered separately.
Locating: Locate the thermostat where it will be exposed to unrestricted natural air circulation representative of the average conditions of the controlled space. Do not locate near sources of non-representative conditions (such as lamps, motors, sunlight, radiators, and concealed pipes or ducts in the wall) which might affect the control point.

INSTALLATION

The pneumatic aspirated thermostat fitting is designed for flush mounting. When installing the wall box (AT-509), make sure that the front of the box is flush with the finished wall surface. The box is normally held in place by concrete block or masonry walls. Two holes are provided in the box for installation in lath-and-plaster walls. Using these two holes, the box may be attached to the lath, wall studs, etc., by means of wire, nails or screws.

Note: When using the box in lath-and-plaster walls seal around the fasteners after mounting the box to prevent wall air currents from entering the box. If desired, this fitting may be surface mounted.

AT-509 Wall Box Fitting: For installation in the wall box, refer to Figure 1.

1. Remove and discard the cardboard cover plate on the wall box. (The cardboard cover protects the fitting while the wall is being plastered.)
2. If the plastic tubing, attached to the thermostat, is longer than necessary for easy coiling in the wall box, the tubing can be cut to length. Be sure that the coil spring is left in the tubing (cut it off with the tubing).
3. Place the fiberboard insulator over the tubes on the back of the thermostat.
4. Attach the thermostat tubing to the field tubing. See Figure 2 or 3, depending on type of field tubing used.

5. Fasten the thermostat into the box with the three Allen head mounting screws provided. Tighten the screws evenly.
6. Place aspirating tube over aspirating nozzle.
7. Install cover plate on box making sure that the aspirating tube is positioned in the hole located in the bottom air baffle (which is part of the cover).
8. Fasten cover plate with four screws provided making sure that the gasket on the cover seals against the edge of the wall box.

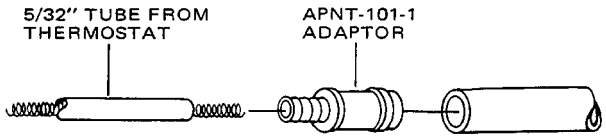

Figure-2

Figure 2 shows the necessary hardware for adapting from 5/32" tubing as is used on the thermostats, to 1/4" plastic tubing which is supplied by the field. For each tube the following hardware is required:

1- APNT-101-1 (5/32" to 1/4" plastic tubing adaptor).

The 1/4" plastic tubing which is brought through the holes is simply attached to the 5/32" plastic by using APNT-101-1 adaptor.

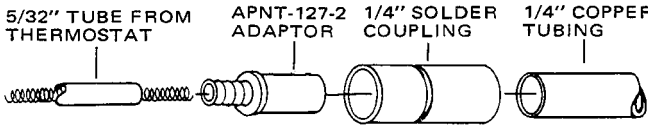

Figure-3

Figure 3 shows the necessary hardware and method for adapting from 5/32" plastic to 1/4" copper tubing. The following hardware is required:

1- APNT-127-2 (5/32" to 1/4" sweat adaptor).

1- 1/4" solder coupling (which is used to connect the APNT-127-2 and the 1/4" copper tubing from the field).

Note: In using this method, the APNT-127-2 and 1/4" copper tubing should be soldered together before attaching the 5/32" plastic tubing to the APNT-127-2.

OPERATION

These thermostats are piloted relay devices. They incorporate an internal pneumatic feedback principle which permits the use of low mass bimetals and minimum leak from the nozzle-restriction side of the circuit. This provides maximum sensitivity with minimum air consumption. Operation may be understood by referring to the schematic diagram, Figure 4.

The supply air pressure (1) is channeled from the main chamber through the restriction (2) into the nozzle (3).

The nozzle-restriction combination controls the pressure to the pilot diaphragm of the pneumatic relay. The bimetal positions the nozzle lever over the nozzle to regulate the pressure in the pilot chamber. The force exerted against the pilot diaphragm (4) actuates the relay part of the system.

The relay is operated by the pressure on the pilot diaphragm as follows:

1. An increase in pressure on the pilot chamber diaphragm (4) overcomes the preload force on the pilot diaphragm spring (5), the main valve plug spring (6) and the air pressure on the plug (7), to move the supply main valve off its seat. Supply air pressure then flows into the branch chamber (8). The resulting pressure change is transmitted to the feedback chamber (9), where it exerts a force on the feedback plunger (10), moving it up. The force is transmitted to the nozzle lever through the feedback levers (11 and 12) and spring (13) to balance the force exerted by the bimetal. This action provides a linear relationship between temperature at the bimetal and branch line pressure.

A reduction in pressure on the pilot diaphragm allows the diaphragm to move away from contact with the bleed valve seat (14). The bleed valve seat then moves off the main valve plug and allows air from the branch chamber to bleed through the bleed valve and out to atmosphere through exhaust port (15). This reduces the force in the feedback chamber until it is balanced by the reduced bimetal force. At that point the pilot chamber pressure is just adequate to cause the bleed valve to seat on the main check and stop flow of air out of the branch.

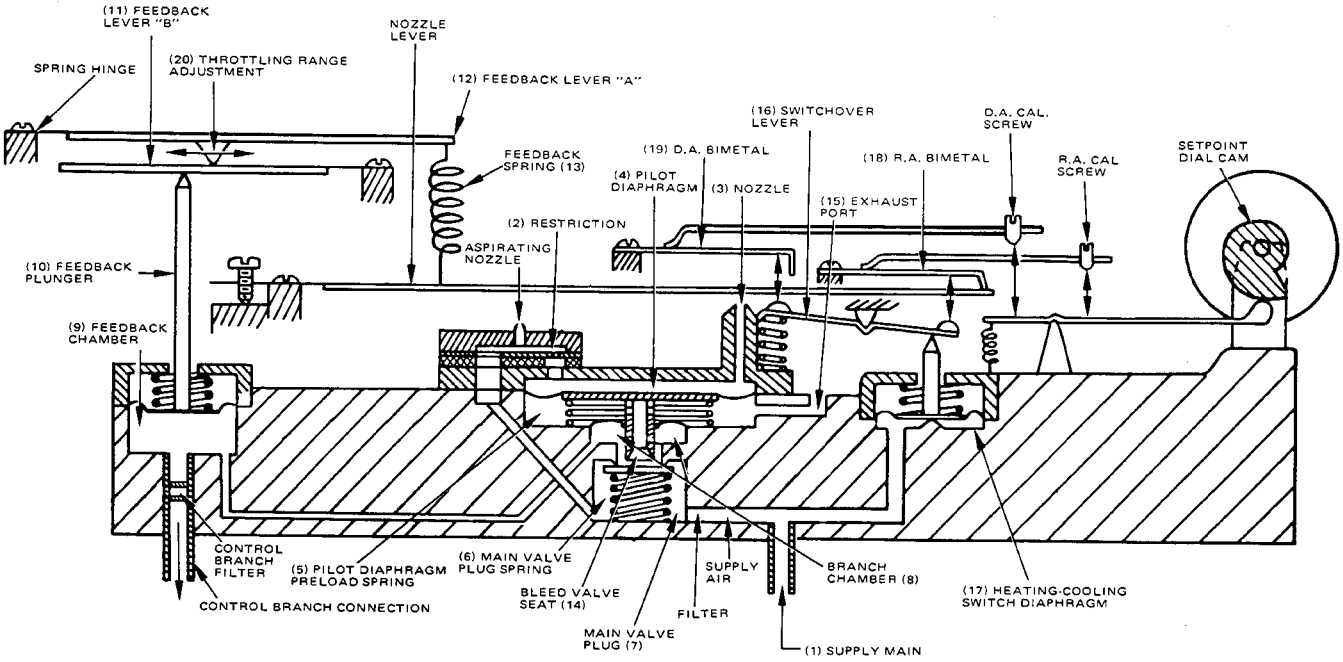

Figure-4

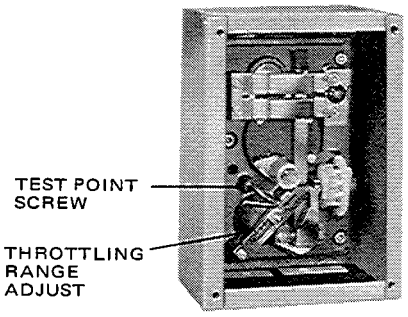

Figure-5

Calibration: After the installation has been completed and the throttling range adjustment completed, the thermostat should be checked for calibration. As a nominal calibration, the branch line control pressure should be 8 psig when the setpoint is equal to the temperature in the wall box as indicated by an accurate thermometer. On some applications, a value other than 8 psig will be required to get the desired control results. In this case, change the 8 psig designation used in the calibration procedure.

Caution: The thermal element of the room thermostat is very sensitive to temperature change. Do not effect its temperature by touching the bimetal or breathing on the thermostat. When calibrating the instrument, observe the wall box temperature frequently and reset the setpoint dial if required.

1. Remove the box cover by loosening the cover screw.
2. Using a 5/64" Allen wrench, unscrew (counterclockwise rotation) the test point screw one full turn (Figure 5).
3. Attach the test gauge rubber seal to the box, as shown. Using a rotary motion, push the gauge on as far as it will go (1/4" minimum). See Figure 6. The tubing will support the test gauge in a position where it will be easily read. The supply pressure to the thermostat should be 15 psig.
4. Adjust the setpoint dial to the room temperature as indicated on the test thermometer.
5. With a 0.048" six spline wrench, adjust the temperature adjusting screw (Figure 6). turn the screw clockwise if the controlled pressure is above 8 psig and counterclockwise if it is below 8 psig. Adjust the screw until the controlled pressure is 8 ±1 psi.

Note: The hex nuts on the setpoint adjusting screws are a tension device only. They should not be loosened to make an adjustment.

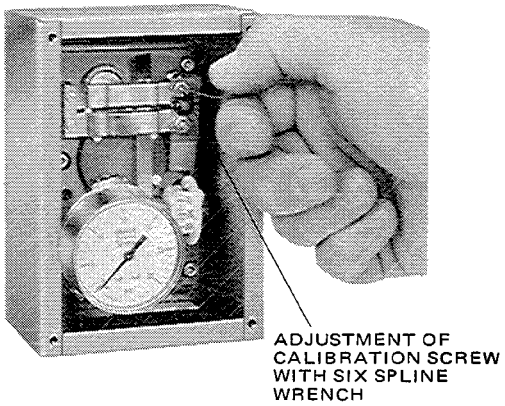

Figure-6

All Thermostats:

6. Remove the test gauge.
7. Tighten the test point screw (turn clockwise).
8. Remove test thermometer from box.
9. Install cover plate on box making sure that the aspirating tube is positioned in the hole located in the bottom air baffle (which is part of the cover).
10. Fasten cover plate with four screws provided making sure that the gasket on the cover seals against the edge of the wall box.

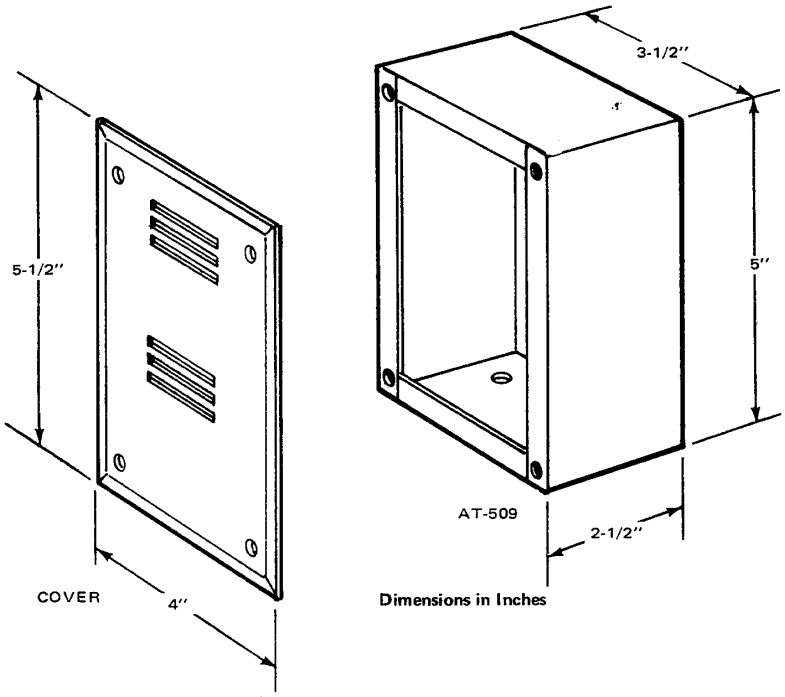

Figure-7 Dimensions.

On October 1st, 2009, TAC became the Buildings business of its parent company Schneider Electric. This document reflects the visual identity of Schneider Electric, however there remains references to TAC as a corporate brand in the body copy. As each document is updated, the body copy will be changed to reflect appropriate corporate brand changes.

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