



Pneumatic One-Pipe Room Thermostats General Instructions

GENERAL INFORMATION

The pneumatic thermostats are used for proportional control of pneumatically actuated valves, damper actuators, and similar devices in heating ventilating and air-conditioning systems.

The TK-5001 is a direct-acting thermostat, normally used in heating applications. The TK-5010 is a reverse-acting thermostat and is normally used in cooling applications.

Supply Air Pressure: 30 psig (206.8 kPa) maximum; 15 psig (103.4 kPa) nominal for single acting thermostats.

Throttling Range: Fixed-6F° (3.5 C°), for a 10 psig (69 kPa) branch line pressure change, nominally 3 to 13 psig (20.7 to 89.6 kPa).

Air Capacity: For sizing compressors; average air consumption is .016 standard cubic feet per minute (scfm) (0.453 L/m) for 15 psig (103.4 kPa) main, 0.024 scfm (0.679 L/m) for 20 psig (137.9 kPa) main. The maximum air requirement for sizing air mains is 36 standard cubic inches per minute (scim) (9.83 mL/s) for 15 psig (103.4 kPa) main, 50 scim (13.65 mL/s) for 20 psig (137.9 kPa) main.

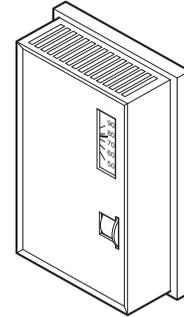
Air Connection: One plastic tube reinforced with a coil spring to simplify installation. Fittings are ordered separately. A wall box and mortar joint fitting are offered. A remote in-line restrictor is required. (see pages three and four for typical piping.)

INSTALLATION

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 on non-representative conditions (such as lamps, motors, sunlight, radiators and concealed pipes or ducts within the walls), which might affect the control point.

The pneumatic room thermostat fittings may be installed either flush or surface mounted. Two types of fittings are available: AT-506 or AT-516 (wall box fitting) for surface mounting on all wall surfaces and flush mounting on plastered or stud walls and the AT-519 for flush mounting on masonry walls. The wall box fitting AT-506 or AT-516 is installed in the wall or on the wall, attaching it firmly through the screw holes in the back of the die cast box.

Wall Box Fitting: For installation on a wall box fitting, 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. Place the mounting plate against the wall. Install the two flathead screws supplied, to hold the mounting plate to the wall box. Before tightening the screws, align the mounting plate so that it is square with the wall.
3. 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. Use a side cutting or diagonal pliers, and cut the tubing at a 45° angle, for ease in inserting the tubing into the "O" ring seal. Be sure that the coil spring is left in the tubing (cut it off with the tubing).
4. Remove and discard the short plug or jumper tube which is inserted in the connector head of the wall box, by pulling it straight out from the hole.
5. Place the fibre board insulator over the tubing on the back of the thermostat.
6. **AT-516** - Insert the tube (white) in the center hole in the connector. *Do not use any lubricant on the plastic tubing.* **AT-506** - Using the AT-506 requires the AT-532-111-1-01 restrictor to be located under the thermostat cover. See Figure 1.
Insert the main plastic tubing (black) 1/4-inch or slightly further into the hole on the left in the connector head. Insert the branch line tubing (white) in the right hand hole in the connector. *Do not use any lubricant on the plastic tubing.*
7. Fasten the thermostat to the mounting plate with the three Allen head mounting screws provided. Tighten the screws evenly.
8. Replace cover.

AT-517 Mortar Joint Fitting: Where the thermostat is to be mounted on a mortar joint fitting, the following procedure is suggested. Refer to Figure 2.

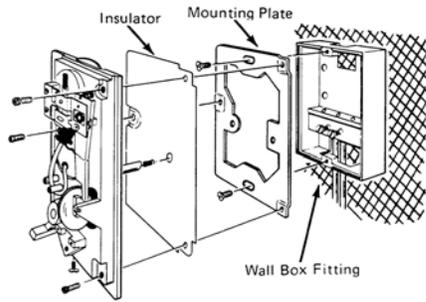


Figure-1 Mounting on AT-506 or AT-516.

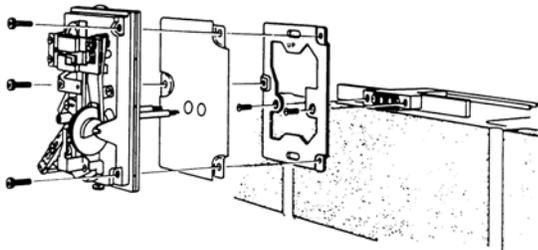


Figure-2 Mounting on AT-517.

1. Remove the screws holding the protector block in place. Pry out and discard the protector block.
2. Take the thermostat mounting plate from the thermostat package and attach it to the connector head with the two flathead screws provided. Be sure the mounting plate is vertical.
3. Remove and discard the short plug which is inserted in the connector head by pulling it straight out from the holes.
4. Cut the plastic tube on the back of the thermostat as follows:
Measure 2-7/8-inch from the back of the thermostat, and using a side cutting or diagonal pliers, cut the tubing at a 45° angle to make the tubing slide into the connector head more easily.
Remove the coil spring from the tubing and cut-off and discard 7/8-inch of the coil spring. Replace the remaining coil spring in the tubing.
5. Insert the short length of copper tubing, supplied with the fitting, into the plastic tubing. The copper tubing will stiffen the plastic tubing so it can be installed easily.
6. Place the fibre board insulator over the tube on the back of the thermostat.
7. Lubricate the outside of the plastic tube (this applies to the mortar joint fitting only) with water or glycerin. Be sure that none of the lubricant gets inside the tubing.
8. Push the plastic air line into the right hand hole in the connector head. Use a slight back and forth circular motion, while pushing the tubing firmly into the sockets. The tubing should to into the hole about 1/4-inch or further.
9. Push the thermostat against the mounting plate. At the same time pull the excess tubing through the thermostat, being careful not to unplug it from the fitting.

10. Fasten the thermostat to the mounting plate with the Allen head screws provided. Tighten the screws evenly.

Mounting on Electrical Box:

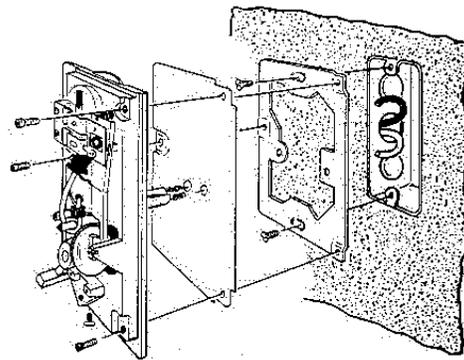


Figure-3

Figure 3 shows a typical method of mounting using a standard electrical box. When this is done, the tubing is brought through the knock-out holes and adaptors are used to adapt from the field tubing to the thermostat tubing. See Figure 4 as required for the different methods depending on the type of field tubing. In mounting the thermostat attach the thermostat mounting plate to the hand box or wall with the field tubing protruding through the center opening. Thread the thermostat tubing through the insulator plate and attach it to the field tubing as shown in Figures 4.

Note: This type of mounting is used when mounting on a block wall when the thermostat has the AT-532-111-1-01 restriction located under the cover.

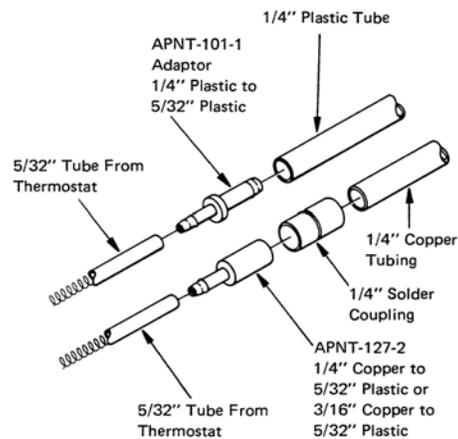


Figure-4

ADJUSTMENTS

Thermostats are shipped from the factory, calibrated to provide 8 psig (55.1 kPa) control line pressure when the control point is equal to the set point. The throttling range is 6F°(3.5 C°), per 10 psi (3.3 C° per 69 kPa) control pressure change.

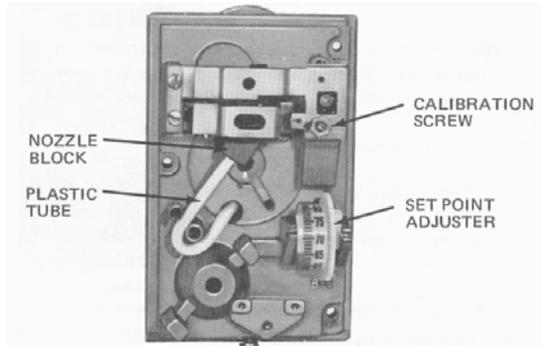


Figure-5

CALIBRATION

After the installation has been completed the thermostat should be checked for calibration. As a nominal calibration, the branch line control pressure should be 8 psig (55.1 kPa) when the set point is equal to the room temperature as indicated on the thermostat thermometer. On some applications, a value other than 8 psig (55.1 kPa) will be required to get the desired control results. In this case, change the 8 psig (55.1 kPa) designation used in the calibration procedure.

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

Restriction Remote from Thermostat:

1. Remove the thermostat cover by loosening the cover screw and raising the bottom of the cover, off the base. Lift up the cover after it has cleared the mechanism. (See Figure 5).
2. Remove 5/32-inch plastic tube from nozzle block (Figure 5).
3. Insert 5/32-inch tubing of calibration kit (Figure 6) into nozzle block.
4. Insert tube removed from nozzle block in Step 2 into adapter (Figure 7).
5. Support gauge with hand (Figure 8).
6. Adjust the set point dial to the room temperature as indicated on the thermometer in the cover. (If the thermostat has no cover thermometer, use a test thermometer.)
7. With a .048-inch six spline wrench, adjust the calibration screw (Figure 8). Turn the screw clockwise if the controlled pressure is above 8 psig (55.1 kPa) and counterclockwise if it is below 8 psig (55.1 kPa). Adjust the screw until the controlled pressure is 8 ± 1 psi (55.1 ± 6.9 kPa).

Note: The hex nuts on the calibration screws are a tension device only. They should not be loosened to make any adjustments.

9. Replace tube removed in Step 2 into nozzle block.
10. Replace the cover and tighten the cover screws.

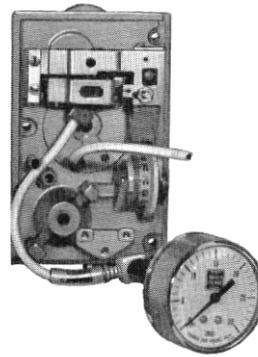


Figure-6

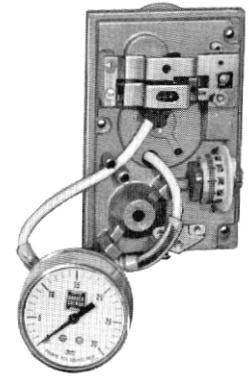


Figure-7

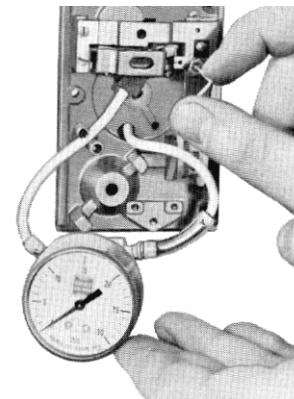


Figure-8

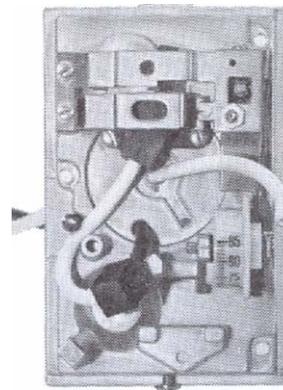


Figure-9

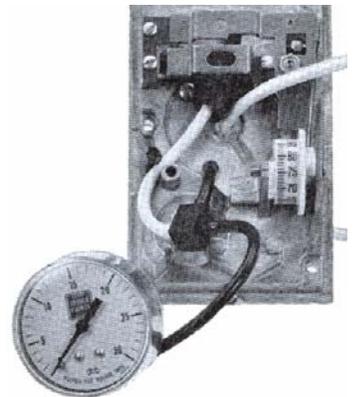


Figure-10

8. Remove the test gauge.

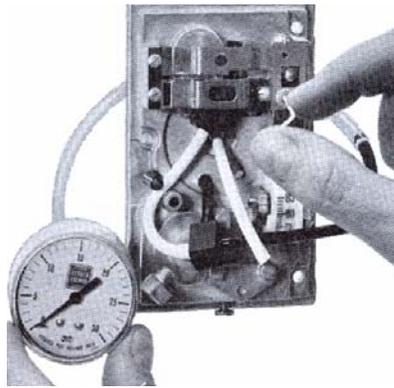


Figure-11

Calibration and Installation with Restriction Installed on Thermostat

Order separately one APNT 11-011 tube and one APNT 93-30 spring.

1. Remove the thermostat cover by loosening the cover screw and raising the bottom of the cover, off the base. Lift up the cover after it has cleared the mechanism.
2. Remove white 5/32-inch plastic tube from nozzle block (Figure 5) and base.
3. Cut off approximately 3 inches of the tubing and spring. Retain balance of tube and spring.
4. Install the 3-inch piece of tube (white) to one of the side connections of the AT-532-111-1-01. (See Figure 12). Insert the 3-inch piece of spring.
5. Install one APNT 11-011 (black 5/32-inch tube) to the main connection of the AT 532-111-1-01. (See Figure 12). Note the APNT 11-011 must be ordered separately.
6. Insert one APNT 93-030 spring into the black tube as far as possible and cut off any excess spring.
7. Insert the 3-inch piece of white tube back into the nozzle block and press between the roll pin and boss on the base.
8. Connect the remaining white tube to the wallbox fitting by inserting it into the right hand hole, or connect to field branch line.
9. Attach the mounting plate to the wallbox fitting or wall allowing the white tube to protrude through the mounting plate.
10. Insert the black tube through a hole in the base (see Figures 1 and 9, 10, 11) and then the left hole in the insulator card, and connect to the wallbox fitting by inserting it into the left hand hole, or connect to field main line.
11. Insert the white tube from the wallbox through the right hole in the insulator card, then insert through a hole in the base.
12. Attach the thermostat to the mounting plate with screws provided.

13. Attach the test gauge (from AL-341 kit) with the tygon connected to it, to the side connection on the AT-532-111-1-01. (See Figure 10).
14. Support the test gauge with one hand. (See Figure 11).
15. Adjust the setpoint dial to the room temperature as indicated on the thermometer in the cover. If the thermostat has no cover thermometer, use a test thermometer.
16. With a .048-inch six spline wrench, adjust the calibration screw (see Figure 5). Turn the screw clockwise if the controlled pressure is above 8 psig (55.1 kPa), and counterclockwise if it is below 8 psig (55.1 kPa). Adjust the screw until the controlled pressure is mid value of the actuator spring [i.e., 5-10 spring = 7-1/2 psig (57.1 kPa)] ± 1 psig (6.9 kPa).

Note: The hex nuts on the calibration screws are for tension only. They should not be loosened to make any adjustments.

17. Remove the test gauge.
18. Connect the white tube from the wallbox to the AT-532-111-1-01 where the test gauge was and push the excess tube both black and white back into the wallbox.
19. Replace the cover and tighten the cover screw.

Application of In-Line Restrictor (AT-532)

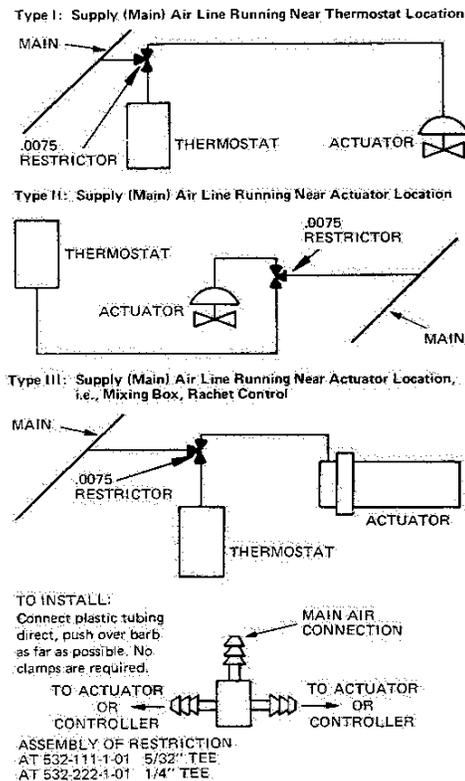


Figure-12

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