# Installation Instructions

**Designed and Assembled in the USA.**

A14644

**Universal Application Non-Programmable Thermostat**

**NOTE**: Read the entire instruction manual before starting the installation.

## TABLE OF CONTENTS

## SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency muse use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and the current editions of the National Electrical Code (NEC) NFPA 70.

In Canada, refer to the current editions of the Canadian Electrical Code CSA C22.1.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in the instructions or manuals, be alert to the potential for personal injury.

Understand the signal words **DANGER**, **WARNING**, and **CAUTION**. These words are used with the safety-alert symbol. **DANGER** identifies the most serious hazards which **will** result in severe personal injury or death. **WARNING** signifies a hazard which **could** result in personal injury or death. **CAUTION** is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

## INTRODUCTION

The MODEL-21NHP Universal Application non-programmable thermostat can be configured for either AC or HP applications. Both modes are dual-powered, operating from either 24VAC or two alkaline AA batteries. Configuration settings are stored in non-volatile memory, preserving this information during power loss and battery removal. Features include large backlit display and modern styling.

When AC application is selected, one stage of heating and one stage of cooling are provided.

When HP application is selected, two stages of heating and one stage of cooling are provided.

## INSTALLATION CONSIDERATIONS

The MODEL-21NHP, whether configured for A/C or HP application, may be wired with or without connecting a common wire between the indoor equipment and the thermostat. However, it is recommended to use a common wire whenever possible.

Without a common wire, batteries must be installed. However, battery power will be supplemented by "power stealing."

This means the thermostat will steal a small amount of power from the equipment to which it is connected. This will also keep it powered while changing the batteries.

**NOTE**: Not all HVAC equipment is compatible with power-stealing type thermostats. Consult the system equipment Installation Instructions before applying this thermostat in a power stealing manner.

If both batteries and 24VAC operation are used (batteries installed and the common wire connected), indefinite clock operation is provided. The battery will be used only during AC power loss, preserving battery life.

# INSTALLATION

## Step 1 — Thermostat Location

Thermostat should be mounted:
- Approximately 5 ft (1.5m) from floor.
- Close to or in a frequently used room, preferably on an inside partitioning wall.
- On a section of wall without pipes or duct work.

Thermostat should NOT be mounted:
- Close to a window, on an outside wall, or next to a door leading to the outside.
- Exposed to direct light and heat from the sun, a lamp, fireplace, or other heat-radiating object which may cause a false reading.
- Close to or in direct airflow from supply registers and return-air grilles.
- In areas with poor air circulation, such as behind a door or in an alcove.

## Step 2 — Install Thermostat

**IMPORTANT**: Install batteries last to ensure proper thermostat mounting and latch engagement.

---

### ⚠ WARNING

**ELECTRICAL SHOCK HAZARD**

Failure to follow this warning could result in personal injury or death.

Before installing thermostat, turn off all power to unit. There may be more than one disconnect.

---

1. Turn OFF all power to unit.
2. If an existing thermostat is being replaced:
   a. Remove existing thermostat from wall.
   b. Disconnect wires from existing thermostat, one at a time. Be careful not to allow wires to fall back into wall.
   c. As each wire is disconnected, record wire color and terminal marking.
   d. Discard or recycle old thermostat.

---

### ⚠ CAUTION

**ENVIRONMENTAL HAZARD**

Failure to follow this caution may result in environmental damage.

Mercury is a hazardous waste. Federal regulations require that mercury be disposed of properly.

---

3. Separate front and back (mounting base) assembly of thermostat.
4. Route thermostat wires through hole in mounting base. Level mounting base against wall (for aesthetic value and optimum air flow, the thermostat need not be level for proper operation) and mark wall through 2 of the available mounting holes.
5. Drill two 3/16-in. (5 mm) mounting holes in wall where marked.

6. Secure mounting base to wall with 2 anchors and screws provided, making sure all wires extend through hole in plastic.

**NOTE**: Anchoring the mounting base will ensure proper mounting and allow latch to fully engage.

7. Strip 1/4 in. insulation from thermostat wire and adjust length to reach terminal block connector on mounting base. Match and connect wires to proper terminal location in accordance with wiring diagrams.
8. Push any excess wire back into wall. Seal hole in wall to prevent air leaks. Leaks can affect thermostat operation. Any excess wire left inside thermostat casing may also affect thermostat operation by interfering with airflow across the temperature sensor.
9. Locate jumper marked J2 on circuit board. If common (C) wire has been connected, put J2 in the "24VAC" position. If no common wire leave J2 in the default "BATT" position.
10. Set the thermostat front housing into the (2) notches on the bottom of the mounting plate.
11. Rotate the front housing forward and snap into place, making sure terminal block connector aligns and assembly is secure.
12. Remove the branded faceplate and insert batteries provided.
13. Replace branded faceplate.
14. Turn ON power to unit.

On power up, the LCD readout will display AC, as this is the default equipment type.

## Step 3 — Set Thermostat Configuration

Configuration options allow the installer to configure the thermostat for a particular installation.

These selections are intended to be made at installation and normally are not modified by the homeowner. Below is a list of available options followed by a description of each one.

Option 01 - Equipment type

Option 03 - Fahrenheit/Centigrade operation

Option 04 - Enable fan (G) on with heat W output

Option 10 -O (reversing valve) On with Heat or cool (present only when configured for HP applications)

Option 13 - Room air temperature offset adjustment

Option 15 -Auto Changeover. "OF" means AUTO Mode is off. "ON" means AUTO MODE is on. Default = OF.

**To Enter The Configuration Mode:**

Press and hold FAN button for approximately 10 sec until room temperature disappears and the display reads "01". You are now in configuration mode.

**NOTE**: If FAN button is pressed again, or if no button is pressed for 3 minutes, the thermostat will exit configuration mode and return to normal operation. To re-enter configuration mode, the FAN button must be pressed and held for 10 sec again.

While in the configuration mode, the temperature display is used to show both the option number and the selected choice within each option. Each press of the MODE button alternates between the option number and the selection within that option. When the configuration mode is first entered, option 01 is displayed. The UP and DOWN buttons now move between the available option numbers. Once an option number is selected, press the MODE button once to display the currently selected choice within that option. The UP and DOWN buttons now move between the available choices within that option. After the new choice is made, press the MODE button again to return to the option number display. When finished with option selections, press FAN button once to exit the configuration mode.

**Option 01 — Equipment Type**

Selections: HP, AC, PH, or PC

Meanings:

> PH or PC selects PTAC units (Packaged Terminal Air Conditioners) which are used in motel rooms and other rented spaces. When this option is selected, the display shows only the setpoint, not the room temperature. Also the compressor timeguard is disabled, allowing the compressor to turn on immediately when a demand is established.

HP or PH controls 1 speed heat pump with 1 stage of aux heat.

AC or PC controls 1 speed air conditioner with one stage of heat.

**Option 03 - Fahrenheit/Centigrade Selection**

This selection operates the thermostat in either Fahrenheit or Centigrade.

Selections: F = Fahrenheit — This is default.
C = Centigrade.

**Option 04 - G (fan) ON with W (Heat) Selection**

Selections: OF = G not energized with W — This is default.
ON = G energized with W.

This selection determines whether the fan (G) is to be ON or OFF when W (furnace or strip heat) is ON. Furnaces and fan coils which manage their own blowers do not require a separate G signal. Some auxiliary heaters require a separate G signal to operate the blower when W is applied.

**Option 10 - Reversing valve**

Applies only when configured for HP application.

Selections: C = reversing valve energized in cooling —This is default.

H = reversing valve energized in heating

**Option 13 - Room Air Temperature Offset**

Selections: ±5°F/±3°C. Default is 0.

The number of degrees to be added to the displayed temperature to calibrate or deliberately miscalibrate the measured room temperature. The selected number is the number of degrees, plus or minus, which will be added to actual temperature. This option is in °F even if Option 3 is set for °C.

**Option 15 - Auto Changeover**

Selections: ON, OF — Default is OF.

The heat setpoint and cool setpoint are separated by a minimum of 2 degrees. This feature allows the thermostat to automatically change between heating and cooling mode when a demand has been present in the opposite mode for a period of 20 minutes.

Manually changing either the cooling or the heating setpoint will allow an auto changeover to occur without the 20 minute time constraint.

**Option 21 - Keypad Lockout**

Selections: ON, OF — Default is OF.

With OF selected, the keypad cannot be locked. With ON selected the keypad will lock after 3 min of inactivity. When locked, any key press will result in "OF" being displayed on the screen to indicate that manual input is not allowed. To unlock press the UP and DOWN keys simultaneously for 5 seconds. Once unlocked, it will re-lock 3 minutes after the last key press.

## Step 4 — Thermostat Operation

### Temperature Display

Thermostat will display room temperature until UP or DOWN button is pressed. The words SET TEMP appear when these buttons are pressed, and the current setpoint is displayed. If no buttons are pressed for 5 seconds, the display will change back to show room temperature.

### Backlighting

Continuous backlighting is not available. The backlight will come on for 10 seconds after any button press. Without AC power and when the battery is low, the backlight will remain off with button presses.

### Battery Indicator

A battery indication icon on the display shows nothing, half, or low/no battery condition. If the battery is full or operation is from AC power, no icon appears. Under battery operation, if the battery is half full, a half full battery icon appears. As the battery depletes below half, the icon remains at half, but the 10 second backlight disappears. When the battery is absent or depleted, the display goes blank except for an empty battery icon and all outputs are turned off.

### Timeguard Timer

A 5-minute timeguard is built into the thermostat immediately upon power-up, and any time the compressor turns off. The compressor will not turn on until the timeguard has expired. The timeguard affects only compressor operation. Pressing UP and FAN buttons simultaneously will override the timeguard for 1 cycle. With PH or PC selected under Option 01, this timer is defeated.

### Cycle Timer

In normal heating and cooling operation the thermostat will not allow more than 4 equipment cycles per hour (or 1 cycle every 15 minutes). Both the Y and W outputs have a 15-minute timer that starts counting down when the output is turned on, (e.g., if Y output is turned on for 9 minutes and then satisfies, it cannot turn back on for another 6 minutes regardless of demand). However, pressing UP and FAN buttons simultaneously or changing the setpoint will override the timer for 1 cycle.

### Minimum On Timer

Once the equipment has turned on, it will remain on for a minimum of 3 minutes regardless of demand. However, the equipment can turn off in less than 3 minutes if a change in setpoint or a change in mode occurs.

### Staging Timer

If the thermostat is configured for a heat pump application, it has 2-stage heat capability. In normal operation there is a 15-minute delay between the first and second stages of heat. The Y output will energize first, then 15 minutes later, W is allowed to come on if the thermostat determines it is not satisfying the demand.

However, if the heating demand is greater than 5°F/3°C, there will be only a 30-second delay before bringing on W.

### Auxiliary Heat Indicator

When operating a heat pump and either auxiliary heat or emergency heat is active, the AUX HEAT icon will show on the LCD.

### Error Messages

If the room temperature sensor fails, two dashes (--) will appear in the temperature display and all heating and cooling outputs will be turned off. The thermostat must be replaced.

If the internal non-volatile memory fails, E4 will alternately flash with the temperature on the display and all heating and cooling outputs will be turned off. The thermostat must be replaced.

## Step 5 — Check Thermostat Operation

### Fan Operation

1. Press FAN button. This will start continuous fan operation. FAN ON icon will turn on.
2. Press FAN button again. This will stop continuous fan operation. FAN ON icon will turn off.

## Heating Operation

1. Press MODE button until HEAT is displayed.
2. Press UP button until LCD readout reads 3°F/2°C above room temperature. Press UP and FAN buttons simultaneously to defeat timers. Heating system should begin to operate immediately.
3. For HP applications only, press MODE button until EMHT (emergency heat) appears. Press UP and FAN buttons simultaneously to defeat timers. Emergency heating (W is ON, Y is OFF) should begin immediately.

## Cooling Operation

1. Press MODE button until COOL is displayed.
2. Press DOWN button until LCD readout reads 3°F/2°C below room temperature. Press UP and FAN buttons simultaneously to defeat timers. Cooling system should begin to operate immediately.

Table 1 shows the thermostat outputs for each available stage of heating or cooling. It may be useful in checkout or troubleshooting.
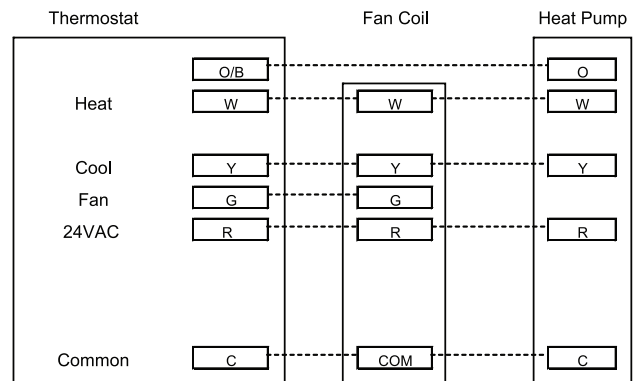
### Table 1 – Outputs

| EQUIPMENT CONFIGURATION OPTION #1 | COOL STAGE 1 | HEAT STAGE 1 | HEAT STAGE 2 | EM HEAT |
|---|---|---|---|---|
| AC, PC | Y, G | W | – – | – – |
| HP, PH RVS = C | Y, G, O/B | Y, G | Y, G, W | W |
| HP, PH RVS = H | Y, G | Y, G, O/B | Y, G, W, O/B | W |

# WIRING DIAGRAMS
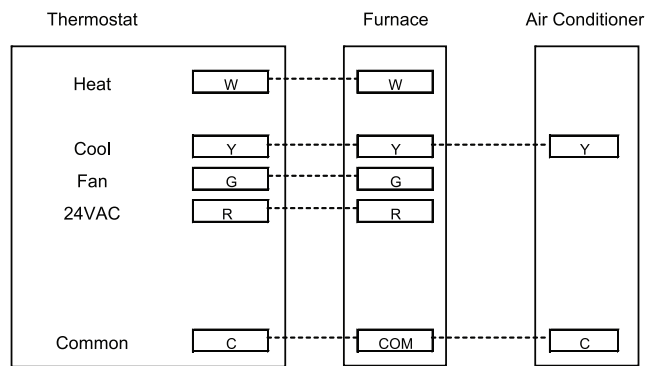


**Fig. 1 – A/C Thermostat Typical Installation**



**Fig. 2 – HP Thermostat Typical Installation**