



Heating & Cooling Products

Bard Pt# 8403-042
T8511G1070

Microelectronic Heat Pump Thermostat

INSTALLATION INSTRUCTIONS

APPLICATION

The Microelectronic Heat Pump Thermostat provides electronic control of 24 Vac two-stage heating and one-stage cooling heat pump systems. This thermostat requires a common wire to supply power.



RECYCLING NOTICE

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

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

2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After completing installation, use these instructions to check out the product operation.



CAUTION

Disconnect power supply to prevent electrical shock or equipment damage.

Location

Install the thermostat about 5 ft (1.5m) above the floor in an area with good air circulation at average temperature. See Fig. 1.

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow the instructions can damage the product or cause a hazardous condition.

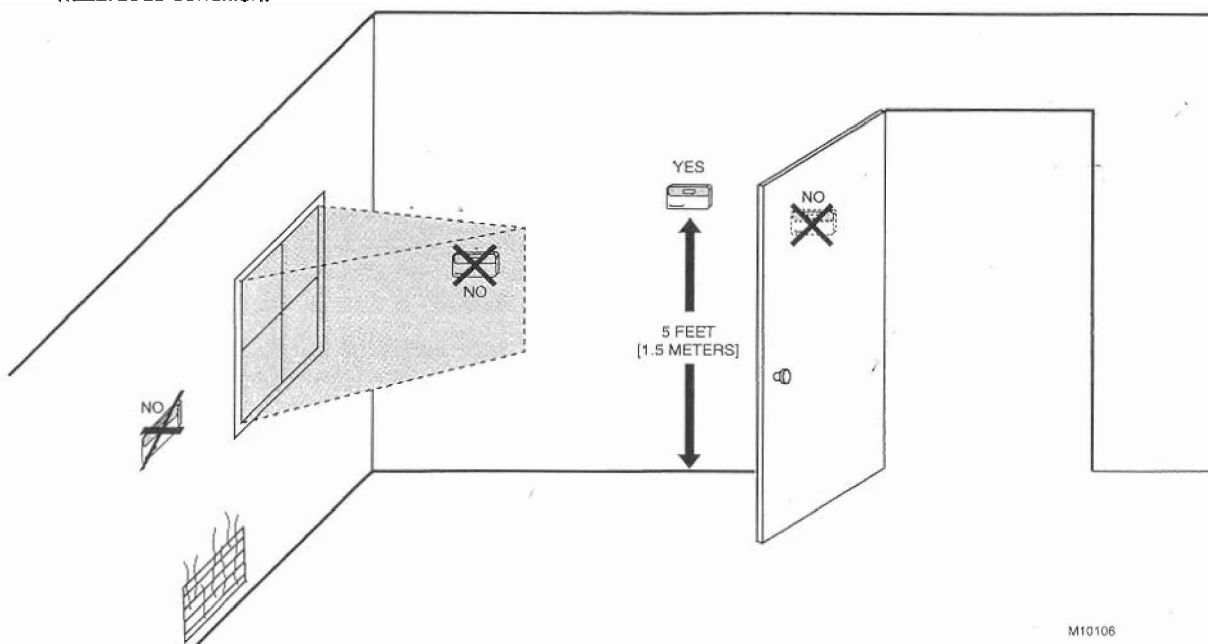


Fig. 1. Typical location of thermostat.

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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.

Wallplate Installation

The thermostat can be mounted horizontally on the wall or on a 2 in. x 4 in. wiring box. Position wallplate horizontally on the wall or on a 2 in. x 4 in. wiring box.

1. Position and level the wallplate (for appearance only). The thermostat will function properly even when not level.

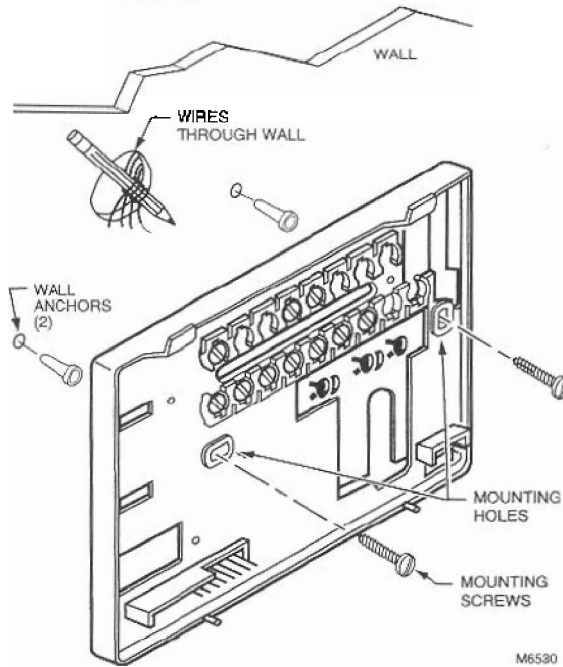


Fig. 2. Mounting the wallplate.

2. Use a pencil to mark the mounting holes. See Fig. 2.
3. Remove the wallplate from the wall and drill two 3/16 inch holes in the wall (if drywall) as marked. For firmer material such as plaster or wood, drill two 7/32 inch holes. Gently tap anchors (provided) into the drilled holes until flush with the wall.
4. Position the wallplate over the holes, pulling wires through the wiring opening.
5. Loosely insert the mounting screws into the holes.
6. Tighten mounting screws.

WIRING

All wiring must comply with local electrical codes and ordinances. Refer to Figs. 3 and 4 for typical hookups. A letter code is located near each terminal for identification.



CAUTION

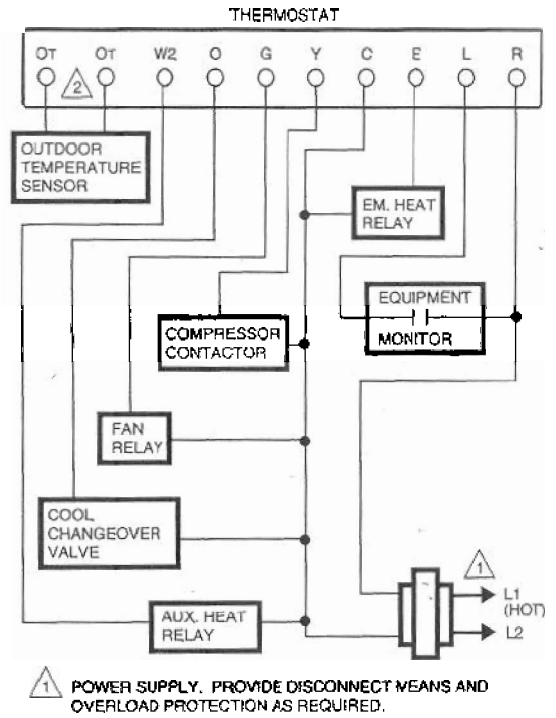
Disconnect power before wiring to prevent electrical shock or equipment damage.

1. Loosen the terminal screws on the wallplate and connect the system wires. See Fig. 5.

IMPORTANT

Use 18 gauge, color-coded thermostat cable for proper wiring.

2. Securely tighten each terminal screw.
3. Push excess wire back into the hole.
4. Plug the hole with nonflammable insulation to prevent drafts from affecting the thermostat.



1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

2 AVAILABLE ON SELECT MODELS.

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Fig. 3. Typical hookup in heat pump system with emergency heat relay.

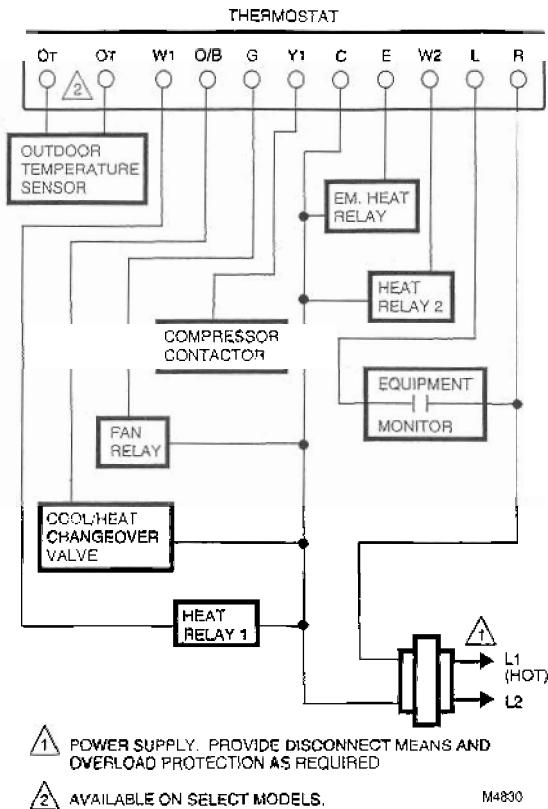


Fig. 4. Typical hookup in heat pump application with emergency heat relay and O/B terminal.

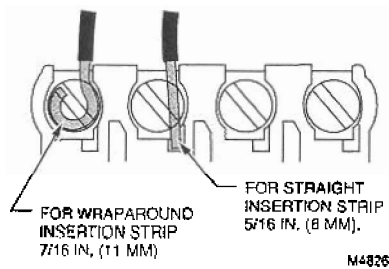
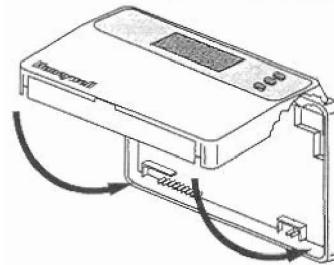


Fig. 5. Proper wiring technique.

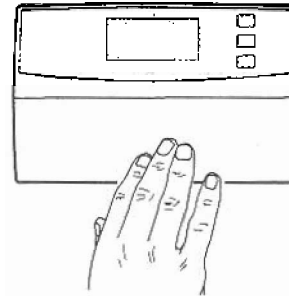
Mounting Thermostat

1. Engage tabs at the top of the thermostat and wallplate. See Fig. 6.
2. Press lower edge of case to close and latch.

A. ENGAGE TABS AT TOP OF THERMOSTAT AND WALLPLATE.



B. PRESS LOWER EDGE OF CASE TO LATCH



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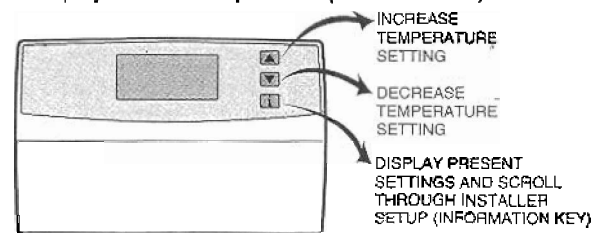
Fig. 6. Mounting thermostat on wallplate.

NOTE: To remove the thermostat from the wall, first pull out at the bottom of the thermostat; remove top last.

Using Thermostat Keys

The thermostat keys (see Figs. 7 and 8) are used to:

- set the system operation,
- set the fan operation,
- set temperature,
- display present setting,
- configure Installer Setup,
- check System Test,
- display outdoor temperature (select models).



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Fig. 7. Thermostat key locations and descriptions.

SETTINGS

System and Fan Settings

System settings control the thermostat operation as follows:

- Em. Heat: Emergency heat relay is automatically controlled by the thermostat. The cooling system is off. The compressor is de-energized.
- Heat: The thermostat controls the heating.
- Off: Both the heating and cooling are off.
- Cool: The thermostat controls the cooling.
- Auto: The thermostat automatically changes between heating and cooling operation, depending on the indoor temperature.

Fan settings control the system fan as follows:

- On: Fan operates continuously.
- Auto: Equipment controls fan.

The system default setting is Heat and the fan default setting is Auto. Use the keyboard or system and fan switches, depending on model, to change to the desired settings. See Fig. 8.

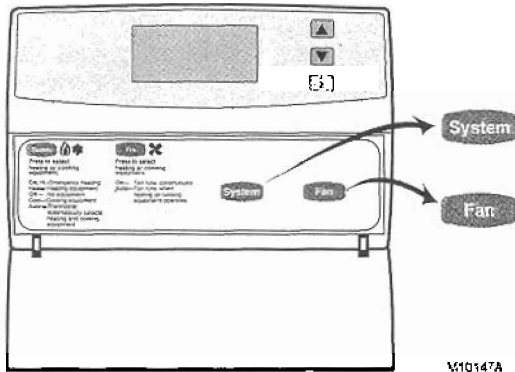



Fig. 8. System and fan keys.

NOTE: Always press the system and fan keys with your fingertip or similar blunt tool. Sharp instruments like a pen or pencil point can damage the keyboard.

Temperature Settings

The default setpoint for heat is 70°F (21°C) and for cool is 78°F (25.5°C). Press the increase ▲ or decrease ▼ key to change the present setting. To change between heat and cool, press the Information  key until the setting to be changed appears.

INSTALLER SETUP



NOTE: For most applications, the thermostat factory-settings do not need to be changed. Review the factory settings in Table 2 and if no changes are necessary, go to the Installer System Test section.

The Installer Setup is used to customize the thermostat to specific systems. Some of the options include temperature display, changeover, minimum equipment on time and minimum off time. Installer numbers are listed in Table 2. The table includes all the configuration options and the factory-settings available.


IMPORTANT

The Installer Setup must be set correctly for the HVAC equipment, thermostat and subbase to operate properly.

A combination of key presses are required to use the Installer Setup feature.

To enter the Installer Setup, press and hold the Information  key with the increase ▲ and decrease ▼ keys until the first number is displayed. All display segments appear for approximately three seconds before the number is displayed. See Figs. 9 and 10. To advance to the next Installer Setup, press the Information  key.

To change a setting, use the increase ▲ or decrease ▼ key.

To exit the Installer Setup, press and hold the Information  key until the display returns to normal (approximately three seconds). The display scrolls the numbers backwards to get to the normal display. The Installer Setup is automatically exited if no key press is made for five minutes.

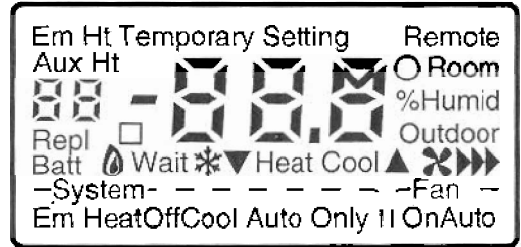


Fig. 9. Display of all the segments of the LCD.

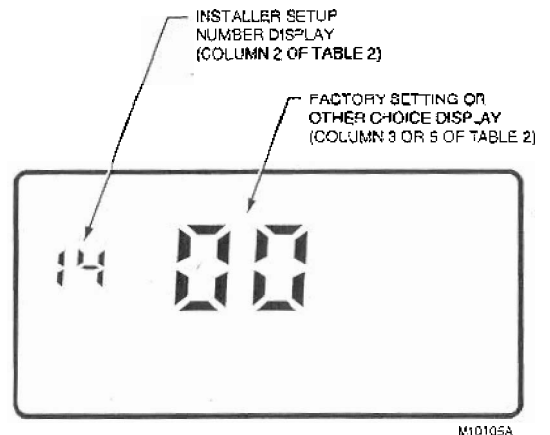


Fig. 10. Display of Installer Setup and setting.

NOTE: Only configurable numbers are shown.

Table 2. Thermostat Installer Setup Options.

| Select | Installer Setup Number (Press i key to change) | Factory-Setting | | Other Choices (Press ▲ or ▼ key to change) | | Actual Setting |
|--|--|-----------------|--|---|--|----------------|
| | | Display | Description | Display | Description | |
| Not used | 01 thru 04 | | | | | |
| Heating cycle rate | 05 | 03 | Stage 2 | 03, 06 or 09 | 03 3 cph used for stage 1 heat pump systems 06 6 cph used for conventional systems 09 9 cph used for electric heat systems | |
| | 06 | | Not used | | | |
| | 07 | 09 | Emergency heat | | | |
| Not used | 08 thru 11 | | | | | |
| Changeover | 12 | 00 | Automatic changeover | 00, 02 | 01 Manual changeover 02 Automatic changeover only | |
| Not used | 13 | | | | | |
| Degree temperature display | 14 | 00 | Temperature is displayed in $^{\circ}$ F | 01 | Temperature is displayed in $^{\circ}$ C | |
| Not used | 15 thru 18 | | | | | |
| Extended fan operation in heating | 19 | 00 | No extended fan operation after the call for heat ends | 01 | Fan operation is extended 90 seconds after the call for heat ends | |
| Extended fan operation in cooling | 20 | 00 | No extended fan operation after the call for cool ends | 01 | Fan operation is extended 90 seconds after the call for cool ends | |
| Not used | 21 thru 23 | | | | | |
| Outdoor temperature display | 24 | 01 | No outdoor temperature is displayed | 01 | Outdoor temperature is displayed. Requires a C7089B1000 Outdoor Sensor. | |
| Not used | 25 thru 28 | | | | | |
| O/B terminal energized in heating or cooling | 29 | 01 | O/B terminal is energized for reversing valve in heating | 00 | O/B terminal is energized for reversing valve in cooling | |
| Not used | 30 thru 32 | | | | | |
| Minimum off time for the compressor | 33 | 00 | 5 minute minimum off time for the compressor | 01, 02, 03, 04 or 05 | Minimum number of minutes (0 thru 5) the compressor will be off between calls for the compressor | |
| Heating setpoint range stop | 34 | 90 | Heating setpoint can be set no higher than 90 $^{\circ}$ F | 40 thru 90 | Number can be set anywhere between 40 and 90 in 1 $^{\circ}$ F increments | |
| Cooling setpoint range stop | 35 | 45 | Cooling setpoint can be set no lower than 45 $^{\circ}$ F ^a | 45 thru 99 | Number can be set anywhere between 45 and 99 in 1 $^{\circ}$ F increments | |
| display | | 00 | LCD On symbol is displayed when system is energized | 01 | Display is disabled, usually set for 01 for a zoned system | |

(continued)

Table 2. Thermostat Installer Setup Options (continued).

| Select | Installer Setup Number (Press \square key to change) | Factory-Setting | | Other Choices (Press \blacktriangle or \blacktriangledown key to change) | | Actual Setting |
|--------------------------------|---|-----------------|--|---|---|----------------|
| | | Display | Description | Display | Description | |
| Temperature display adjustment | 37 | 00 | No difference in displayed temperature and actual room temperature | -3 thru 03 | 01 Display adjusts to 1°F higher than actual room temperature 02 Display adjusts to 2°F higher than actual room temperature 03 Display adjusts to 3°F higher than actual room temperature -1 Display adjusts to 1°F lower than actual room temperature -2 Display adjusts to 2°F lower than actual room temperature -3 Display adjusts to 3°F lower than actual room temperature | |

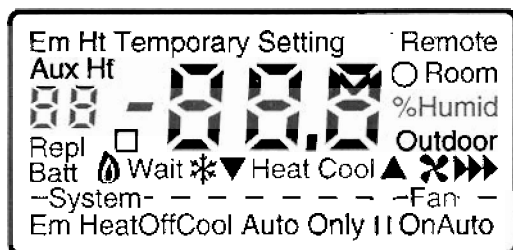
INSTALLER SYSTEM TEST

Use the Installer System Test to check the thermostat configuration and operation. Refer to Table 3 for a list of the available system tests.

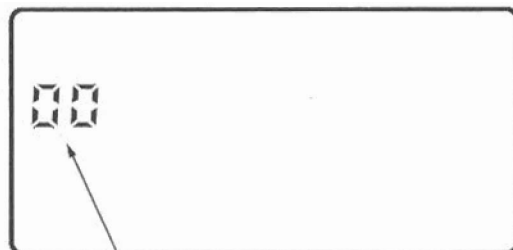
To start the System Test:

NOTE: The minimum off time for compressors is bypassed during the Installer System Test.

Press and hold the increase \blacktriangle and decrease \blacktriangledown keys, at the same time, until two zeros appear. All segments of the LCD are displayed before the two zeros appear.



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TEST NUMBER

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NOTE: Press and hold the increase \blacktriangle and decrease \blacktriangledown keys for three seconds to exit the system test. The system test times out after five minutes without any key press.

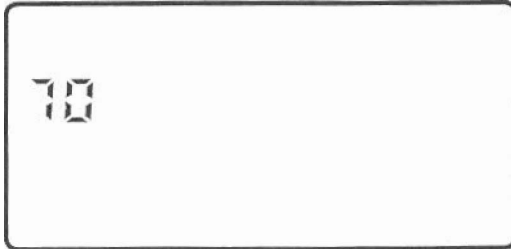
Table 3. Tests Available in the Installer System Test.

| Test Number | System Test Description |
|-------------|--|
| 10-19 | Heating equipment can be turned on and off |
| 20-29 | Emergency heat (select models) equipment can be turned on and off |
| 30-39 | Cooling equipment can be turned on and off |
| 40-49 | Fan equipment can be turned on and off |
| 60-69 | System key or system switch position test |
| 70-79 | Thermostat information including date code and software versions are displayed |


Refer to Table 4 for directions and results of the specific tests.

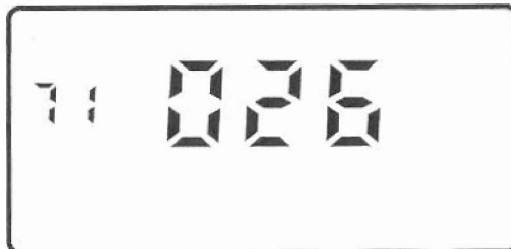
Thermostat Information

1. Press the Information  key to access the thermostat information




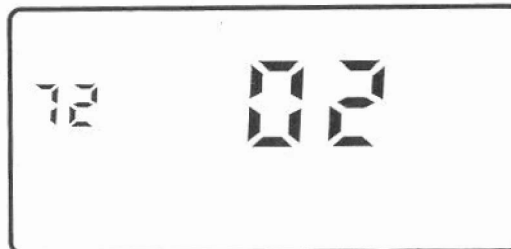
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2. Press the increase  key to display the production date code. The first two large digits are the month and the third digit is the last digit of the year. (Example: 026 = February 1996)




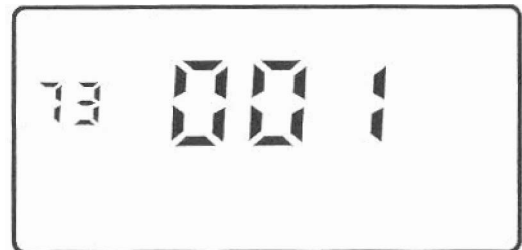
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3. Press the increase  key again to display the software identification code. (Example: 02 = software ID code 2)




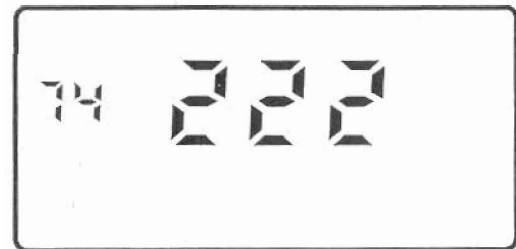
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4. Press the increase  key again to display the software revision number. (Example: 001 = revision number 1)





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5. Press the increase  key again to display the EEPROM identification code. (Example: 222 = EEPROM ID 222)



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6. Press and hold the increase  and decrease  keys together, until the room temperature is displayed, to exit the system test. The system test times out after five minutes without any key press.

CHECKOUT

Outdoor Temperature Sensor (Where Applicable)

Expose the outdoor temperature sensor to outdoor air for a minimum of five minutes before reading. With an accurate thermometer ($\pm 1^\circ\text{F}$ [$\pm 0.5^\circ\text{C}$]), measure the temperature at the sensor location, allowing time for the thermometer to stabilize before reading. Match the thermometer reading to the outdoor temperature display at the thermostat.

TROUBLESHOOTING GUIDE

| Symptom | Possible Cause | Action |
|--|---|--|
| Display will not come on. | Thermostat is not being powered. | <ul style="list-style-type: none"> ¥ Check that C terminal is connected to the system transformer. ¥ Check for 24 Vac between C and R or RH terminals. If missing 24 Vac: check if the circuit breaker is tripped reset the circuit breaker. check if the system fuse is blown replace the fuse. check if the power switch on the HVAC equipment is in the Off position set to the On position. check wiring between thermostat and HVAC equipment replace any broken wires and tighten any loose connections. If 24 Vac is present, proceed with troubleshooting. |
| | Thermostat microprocessor is locked up. | Remove the thermostat from the wallplate for 2 minutes. After 2 minutes, replace the thermostat on the wallplate. |
| Temperature display is incorrect. | Room temperature display has been reconfigured. | Enter Installer Setup mode number 37 and reconfigure the display. |
| | Thermostat is configured for °F or °C display. | Enter Installer Setup mode number 14 and reconfigure the display. |
| | Bad thermostat location. | Relocate the thermostat. |
| Temperature settings will not change. (Example: Cannot set the heating higher or the cooling lower.) | The upper or lower temperature limits were reached. | Check the temperature setpoints: <ul style="list-style-type: none"> ¥ Heating limits are 40° to 90°F (4.5° to 32°C) ¥ Cooling limits are 48 to 99°F (9° to 35°C). |
| | The setpoint temperature range stops were configured. | Check Installer Setup mode numbers 34 and 35 and reconfigure the setpoint stops. |
| Heating will not come on. | No power to the thermostat. | <ul style="list-style-type: none"> ¥ Check that C terminal is connected to the system transformer ¥ Check for 24 Vac between C and R or RH terminals. If missing 24 Vac: check if the circuit breaker is tripped reset the circuit breaker. check if the system fuse is blown replace the fuse. check if the system switch at the equipment is in the Off position set to On position. check wiring between thermostat and HVAC equipment replace any broken wires and tighten any loose connections. If 24 Vac is present, proceed with troubleshooting. |

(continued)

Troubleshooting Guide (continued)

| Symptom | Possible Cause | Action |
|---|---|--|
| Heating will not come on (continued). | Thermostat minimum off time is activated. | Wait up to five minutes for the system to respond. |
| | System selection is not set to Heat. | Set system selection to Heat. |
| | O/B terminal configured incorrectly. | Check Installer Setup mode number 29 and reconfigure correctly. |
| | O or B terminal miswired | Check system description to determine whether changeover should be energized in heat (B) or cool (O). Rewire if necessary. |
| Cooling will not come on. | No power to the thermostat. | ¥ Check that C terminal is connected to the system transformer. ¥ Check for 24 Vac between C and R or RC and Y terminals. If missing 24 Vac: check if the circuit breaker is tripped reset the circuit breaker. check if the system fuse is blown replace the fuse. check if the system switch at the equipment is in the Off position set to the On position. check wiring between thermostat and HVAC equipment replace any broken wires and tighten any loose connections. If 24 Vac is present, proceed with troubleshooting. |
| | Thermostat minimum off time is activated. | ¥ Wait up to five minutes for the system to respond. ¥ Enter Installer Setup mode number 33. Reconfigure minimum off time (if required). |
| | System selection is not set to Cool. | Set system selection to Cool. |
| | O/B terminal configured incorrectly. | Check Installer Setup mode number 29 and reconfigure correctly. |
| | O or B terminal miswired. | Check system description to determine whether changeover should be energized in heat (B) or cool (O). Rewire if necessary. |
| System On indicator is lit, but no heat is being delivered. | Heating equipment is not operating. | Verify operation of heating equipment in self-test. |