



Digital Programmable

Thermostats

Owner's Manual & Installation Instructions

RAK148P1

RAK164P1

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As an ENERGY STAR® partner, GE has determined that this product meets the ENERGY STAR® guidelines for energy efficiency.

Important safety information.

⚠ WARNING! *Always turn off power at the main power supply before installing, cleaning or removing the thermostat.*

- *This thermostat is for 24 VAC applications only. Do not use on voltages over 30 VAC.*
- *All wiring must conform to local and national electrical and building codes.*
- *Do not use air conditioning when the outdoor temperature is below 50 degrees; this can damage your A/C system and cause personal injuries.*
- *Use this thermostat only as described in this manual.*

Specifications.

Electrical rating: • 24 VAC (18–30 VAC)

- 1 amp maximum per terminal
- DC Power: 3.0 VDC (2 “AA” batteries included)
- 4 amp maximum total load

Operating temperature range: 40°F–99°F (4°C–37°C)

Temperature set range: 60°F–85°F (15°C–29°C)

Accuracy: ± 1°F (± 0.5°C)

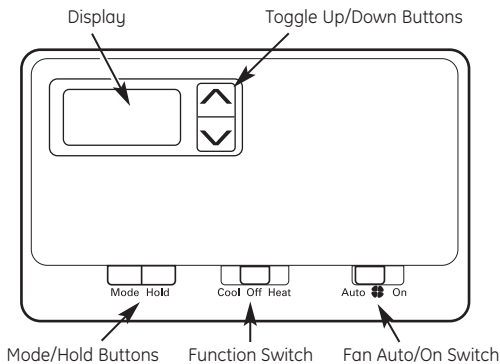
System configurations: 2-stage heat (RAK148P1 heat pump/resistance heat); 1-stage heat (RAK164P1 resistance heat); 1-stage cool

Timing: Anti-short cycle: 3 minutes (minimum compressor run time/off time). **Note:** There may be a 3 minute minimum fan run time/off time on some models.

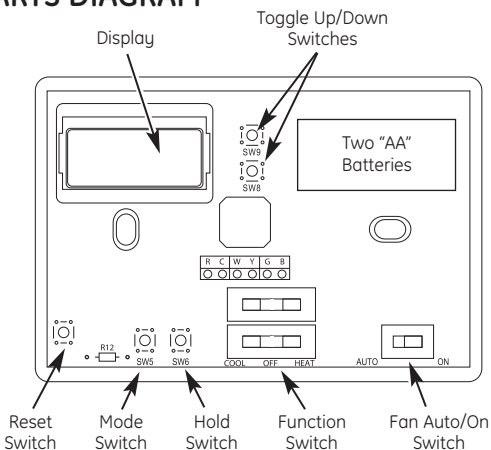
Terminations: R, C, W, Y, G, B (RAK148P1);
R, C, W, Y, G (RAK164P1)

INTRODUCTION OVERVIEW

THERMOSTAT CONTROL



PARTS DIAGRAM



INSTALLATION INSTRUCTIONS



ELECTRICAL SHOCK HAZARD—Turn off power at the main service panel by removing the fuse or switching the appropriate circuit breaker to the OFF position before removing the existing thermostat.

PACKAGE CONTENTS/TOOLS REQUIRED

Package includes: Thermostat on base, thermostat cover, 2 “AA” batteries, wiring labels, screws and wall anchors.

Tools needed: Drill with 3/16” bit, hammer, screwdriver.

TO REMOVE EXISTING THERMOSTAT

1. Turn off power to heating and cooling system by removing the fuse or switching off the appropriate circuit breaker.
2. Remove cover of old thermostat. This should expose the wires.
3. Label the existing wires with the enclosed wire labels before removing wires.
4. After labeling wires, remove wires from wire terminals.
5. Remove existing thermostat base from wall.
6. Refer to the following section for instructions on how to install this thermostat.

TO INSTALL THERMOSTAT

IMPORTANT: *Thermostat installation must conform to local and national building and electrical codes and ordinances.*

Note: *Mount the thermostat about five feet above the floor. Do not mount the thermostat on an outside wall, in direct sunlight, behind a door or in an area affected by a vent or duct.*

TO INSTALL THERMOSTAT (cont.)

1. Turn off power to the heating and cooling system by removing the fuse or switching off the appropriate circuit breaker. Move the **Function** switch to **Off**.
2. To remove cover, insert and twist a coin or screwdriver in the slots on the sides of the thermostat.
3. Put thermostat base against the wall where you plan to mount it. Make sure wires will feed through the wire opening in the base of the thermostat.
4. Mark the placement of the mounting holes.
5. Set thermostat base and cover away from working area.
6. Using a 3/16" drill bit, drill holes in the locations you have marked for mounting.
7. Use a hammer to tap supplied anchors in mounting holes.
8. Align thermostat base with mounting holes and feed the control wires through the wire opening.
9. Use supplied screws to mount thermostat base to wall.
10. Insert stripped, labeled wires in matching wire terminals. See "Wiring Diagrams" section of this manual.

⚠ CAUTION! *Make sure exposed portion of wires does not touch other wires.*

11. Tighten screws on terminal block. Gently tug wire to be sure of proper connection. Double check that each wire is connected to the proper terminal.
12. Insert two "AA" batteries into battery holder. Verify that they are oriented as shown on battery holder.
13. Seal hole for wires behind thermostat with non-flammable insulation or putty, or use a wall plate obtainable from a local hardware or home building store.

INSTALLATION INSTRUCTIONS

TO INSTALL THERMOSTAT (cont.)

14. Replace cover on thermostat by snapping it in place.
15. Turn on power to the system at the main service panel.
16. Test thermostat operation as described in *Testing the Thermostat*.

Wiring diagrams.

Table 1: Terminals for five wires heat/cool system (RAK164P1 only)

R	C	W	Y	G
24 VAC HOT	24 VAC COMMON	AUXILIARY HEAT—ELECTRIC	COMPRESSOR	INDOOR FAN

Note: Connect G terminal of thermostat to Zoneline Gl terminal for low fan speed or terminal Gh for high fan speed. Only one can be selected.

Table 2: Terminals for six wires 2 heat/1 cool system (RAK148P1 only)

R	C	W	Y	G	B
24 VAC HOT	24 VAC COMMON	AUXILIARY HEAT—ELECTRIC	COMPRESSOR	INDOOR FAN	REVERSING VALVE (HEAT ACTIVE)

Note: Connect G terminal of thermostat to Zoneline G1 terminal for low fan speed or terminal Gh for high fan speed. Only one can be selected.

Configuration mode.

The configuration mode is used to set the RAK148P1 and RAK164P1 to match your heating/cooling system. These thermostats function with up to 2-stage heat pump systems (RAK148P1 only).

To configure the RAK148P1 and RAK164P1, perform the following steps:

Note: Operation being set will blink in the display.

1. Slide the **Function** switch to the **OFF** position.
2. Simultaneously hold the \vee and \wedge buttons in for 6 seconds while the thermostat is in **OFF** mode.
3. Press the \vee or \wedge button to change settings within each screen.
4. Press the **Hold** button to advance to the next screen.
Note: The **Mode** button will return you to the previous screen.
5. To exit configuration mode, slide the **Function** switch to **Heat** or **Cool**.

Configuration Mode Settings

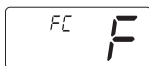
The setup screens for Configuration Mode are as follows:

1. **Temperature Scale (F or C)**—

Choose Fahrenheit or Celsius.

Press the \vee or \wedge button to select.

Press the **Hold** button to advance to the next screen.



2. **Temperature Differential**—

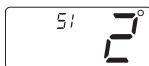
Stage 1—(1–9°F) (1–5°C)—

(Factory Setting is 2°F/1°C for Each Stage)—Set the number of

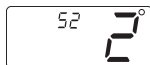
degrees between your “setpoint” temperature and your “turn on” temperature for first stage.

Press the \vee or \wedge button to set differential value.

Press the **Hold** button to advance to the next screen.



3. Temperature Differential—Stage 2—(RAK148P1 only) (1–9°F) (1–5°C)—Set the number of degrees between when stage 1 turns on and stage 2 turns on.



degrees between when stage 1 turns on and stage 2 turns on.

Press the \vee or \wedge button to set differential value.

Press the **Hold** button to advance to the next screen.

4. Minimum Cool Setpoint (60, 64, 66, 68, 70, 72, 74, 76°F) (15, 17, 19, 20, 21, 22, 23, 24°C)



Adjust to control the minimum Cool set temperature allowed.

Press the \vee or \wedge button to select.

Press the **Hold** button to advance to the next screen.

5. Maximum Heat Setpoint (65, 70, 72, 74, 76, 78, 80, 85°F) (18, 21, 22, 23, 24, 26, 27, 29°C)



Adjust to control the maximum Heat set temperature allowed.

Press the \vee or \wedge button to select.

Press the **Hold** button to advance to the next screen.

6. Room temperature offset (+9°F to -9°F) (+5°C to -5°C)



Adjust to calibrate displayed room temperature to match actual room temperature.

Press the \vee or \wedge button to select.

Press the **Hold** button to advance to the next screen.

Move the **Function** switch to **Heat** or **Cool** position to lock the settings into memory.

Operation.

The RAK148P1 and RAK164P1 thermostats have buttons that are used to:

- Adjust the setpoints of the thermostat
- Set the modes
- Program the schedule

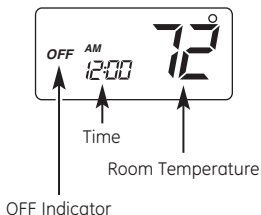
Setting the Room Temperature (Setpoint Temperature)

1. With the ***Function*** switch at ***Cool*** or ***Heat***, the current temperature setpoint displays.
2. Press the \vee or \wedge button until the desired temperature setpoint displays.
3. The new temperature setpoint is automatically saved in memory.

Starting the thermostat.

⚠ CAUTION! Do not use air conditioning when the outdoor temperature is below 50 degrees. This can damage your air conditioning system and cause personal injuries.

1. Move the **Fan Auto/On** switch to the **Auto** position. **On** position runs indoor fan continuously.
2. Move the **Function** switch to **Cool** or **Heat**, depending on the season.



Testing the thermostat.

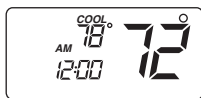
Once the thermostat is installed, it should be thoroughly tested.

⚠ CAUTION! Do not use air conditioning when the outdoor temperature is below 50 degrees. This can damage your air conditioning system and cause personal injuries.

Note: Before testing the thermostat, move the **Fan Auto/On** switch to the **Auto** position.

Cool Test

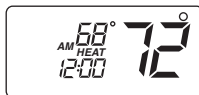
1. Slide **Function** switch to **Cool** position. **Cool** mode screen is displayed.
2. Adjust set temperature so it is 5 degrees below room temperature.
3. Air conditioning should come on within a few seconds.
4. Adjust the set temperature so it is 2 degrees above the room temperature and the A/C should turn off. **Note:** There is a 3 minute time delay and a 3 minute minimum run time for the compressor when it turns on/off. (On some models, the fan may also have a 3 minute minimum run time/off time delay.)



Testing the thermostat.

Heat Test

1. Slide **Function** switch to **Heat** position. **Heat** mode screen is displayed.
2. Adjust set temperature so it is 5 degrees above room temperature.
3. Heat should come on within a few seconds.
4. Adjust the set temperature so it is 2 degrees below the room temperature and the heat should turn off. **Note:** There is a 3 minute time delay and a 3 minute minimum run time for the compressor when it turns on/off. (On some models, the fan may also have a 3 minute minimum run time/off time delay).



Note: "Quick Heat Recovery" is activated each time the thermostat is switched from **Off** or **Cool** modes to **Heat** mode. Electric heaters are energized until the thermostat set point is reached. Heat pump operation will resume at next call for heat (heat pump only).

Fan Test

1. Slide **Fan Auto/On** switch to **On** position.
2. Indoor fan turns on.
3. Slide **Fan Auto/On** switch to **Auto** position.
4. Indoor fan turns off.



Operating functions.

Off

- In this mode, the thermostat will not turn on the heating or cooling devices (manual fan can operate).
- **Off** is also used to access **Setup** and **Program** modes.



Cool

- In this mode, the thermostat controls the cooling system.
- Press the **Mode** button to enter and exit the **Program Cool** mode.
- In **Program Cool** mode (**PROG** displays), the thermostat will follow the program schedule that is stored in memory.

Heat

- In this mode, the thermostat controls the heating system.
- Press the **Mode** button to enter/exit the **Program Heat** mode.
- In **Program Heat** mode (**PROG** displays), the thermostat will follow the program schedule that is stored in memory.

Hold

- When in **Programmable Cool** or **Programmable Heat**, you can lock in the present settings indefinitely by pressing the **Hold** button once (**PROG** flashes). Press **Hold** button again to leave **Hold** mode (**PROG** solid). For a temporary **Hold** period, raise or lower set temperature to desired set temperature. The thermostat will automatically return to programmed set temperature after 2 hours.

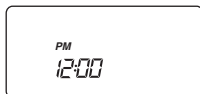
Setting the time and day of the week.

The time and day of the week must be set for your program schedule to operate correctly.

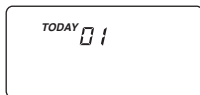
1. Slide the **Function** switch to the **Off** position.



2. Press the **Hold** button in for 6 seconds.
3. Press the \vee or \wedge button to adjust the time in hours. Press the **Hold** button once. Now press the \vee or \wedge button to adjust the time in minutes.



4. Press the **Hold** button while the time is displayed. The display shows the day currently set on the thermostat (01 = Monday, 02 = Tuesday, etc.).



5. Press the \vee or \wedge button to set the current day of the week. **Note:** Sliding the **Function** switch to **Cool** or **Heat** positions will lock the values into memory. You may also press the **Hold** button to enter your programming schedule.

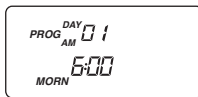
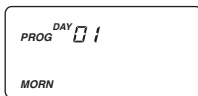
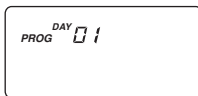
Programming.

Program Overview

The programmable thermostat has four periods (**MORN**, **DAY**, **EVE**, **NITE**) that are customizable for each day of the week. Each period will have a set time, heat temperature and cool temperature. The thermostat monitors the day and time, while maintaining the specific conditions that you have chosen for each period in your program.

Note: Operation being set will blink in the display.

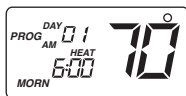
1. Place the **Function** switch in the **Off** position.
2. Press the **Hold** button in for 6 seconds.
3. Press the **Hold** button 3 times.
DAY (01–07) and **PROG** is displayed.
4. Press the \vee or \wedge button to change the day you want to program (01 = Monday, 02 = Tuesday, etc.).
5. Press the **Hold** button to advance to the next parameter.
Note: You can always press the **Mode** button to return to the previous parameter.
 - Period is displayed (**MORN**, **DAY**, **EVE**, **NITE**).
6. Press the \vee or \wedge button to change period of day. The display should blink the period of the day.
7. Press the **Hold** button to advance to the next parameter.
 - Set time is displayed.
8. Press the \vee or \wedge button to adjust hours. Press the **Hold** button once, and then press the \vee or \wedge buttons to adjust minutes.
9. Press the **Hold** button to advance to the next screen parameter. **Note:** Transitions required after 11:59 PM must be programmed in the next day's **MORN** period.



Programming.

- Heat temperature is displayed (60°F to 85°F)

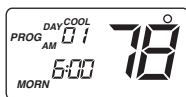
10. Press the \vee or \wedge button to adjust heat set temperature.



11. Press the **Hold** button to advance to the next screen.

- Cool temperature is displayed (60°F to 85°F)

12. Press the \vee or \wedge button to adjust cool set temperature.



13. Press the **Hold** button to advance to the next screen.

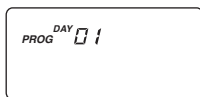
Repeat steps 1–13 to program each day of the week individually or follow the instructions below to program every day the same as Monday. When programming is complete, slide the **Function** switch to **Heat** or **Cool** to exit **Programming Mode**.

Repeat Programming

Once the entire Monday (Day 01) schedule is set, the following procedure can be used to copy the Monday schedule for every day of the week.

After the complete Monday schedule is set (see *Programming*, above), you will be at the **"Day"** screen:

1. Press the \vee button once. Day 01 screen displays.
2. Press the \vee button and hold for 2 seconds. The days of the week stop flashing, locking the settings into memory. Once the schedule is locked in, you can go through each day and make any required changes. This feature speeds up the programming of the standard weekday/weekend schedule.
3. Slide the **Function** switch to **Heat** or **Cool** to exit **Programming Mode**.



Factory preprogramming.

The programmable thermostat comes preprogrammed with the following schedule:

MONDAY	MORN	6:00 AM	DAY	8:00 AM	EVE	6:00 PM	NITE	10:00 PM
<i>thru</i>	HEAT	70°F	HEAT	62°F	HEAT	70°F	HEAT	62°F
SUNDAY	COOL	78°F	COOL	85°F	COOL	78°F	COOL	82°F

Use the following personal program schedule to record your settings:

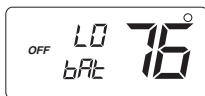
MONDAY 01	MORN		DAY		EVE		NITE	
	HEAT		HEAT		HEAT		HEAT	
	COOL		COOL		COOL		COOL	
TUESDAY 02	MORN		DAY		EVE		NITE	
	HEAT		HEAT		HEAT		HEAT	
	COOL		COOL		COOL		COOL	
WEDNESDAY 03	MORN		DAY		EVE		NITE	
	HEAT		HEAT		HEAT		HEAT	
	COOL		COOL		COOL		COOL	
THURSDAY 04	MORN		DAY		EVE		NITE	
	HEAT		HEAT		HEAT		HEAT	
	COOL		COOL		COOL		COOL	
FRIDAY 05	MORN		DAY		EVE		NITE	
	HEAT		HEAT		HEAT		HEAT	
	COOL		COOL		COOL		COOL	
SATURDAY 06	MORN		DAY		EVE		NITE	
	HEAT		HEAT		HEAT		HEAT	
	COOL		COOL		COOL		COOL	
SUNDAY 07	MORN		DAY		EVE		NITE	
	HEAT		HEAT		HEAT		HEAT	
	COOL		COOL		COOL		COOL	

Low battery indicator.

The programmable thermostats with battery backup have a low battery warning screen. Please note that the low battery warning will not display while in a programming mode or settings menu. The following are the only locations where the low battery warning may occur.

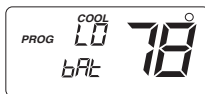
Low battery warning, Off mode

The thermostat will display a low battery indication. The display will toggle between the normal display and the low battery indication.



Low battery warning, Cool mode

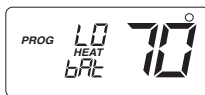
The thermostat will display a low battery indication. The display will toggle between the normal **Cool** mode display or program **Cool** mode display and the low battery indication.



(Program **Cool** Mode Low Battery Indication Shown)

Low battery warning, Heat mode

The thermostat will display a low battery indication. The display will toggle between the normal **Heat** mode display or program **Heat** mode display and the low battery indication.



(Program **Heat** Mode Low Battery Indication Shown)

Combination failure (power failure & low battery).

The programmable thermostats with battery backup also will indicate a combination failure; that is, both a low battery condition as well as a power failure condition. After the power is restored, the following may be indicated:

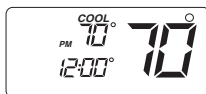
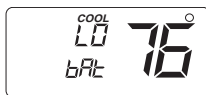
Combination failure, Off mode

The thermostat will display a low battery indication, as well as a power failure indication ("12:00"). The display will toggle between the low battery screen and the "12:00" screen.



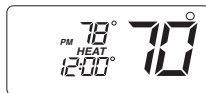
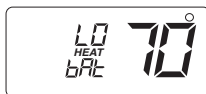
Combination failure, Cool mode

The thermostat will display a low battery indication, as well as a power failure indication ("12:00"). The display will toggle between the low battery screen and the "12:00" screen (Non-Program **Cool** Mode Shown).



Combination failure, Heat mode

The thermostat will display a low battery indication, as well as a power failure indication ("12:00"). The display will toggle between the low battery screen and the "12:00" screen (Non-Program **Heat** Mode Shown).



Troubleshooting tips.

Problem	Solution
No display	Check for 24 VAC at thermostat; display is blank when 24 VAC is not present.
System fan does not come on properly	Verify that wiring is correct.
All thermostat buttons are inoperative	Verify that 24 VAC is present; unit locks out when 24 VAC is not present.
Thermostat turns on and off too frequently	Adjust temperature differential (see <i>Setting a New Temperature Differential</i>).
Program schedule activates at the wrong time	Check time (AM/PM) set on thermostat (see <i>Programming</i>).
Thermostat does not follow program	Verify that it is in Program mode; PROG displays solid; check time (AM/PM); check if in Hold mode (PROG flashing).
"PROG" flashes (in Hold mode)	Press Hold button to remove from Hold mode.
Fan runs continuously	Check Fan Auto/On switch. If set to ON position, fan will run continuously.
Room temperature is not correct	Verify that wall hole is plugged with putty or insulation.
Compressor doesn't run or turn off immediately when changing function or setting	There is a 3 minute time delay and a 3 minute minimum run time for the compressor when it turns on/off.
Fan doesn't run or turn off immediately when changing function or setting	This is normal. On some models, the fan may have a 3 minute minimum run time/off time delay.
"LO bat" displays on screen	Replace batteries with 2 fresh "AA" alkaline batteries.
Display reads "12:00 PM"	Set clock/time.
Problem not listed above	Press the Reset button once. Reset button function: time, day and mode changed to last saved settings (saved after power loss or when exiting program setup; configuration and program settings are unchanged).

Notes.

Notes.

Notes.

Thermostat Warranty.

*Staple your receipt here.
Proof of the original purchase date is
needed to validate the warranty.*

For The Period Of: **GE Will Replace:**

One Year

*From the date of the
original purchase*

Full Replacement of the thermostat which fails
due to a defect in materials or workmanship.

What GE Will Not Cover:

- Service trips to your location.
- Improper installation. If you have an installation problem, contact your installer. You are responsible for providing adequate electrical connections to the product.
- Failure of the product resulting from modifications to the product or due to unreasonable use, including failure to provide reasonable and necessary maintenance.
- In commercial locations, labor necessary to move the unit, after it has been initially installed, to a location where it is accessible for service by an individual technician; or, if the instructions included in this manual have been disregarded.
- Replacement of location fuses or the resetting of circuit breakers.
- Damage to the product caused by improper power supply voltage, accident, fire, floods or acts of God.
- Incidental or consequential damage caused by possible defects with this thermostat.

EXCLUSION OF IMPLIED WARRANTIES—Your sole and exclusive remedy is product exchange as provided in this Limited Warranty. Any implied warranties, including the implied warranties of merchantability or fitness for a particular purpose, are limited to one year or the shortest period allowed by law.

This warranty is extended to the original purchaser and any succeeding owner for products purchased for use within the USA and Canada. In Alaska, the warranty excludes the cost of shipping or service calls to your site.

Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state or province to province. To know what your legal rights are, consult your local, state or provincial consumer affairs office or your state's Attorney General.

Warrantor: General Electric Company, Louisville, KY 40225