T8511G,R Microelectronic Heat Pump Thermostats

TRADELINE®

INSTALLATION INSTRUCTIONS

APPLICATION

The T8511 Microelectronic Heat Pump Thermostat provides electronic control of 24 Vac two-stage heating and one-stage cooling heat pump systems. Refer to Table 1 for a general description of the thermostat. All T8511 Thermostats require a common wire to supply power.

Table 1. Description of T8511 Thermostats.

T8511	Changeover	System Selection	Fan Selection	Comments
G	Automatic	Em. Heat-Heat-Off-Auto-Cool	On-Auto	System and fan selections are by keyboard.
R	Manual	Em. Heat-Heat-Off-Cool	On-Auto	System and fan selections are by switches.

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.

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

INSTALLATION

When Installing this Product...

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

Electrical Shock or Equipment Damage Hazard. Can shock individuals or short equipment circuitry.

Disconnect power supply before installation.

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.

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.

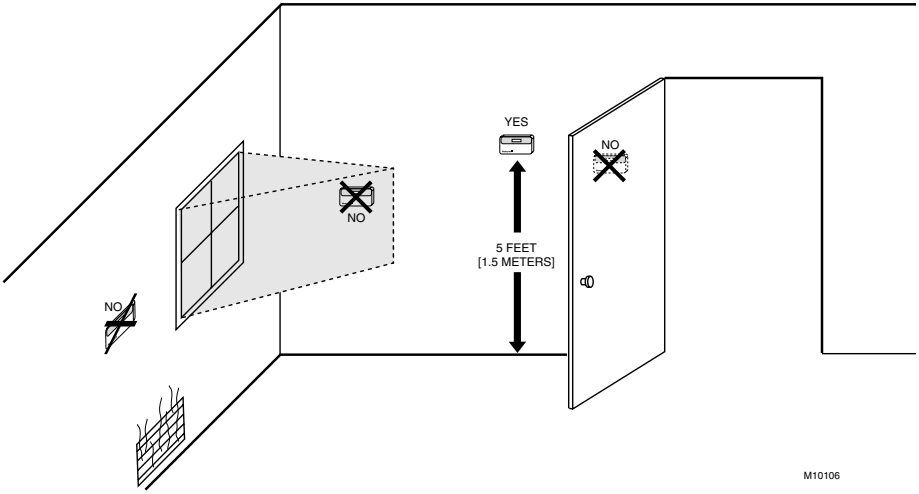


Fig. 1. Typical location of thermostat.

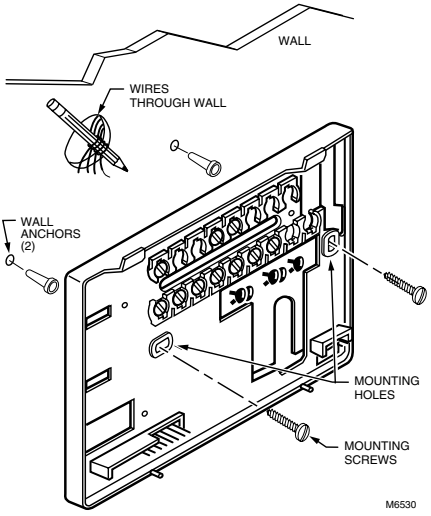


Fig. 2. Mounting the wallplate.

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 Fig. 3 through 5 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. 6.

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.

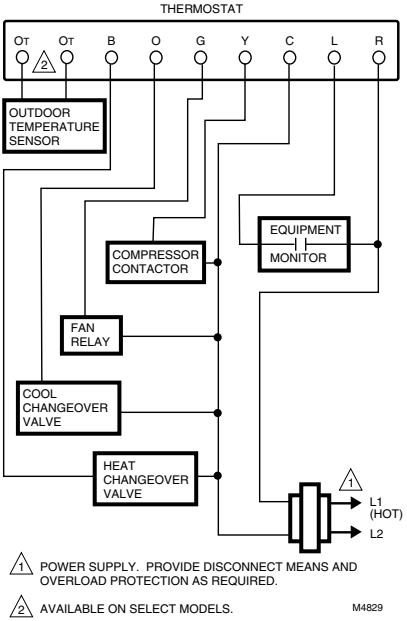


Fig. 3. Typical hookup in heat pump application.

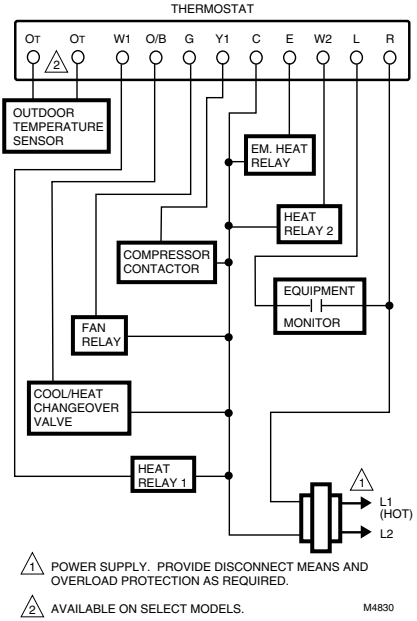


Fig. 5. Typical hookup in heat pump application with emergency heat relay and O/B terminal.

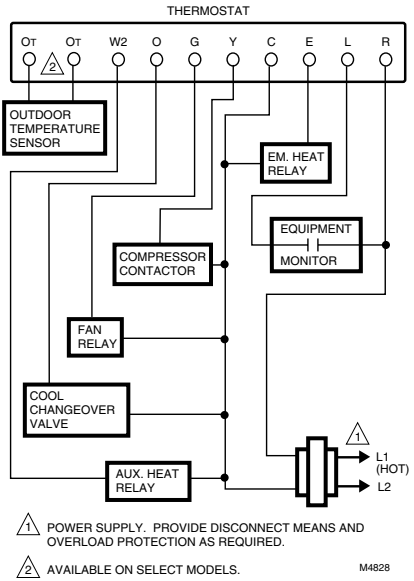


Fig. 4. Typical hookup in heat pump system with emergency heat relay.

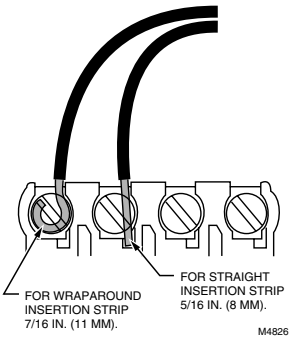


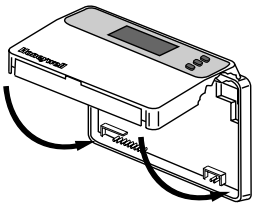
Fig. 6. Proper wiring technique.

Mounting Thermostat

1. Engage tabs at the top of the thermostat and wallplate. See Fig. 7.

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.

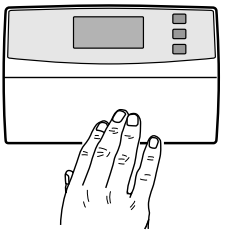


Fig. 7. Mounting thermostat on wallplate.

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 are used to:
- set temperature,
- display present setting,
- configure Installer Setup,
- check System-Test,
- display outdoor temperature (select models).

The T8511G has keys to:
- set the system operation,
- set the fan operation.

See Fig. 8 for the key information.

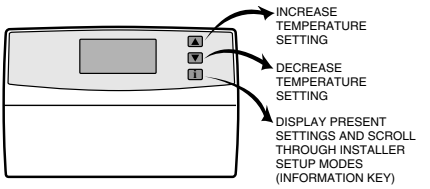


Fig. 8. Thermostat key locations and descriptions.

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 Figs. 9 and 10.

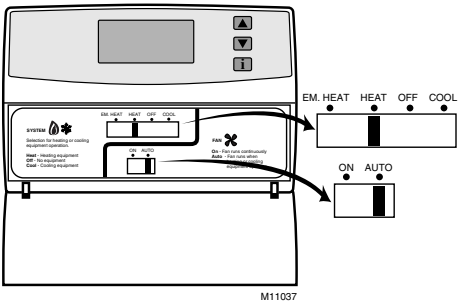


Fig. 9. T8511R (manual changeover) system and fan switches location.

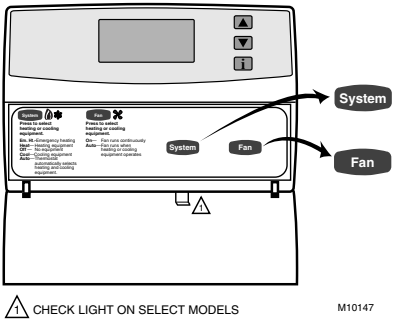


Fig. 10. T8511G (automatic changeover) system and fan keys location.

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 [i] 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 for the T8511.

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 [i] 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. 11 and 12.
— To advance to the next Installer Setup, press the Information [i] key.
— To change a setting, use the increase ▲ or decrease ▼ key.
— To exit the Installer Setup, press and hold the Information [i] 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 presses are made for five minutes.

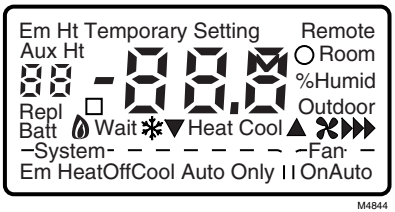


Fig. 11. Display of all the segments of the LCD.

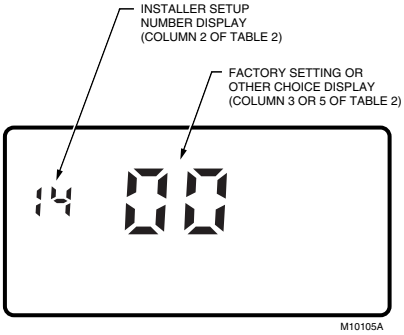


Fig. 12. Display of Installer Setup and setting.

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	—	Not used			—
	07	09	Emergency heat		06—6 cph used for conventional systems 09—9 cph used for electric heat systems	
Not used	08 thru 11	—	—	—	—	—
Changeover (T8511G only)	12	01	Manual changeover	00	00—Automatic changeover	
Not used	13	—	—	—	—	—
Degree temperature display	14	00	Temperature is displayed in °F	01	Temperature is displayed in °C	
Not used	15 thru 18	—	—	—	—	—

[a] The cycle rate for the last stage of heat is adjustable with 6 being the factory setting.

(Continued)

Table 2. Thermostat Installer Setup Options (Continued).

Select	Installer Setup Number (Press i key to change)	Factory-Setting		Other Choices (Press ▲ or ▼ key to change)		Actual Setting
		Display	Description	Display	Description	
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	00	No outdoor temperature is displayed	01	Outdoor temperature is displayed. Needs a C7089B1000 Outdoor Sensor to operate.	
Not used	25 thru 28	—	—	—	—	—
O/B terminal energized in heating or cooling	29	00	O/B terminal is energized for reversing valve in cooling	01	O/B terminal is energized for reversing valve in heating	
Not used	30 thru 32	—	—	—	—	—
Minimum off time for the compressor	33	05	5 minute minimum off time for the compressor	00, 01, 02, 03 or 04	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°F	40 thru 90	Number can be set anywhere between 40 and 90 in 1°F increments	
Cooling setpoint range stop	35	45[a]	Cooling setpoint can be set no lower than 45°F[a]	45[a] thru 99	Number can be set anywhere between 45[a] and 99 in 1°F increments	
System On display	36	00	LCD On symbol is displayed when system is energized	01	Display is disabled, usually set for 01 for a zoned system	
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	

[a] T8511G is 48°F.

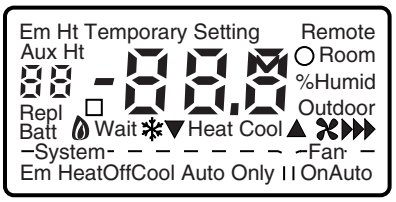
INSTALLER SYSTEM-TEST

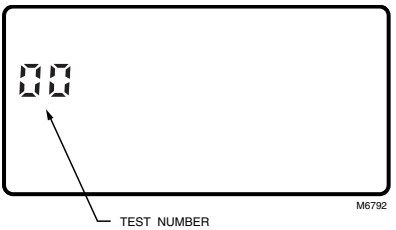
Use the Installer System-Test to check the thermostat configurations and operation. Refer to Table 3 for a list of the available system-tests.

To start the system-test:

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

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





NOTE: Press and hold the increase ▲ and decrease ▼ keys for three seconds to exit the system-test. The system-test times out after five minutes without any key presses.

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 the directions and results of the specific tests.

Table 4. Installer System-Test Options.

Key To Press	Test Number	Description
Heating Equipment System-Test		
i	10	Enter heating equipment system-test. (Set T8511R system switch to HEAT and fan switch to AUTO.)
▲	11	Stage-one heat comes on. The system fan is also energized.
▲	12	Stage-two heat comes on. Stage-one heat and system fan remain on.
▼	11	Stage-two heat turns off.
▼	10	Stage-one heat and system fan turn off.
Emergency Heating Equipment System-Test[a]		
i	20	Change from heating to emergency heating equipment system-test. (Set T8511R system switch to EM. HT.)
▲ [b]	21	Emergency heat comes on. System fan also comes on.
▼ [b]	20	Emergency heat turns off. (Set T8511R system switch to OFF.)
Cooling Equipment System-Test		
i	30	Change from heating or emergency heating to cooling equipment system-test. (Set T8511R system switch to COOL.)
▲	31	Stage-one cooling and system fan come on.
▼	30	Stage-one cool and system fan turn off.

[a] Available on select models.
[b] T8511R models with fixed emergency heat output will not respond to this key press.

(Continued)

Table 4. Installer System-Test Options. (Continued)

Key To Press	Test Number	Description
Fan Equipment System-Test (T8511G only)		
i	40	Change from cooling to fan equipment system-test.
▲	41	Fan comes on.
▼	40	Fan turns off.
T8511G System Key or T8511R System Switch Operation System-Test ***IMPORTANT*** *Test numbers will only be displayed when the system is configured for the selected function.* *EXAMPLE: Numbers 60, 61 and 62 are the only numbers that will be displayed when a system is configured for heat only.*		
SYSTEM KEY OR SWITCH SYSTEM-TEST (When system switch is used, move switch to see Test Number.)		
i	60	Change from fan to key operation system-test.
System	61	Heat Test number is displayed. (Set T8511R system switch to HEAT.)
System	62	Off Test number is displayed. (Set T8511R system switch to OFF.)
System	63	Cool Test number is displayed. (Set T8511R system switch to COOL.)
System	64	Auto Test number is displayed.
System	65	Emergency heat Test number is displayed. (Set T8511R system switch to EM.HT.) NOTE: Press system key again to repeat the System Key System-Test.
FAN KEY SYSTEM-TEST (T8511G only)		
Fan	68	Fan on Test number is displayed.
Fan	69	Fan off Test number is displayed.

Thermostat Information

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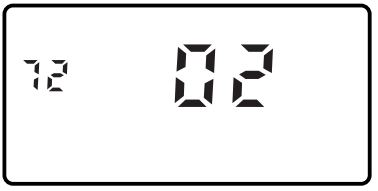
3. Press the increase ▲ key again to display the software identification code. (Example: 02 = software ID code 2)



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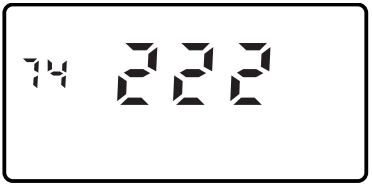
5. Press the increase ▲ key again to display the EEPROM identification code.
(Example: 222 = EEPROM ID 222)



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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 presses.

CHECKOUT

Outdoor Temperature Sensor (Where Applicable)

Allow the outdoor temperature sensor to soak in the outdoor air for a minimum of five minutes before taking a reading. With an accurate thermometer (±1°F [±0.5°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.	• 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 [a].	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: • Heating limits are 40 to 90°F (4.5 to 32°C) • T8511R cooling limits are 45 to 99°F (7 to 35°C) and T8511G cooling limits are 48 to 99°F
	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.	• 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.

[a] Available on select models.

(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[a].	Check Installer Setup mode number 29 and reconfigure correctly.
	O or B terminal miswired[a].	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[a].	Check Installer Setup mode number 29 and reconfigure correctly.
	O or B terminal miswired[a].	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.

[a] Available on select models.

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