

T87F Zone Thermostat and 137421N,P Wallplates; T87F Zone Thermostat and Q539A,B Subbases

INSTALLATION INSTRUCTIONS

APPLICATION

The T87F Thermostat provides 24 Vac single-stage temperature control of Honeywell Zone Control Panels. The panel operates the heating or cooling systems and zone dampers in response to the T87F Zone

Thermostats. The T87F is used with the 137421N or P Wallplate (provided) or Q539A or B Subbase (ordered separately), depending on application. See Table 1 for thermostat/wallplate and subbase applications and specifications.

Table 1. Thermostat/Wallplate and Subbase Applications and Specifications.

Thermostat /Wallplate or Subbase	Application	Switching		Comments
		System	Fan	
T87F3707/ 137421N T87F3715/ 137421P	To control zones other than zone 1 using MM-2 or MM-3 Zone Control Panels. To control zone damper actuators in independent heating-only systems.	None	None	Wallplate included with thermostat. Terminals are marked: W, R, Y.
T87F3715/ Q539A1436 T87F3707/ Q539A1428	To control any zone on TZ-3, EZ-2, EZ-4, EMM-3 or EMM-3U or zone one on MM-2 or MM-3 Zone Control Panels.	COOL-OFF-HEAT	ON-AUTO	Q539A ordered separately. Terminals marked: R,W,Y,G,O,B.
T87F3715/ Q539B1039 T87F3707/ Q539B1021	To control zone damper actuators in independent zones in heating-cooling systems.	HEAT__COOL	None	Q539B ordered separately. Terminals marked: 4,5,6.



MERCURY NOTICE

If this control is replacing a control that contains mercury in a sealed tube, do not place your old control in the trash. Dispose of properly.

Contact your local waste management authority for instructions regarding recycling and the proper disposal of an old control.

INSTALLATION

When Installing This Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Disconnect the power supply to prevent electrical shock or equipment damage.
3. Check the rating given in the instructions and on the product to make sure the product is suitable for your application.
4. Installer must be a trained, experienced service technician.
5. After completing installation, use these instructions to check out the product operation.



Selecting Location

- Install the thermostat about 5 ft (1.5 meters) above the floor in an area with good air circulation at average temperature.
- Do not install the thermostat where it can be affected by:
 - drafts or dead spots behind doors and in corners.
 - hot or cold air from ducts.
 - radiant heat from sun or appliances.
 - concealed pipes and chimneys.
 - unheated (uncooled) areas such as an outside wall behind the thermostat.
- Handle this thermostat carefully; it is a precision instrument that was carefully calibrated at the factory.

CAUTION

Electrical Shock Hazard
Can cause personal injury or equipment damage.
 Disconnect power supply before installation.

Mounting and Wiring

IMPORTANT

To prevent interference with thermostat linkage, keep wire length to a minimum and run wires as close as possible to the subbase.

All wiring must comply with local codes and ordinances.

T87F Zone Thermostat and wallplate or subbase are used in zoned conventional single-stage heating or heating-cooling systems.

137421 Wallplate or Q539 Subbase

REPLACEMENT APPLICATION

1. Remove old equipment. Dispose of properly. See Mercury Notice.
2. Check the existing wallplate or subbase wires for cracked or frayed insulation.
3. Replace any wires in poor condition.
4. If the wires are plastered into the wall, make a hole next to the wires so they can be pushed back into the wall later.
5. Continue with step 3 for New Installation.

NEW INSTALLATIONS

1. Run low voltage thermostat cable (if necessary) to the thermostat location.
2. Pull about 3 in. (76 mm) of cable through a hole in the wall.
3. Connect wires to the terminals inside the wallplate or subbase. See Fig. 1 and 2 or zone control panel installation instructions for wiring diagrams of typical zone systems.
4. Push excess wire back through the hole and plug any opening with insulation to prevent drafts that can affect thermostat performance.

137421 Wiring Cross Reference

Old Terminal	New Terminal
4	W
5	R
6	Y

5. Loosely fasten the thermostat wallplate or subbase to the wall with a screw through the left mounting hole. See Fig. 3.
6. Adjust the wallplate or subbase so it is approximately level and start the second screw through the right mounting slot. Do not tighten.

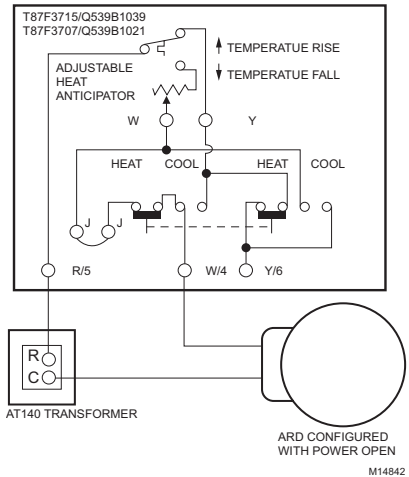


Fig. 1. Wiring single ARD (power open) to thermostat.

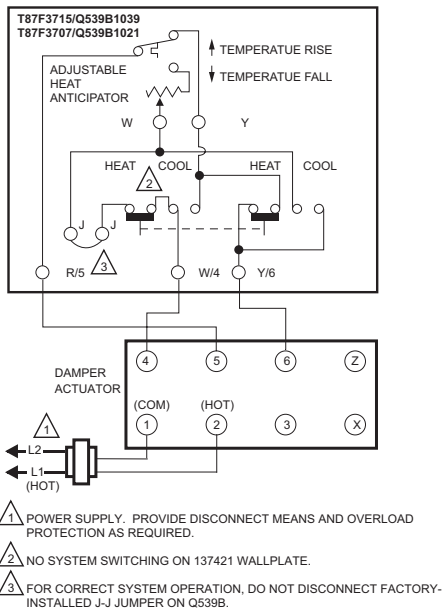


Fig. 2. Wiring T87F Thermostat and Q539B Subbase or 137421 Wallplate in independent zone.

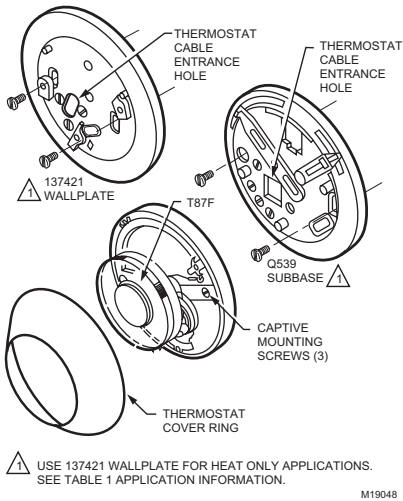


Fig. 3. Mounting T87F Thermostat and 137421 Wallplate or Q539 Subbase.

IMPORTANT

An incorrectly leveled thermostat causes the temperature control to deviate from setpoint.

- Level the thermostat wallplate or subbase exactly using a spirit level as shown in Fig. 4.

IMPORTANT

Do not overtighten thermostat captive mounting screws because damage to subbase threads can result.

- Tighten mounting screws.

T87 Thermostat

- Before mounting the thermostat, see Heat Anticipator Adjustment in Settings and Adjustments section.
- Align the thermostat over the wallplate or subbase and tighten the three mounting screws.

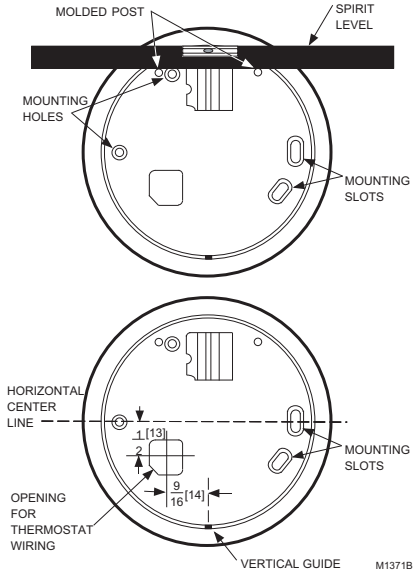


Fig. 4. Leveling wallplate or subbase before mounting T87F.

Settings and Adjustments

Temperature Selection

To select the desired temperature for each zone, turn the transparent dial on the zone thermostat until the desired point on the setting scale (top scale) is aligned with the pointer.

System and Fan Switching

Q539A

The Q539A provides System and Fan switches to control heating-cooling equipment and zone one fan in multi-zone applications:

- The System switch controls the system operation:
 - Heat: Only the heating system operates.
 - Off: Both heating and cooling control systems are disconnected.
 - Cool: Only the cooling system operates.
- The Fan switch controls the fan operation:
 - Auto: The fan operates in response to the plenum fan control in heating; the fan operates in response to the thermostat in cooling.
 - On: The fan runs continuously.
- To change positions, use thumb and index fingers to move the switch lever to the desired position. Place the switch lever directly over the selected function indicator mark.

Q539B

The Q539B provides System switching to control damper actuators in independent zones of heating-cooling systems.

NOTE: The Q539B System switch must be set to the same position as the System switch on the thermostat controlling the heating-cooling equipment.

- Set the System switch to:
 - Heat: When the thermostat is calling for heat, the damper opens; when the thermostat is satisfied, the damper closes.
 - ____: The thermostat is not set to heat or cool; the damper remains in the position (Open or Closed) that it was in when the switch position changed.
 - Cool: When the thermostat is calling for cooling, the damper opens; when the thermostat is satisfied, the damper closes.
- To change positions, use thumb and index fingers to move the switch lever to the desired position. Place the switch lever directly over the selected function indicator mark.

Heat Anticipator Adjustment

The T87F Thermostat has an adjustable heat anticipator. When the T87F is connected to a zone panel, the heat anticipator must be set at 0.1A for correct system operation. When the T87F is connected to a damper in an independent zone application, the heat anticipator must be set to 0.4A for proper system operation. See Fig. 5.

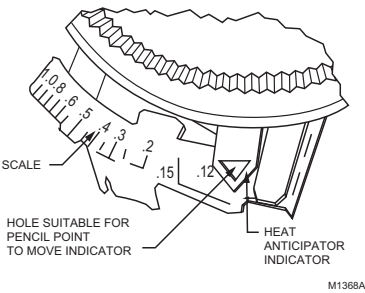


Fig. 5. Adjusting heat anticipator.

Checkout

When installation is complete, turn on the power supply and check thermostat operation using the following procedure. For complete checkout of entire zone system, refer to the zone control panel installation instructions.

CAUTION

Equipment Damage Hazard.
Shorting across thermostat terminals of zone control panels can damage heat anticipator.
 Check operation using these instructions.

IMPORTANT

To assure accurate temperature control, do not touch or breathe on the thermostat bimetal or thermometer.

Multizone System

HEATING

1. Set each thermostat System switch to Heat and Fan switch to Auto on the TZ-3, EMM-3, EMM-3U, EZ-2, and EZ-4.
2. On the MM-2 and MM-3, set zone one thermostat subbase System switch to heat and Fan switch to Auto.
3. Turn Zone one thermostat dial 10°F (6°C) above room temperature to call for heat.
4. Turn dials on all other zone thermostats 20°F (6°C) below room temperature.
5. Be aware that zone one damper remains open and all other zone dampers close. (Dampers can take up to 30 seconds to open or close fully.)
6. Observe that furnace starts immediately and fan starts after a short delay.
7. To check zones other than zone one, turn the dial on one of the zone thermostats 10°F (6°C) above room temperature to call for heat.
8. Be aware that the associated zone damper opens.
9. Turn that zone thermostat dial 10°F (6°C) below room temperature; damper then closes.
10. Repeat steps 7-9 for each zone other than zone one.
11. Turn zone one thermostat dial 10°F (6°C) below room temperature to end call for heat.
12. Unless another thermostat is calling for heat, the furnace shuts off and the fan shuts off after a short time. All dampers then open unless set to closed on the MM-2 or MM-3 panel.

COOLING

1. Set each thermostat System switch to Cool and Fan switch to Auto on the TZ-3, EMM-3, EMM-3U, EZ-2 and EZ-4.
2. On the MM-2 and MM-3, set zone one thermostat subbase System switch to Cool and Fan switch to Auto.
3. Turn zone one thermostat dial 10°F (6°C) below room temperature to call for cooling.
4. Turn dials on all other zone thermostats 10°F (6°C) above room temperature.
5. Be aware that zone one damper remains open; all other zone dampers close. Dampers can take up to 30 seconds to open or close fully.
6. Observe that cooling and fan come on.

IMPORTANT

To prevent compressor short cycling, a minimum off-time may be included to provide a five-minute time delay before activating the compressor after the thermostat last turned off the compressor, or after the system first received power. This delay protects the compressor.

7. To check zones other than zone one, turn the dial on one of the zone thermostats 10°F (6°C) below room temperature to call for cooling.
8. Be aware that the associated zone damper opens.
9. Turn that zone thermostat dial 10°F (6°C) above room temperature; damper then closes.
10. Repeat steps 7-9 for each zone other than zone one.

11. Turn zone one thermostat dial 10°F (6°C) above room temperature to end call for cooling.
12. Unless another thermostat is calling for cooling, cooling and the fan shut off. All dampers then open unless set to closed on the MM-2 or MM-3 panel.

FAN

1. Set the Fan switch on the zone one thermostat subbase to On and the System switch to Off.
2. Observe that the fan runs continuously.
3. Move the Fan switch to Auto to control the fan operation with the plenum fan control in heating with the thermostat in cooling.

Independent Zone

- Use the T87F with the 137421N or P Wallplate for heat-only independent zone applications.
- Use the subbase only to control heating and cooling of independent zones.
- In this application, the T87F controls only the damper actuator; the thermostat is not connected to the heating or cooling equipment. A separate thermostat/subbase is required to control the heating and cooling equipment. See the thermostat instructions for heating-cooling equipment checkout.

T87F THERMOSTAT/Q539B SUBBASE

1. With the heating equipment on and Q539B subbase System switch set to Heat, turn the thermostat dial 10°F (6°C) above room temperature to call for heat. The damper opens.

NOTE: The damper can take up to 30 seconds to fully open or close.

2. Turn the thermostat dial 10°F(6°C) below room temperature; damper closes.
3. With the cooling equipment on and the Q539B Subbase System switch set to Cool, turn the thermostat dial 10°F (6°C) below room temperature to call for cooling; damper opens.
4. Turn the thermostat dial 10°F (6°C) above room temperature; damper closes.

T87F THERMOSTAT/137421 WALLPLATE

1. With the heating equipment on, turn the thermostat dial 10°F (6°C) above the room temperature to call for heat; damper opens.

NOTE: Damper can take up to 30 seconds to fully open or close.

2. Turn the thermostat dial 10°F (6°C) below room temperature; damper closes.

Recalibration

The T87F is accurately calibrated at the factory under controlled conditions and recalibration is not necessary. If it appear that the thermostat is out of calibration:

1. Make sure the thermostat is level and not subjected to radiant heat from the sun, radiators, or appliances.
1. Remove the thermostat cover ring to observe the mercury switch action.
2. After a five- or ten-minute off period (with thermostat setting below room temperature), slowly raise the setting until the switch just makes contact. If the thermometer pointer and setting indicator have the same reading the instant the switch makes, no recalibration is necessary.
3. If recalibration is necessary: turn the setting dial a few degrees above room temperature and remove the cover.
4. Slip the 104994 Calibration Wrench (ordered separately) onto the hex under the bimetal coil and, holding the dial firmly, turn the hex clockwise until the mercury breaks contact. See Fig. 6.
5. Turn the dial to a low setting so the thermostat loses the heat it gained from hands and its own operation. Wait at least five minutes.
6. Slowly turn the dial until the pointers have the same reading.
7. Firmly holding the dial from turning, carefully turn the hex counterclockwise until the mercury switch slips to the heating contact end of the tube.
8. Recheck the calibration, select the desired temperature, and replace the cover.

NOTE: When the T87F provides cooling control, calibration for heating automatically calibrates for cooling.

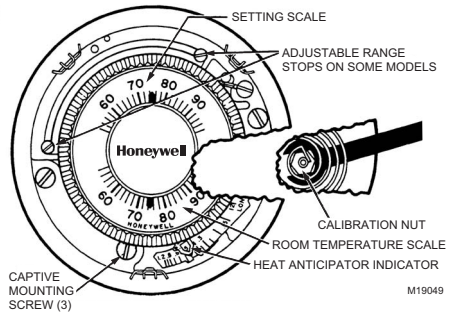


Fig. 6. Recalibrating T87F Thermostat.

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