



Wire and Test a 24V Thermostat

Program: Electrician Technician

Course: EL160 – Low Voltage Applications

Objectives: Under the supervision of your instructor, you should be able to do the following:

- Explain the function of a thermostat in a HVAC system
- Describe different types of thermostats and explain how they are used
- Demonstrate the correct installation and adjustment of a thermostat using proper siting and wiring techniques
- Identify various types of thermostats and explain their operation and uses
- Install a conventional 24V bimetal thermostat and hook it up using the standard coding system for thermostat wiring

Lab Equipment:

- 1 – Bay or Project board (2 ft X 2 ft plywood or equivalent)
- 1 – 24V heating-cooling-fan control automatic changeover thermostat
- 1 – 120V/24V control transformer (minimal VA rating)
- 1 – 120V pigtail with cap (plug)
- 1 – Terminal strip (minimum 6 terminals)

Required Tools:

- 1 – Pair of Wire cutters
- 1 – Pair of Wire strippers
- 1 – Flat head Screwdriver
- 1 – Digital multimeter

Materials:

- 2' – Five-wire thermostat cable
- 1' – Two-conductor (18 to 22 AWG) cable for transformer secondary
- 4 – Mounting screws for thermostat and terminal strip

Safety (PPE):

- Safety glasses

Resources: N/A

Time Required: 120 Minutes

Shop Maintenance:

- All work will cease 20 minutes prior to the end of class.
- All work areas must be cleaned.
- Tools and equipment must be cleaned and returned to the designated areas (cage, tool room, cabinets etc.)
- Any broken or missing tools must be reported immediately.
- Tools and equipment are student's responsibility



Procedures: (Eye protection must always be worn)

This performance project requires the trainee to mount and wire an automatic changeover thermostat according to standard thermostat wiring codes.

1. The transformer must remain de-energized throughout this project.
2. Mount the thermostat, transformer, and terminal strip on the project board as illustrated in Figure 1.
3. Carefully examine the wiring diagram in Figure 2.
4. Connect the secondary (24V) side of the transformer to the terminal strip as shown.
5. Connect the terminal strip of the thermostat cable as shown.
6. Remove the cover from the thermostat and locate the lettered terminals on the thermostat.
7. Prepare the thermostat wire ends by stripping them approximately 3/8 of an inch.
8. Follow the thermostat wiring codes shown in Figure 2 and wrap the wire ends around the terminal screws in the direction of screw tightening.
9. If an "O" (orange) terminal screw is not present in your thermostat, coil the unused orange conductor within the thermostat.
10. Secure the screw terminals and have your instructor check your work.

Note:

Relays will be connected to the terminal strip in the next project.

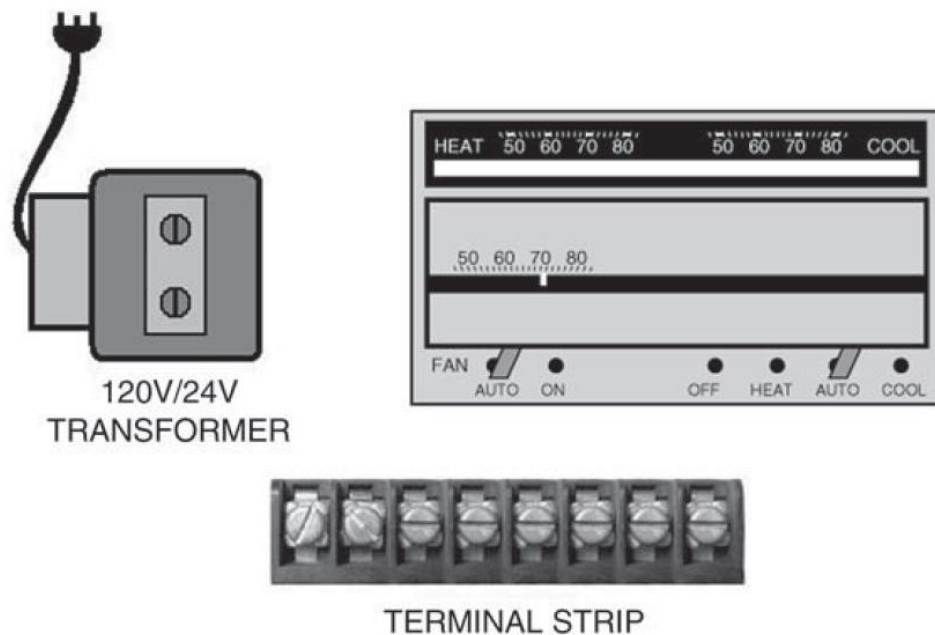


Figure 1 ■ Transformer, Thermostat, and Terminal Strip Layout

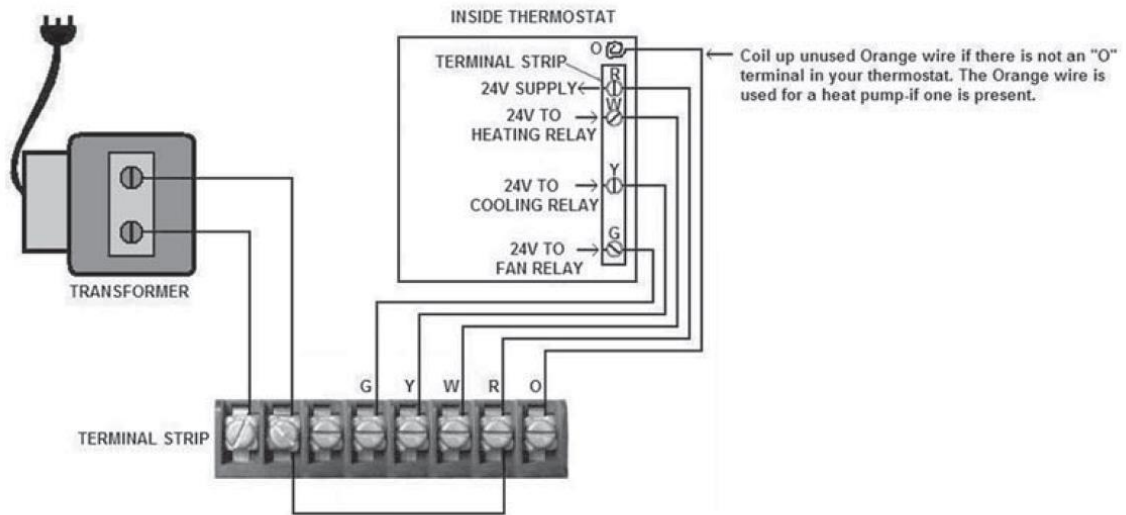


Figure 2 ■ Wiring Diagram