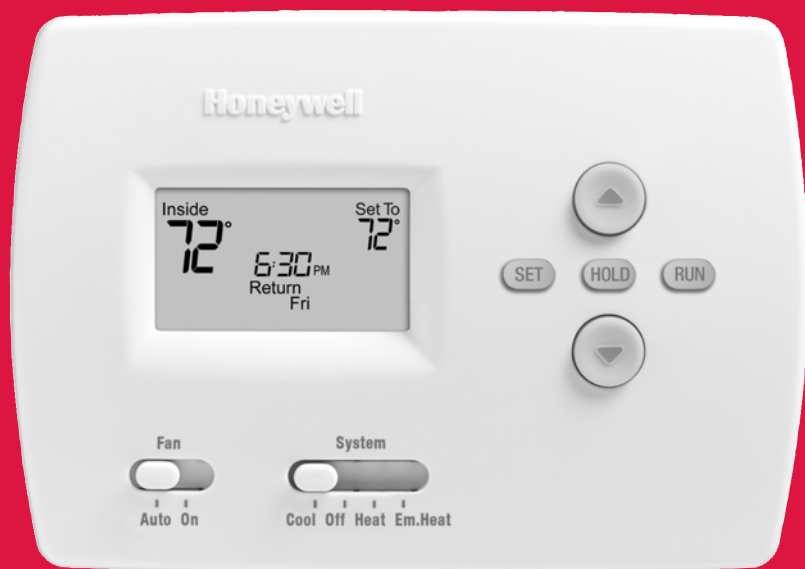


**Honeywell**

# Installation Guide



**PRO TH4210D**

Programmable Thermostat



69-1763

## Product Application

This thermostat provides electronic control of 24 VAC heat pump systems with auxiliary heat (2 heat/1 cool).

## Power Type

- Battery power
- Common wire
- Common wire with battery backup

## System Settings

- Heat, Off, Cool, Em Heat

## Fan Settings

- Auto, On

### **Must be installed by a trained, experienced technician**

- Read these instructions carefully. Failure to follow these instructions can damage the product or cause a hazardous condition.
- Check the ratings in this booklet to verify that this product is suitable for your application (see page 12).
- Always test for proper operation after installation (see pages 7-8).



#### **CAUTION: ELECTRICAL HAZARD**

Can cause electrical shock or equipment damage. Disconnect power before beginning installation.



#### **MERCURY NOTICE**

If this product is replacing a control that contains mercury in a sealed tube, do not place the old control in the trash. Contact your local waste management authority for instructions regarding recycling and proper disposal.

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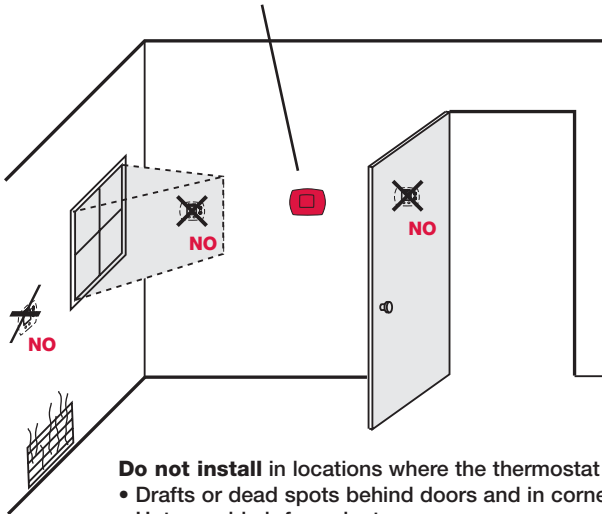
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# Installation tips

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



**Do not install** in locations where the thermostat can be affected by:

- Drafts or dead spots behind doors and in corners
- Hot or cold air from ducts
- Sunlight or radiant heat from appliances
- Concealed pipes or chimneys
- Unheated/uncooled areas such as an outside wall behind the thermostat

## Pre-installation checklist

### Package contents

Check to make sure your package includes the following items:

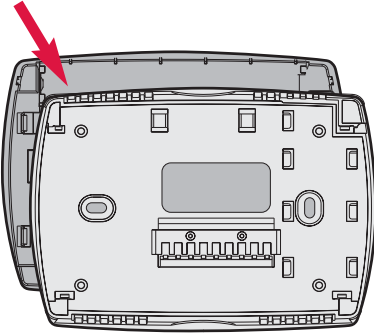
- PRO TH4210D digital thermostat (wallplate attached to back)
- Operating manual
- Wall anchors and mounting screws (2 each)
- AA alkaline batteries (2)
- Quick reference card

### Required tools & supplies

- No. 2 Phillips screwdriver
- Small pocket screwdriver
- Drill
- Drill bit (3/16" for drywall, 7/32" for plaster)
- Hammer
- Pencil
- Electrical tape
- Level (optional)

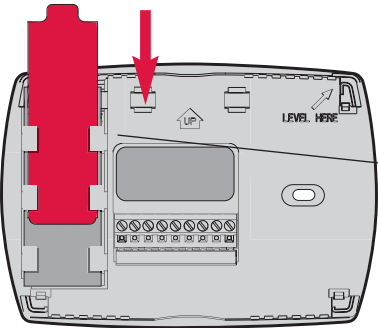
## Wallplate installation

Grasp top and bottom of wallplate and pull to remove from thermostat.



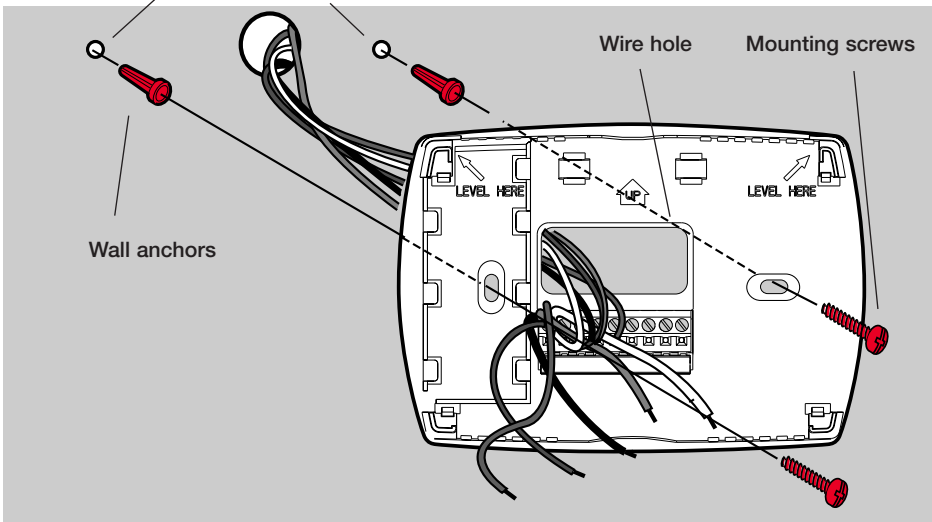
Remove the wallplate from the thermostat as shown at left, then follow directions below for mounting.

- 1 Pull wires through wire hole.
- 2 Position wallplate on wall, level and mark hole positions with pencil.
- 3 Drill holes at marked positions as shown below, then tap in supplied wall anchors.
- 4 Place wallplate over anchors, insert and tighten mounting screws.
- 5 Insert quick reference card in slot in front of wall plate.



Insert quick reference card after wallplate is mounted (see mounting instructions, below)

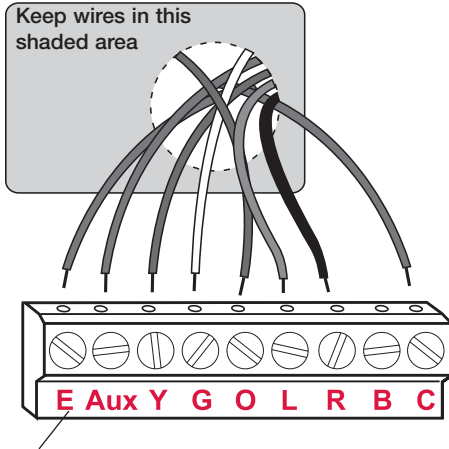
Drill 3/16" holes for drywall.  
Drill 7/32" holes for plaster.



## Wiring



**CAUTION: ELECTRICAL HAZARD.** Can cause electrical shock or equipment damage. Disconnect power before wiring.



Terminal block

### NOTES

#### C terminal

The C (common wire) terminal is optional when thermostat is powered by batteries.

#### L terminal

Heat pump reset. L terminal is powered continuously when thermostat is set to Em Heat.

#### Wire specifications

Use 18- to 22-gauge thermostat wire. Shielded cable is not required.

## Wiring

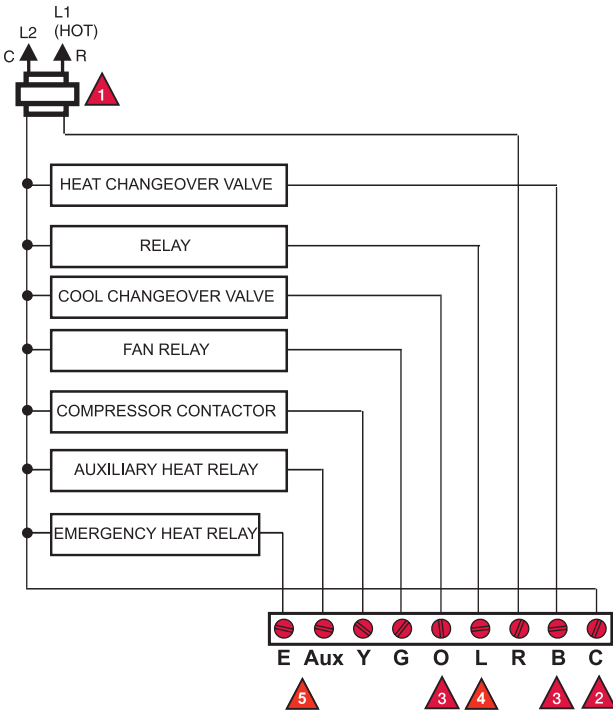
- 1 Loosen screw terminals, insert wires into terminal block, then re-tighten screws.
- 2 Push excess wire back into the wall opening. Keep wires in shaded area as shown at left.
- 3 Plug the wall opening with non-flammable insulation to prevent drafts from affecting thermostat operation.

## Terminal Designations

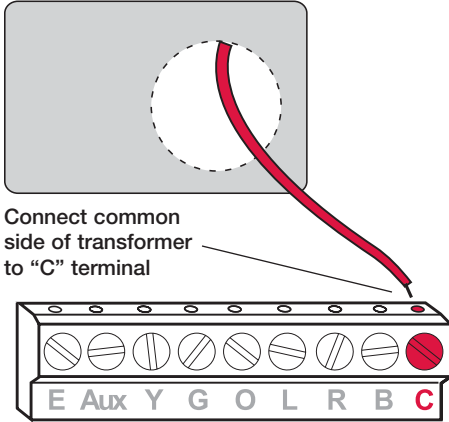
- E** Emergency heat relay.
- Aux** Auxiliary heat relay.
- Y** Compressor contactor.
- G** Fan relay.
- O** Heat pump changeover valve energized in cooling.
- L** Heat pump reset.
- R** Power wire from secondary side of system transformer.
- B** Heat pump changeover valve energized in heating.
- C** Common wire from secondary side of system transformer.

## Wiring diagram

- 1 Power supply. Provide disconnect means and overload protection as required.
- 2 Optional 24 VAC common connection.
- 3 Use either **O** or **B** terminals for changeover valve.
- 4 L terminal is powered continuously when thermostat is set to Em Heat.
- 5 Install field jumper between E and Aux if there is no emergency heat relay.



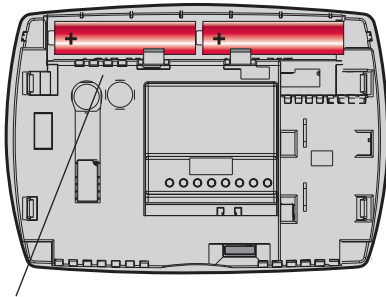
## Power options & mounting



### AC Power

The thermostat can be powered by 24 VAC power, or by batteries.

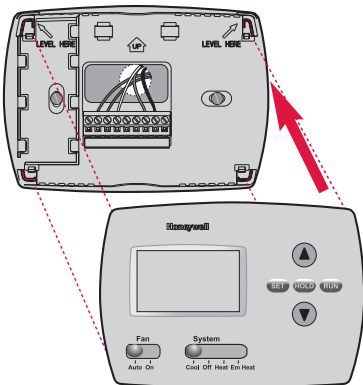
To wire the thermostat for AC power, connect the common side of the transformer to the "C" terminal as shown at left.



Install batteries in back of thermostat (optional if AC powered).

### Battery Power

The thermostat can be powered by batteries alone or, if used with AC power, can provide backup power. During power interruptions the batteries will save time/day settings and power the display.



### To Mount Thermostat

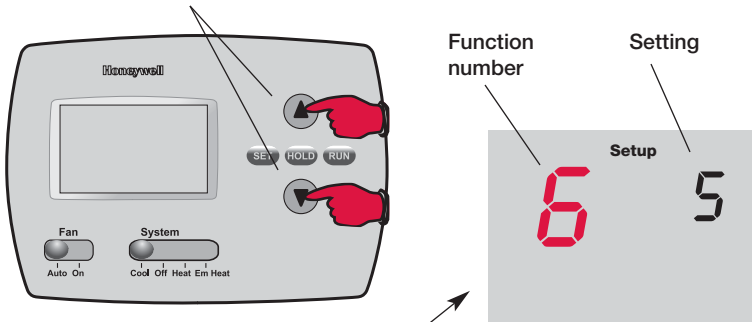
Align the 4 tabs on the wallplate with corresponding slots on the back of the thermostat, then push gently until the thermostat snaps in place.



## Installer setup

Follow the procedure below to configure the thermostat to match the installed heating/cooling system, and customize feature operation as desired.

Press and hold both buttons



To begin, press and hold the ▲ and ▼ buttons until the display changes

- Press ▼ to change settings
- Press ▲ to advance to next function
- Press and hold ▼▲ to exit and save settings

### Setup Function

- 6 Auxiliary heat cycle rate**  
(CPH: cycles/hour)
- 8 Emergency heat cycle rate** (CPH)
- 9 Compressor cycle rate** (CPH)
- 13 Adaptive Intelligent Recovery**
- 14 Temperature display**
- 15 Compressor protection**

### Settings & Options

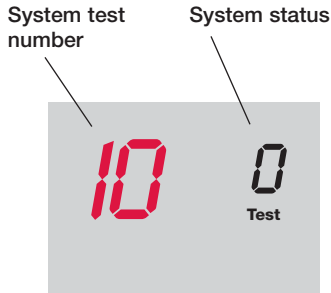
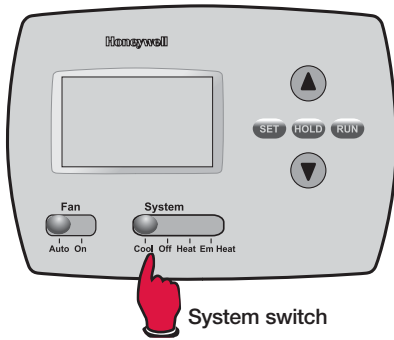
- 5 For gas or oil furnaces of less than 90% efficiency**
  - 1 For steam or gravity systems
  - 3 For hot water systems & furnaces of over 90% efficiency
  - 9 For electric furnaces
  - [Other cycle rate options: 2, 4, 6, 7, 8, 10, 11 or 12 CPH]
- 9 For electric emergency heat**
  - 1 For steam or gravity systems
  - 3 For hot water systems & furnaces of over 90% efficiency
  - 5 For gas or oil furnaces of less than 90% efficiency
  - [Other cycle rate options: 2, 4, 6, 7, 8, 10, 11 or 12 CPH]
- 3 Recommended for most compressors**  
[Other cycle rate options: 1, 2, 4, 5 or 6 CPH]
- 1 On** **\*\*See page 9**
- 0 Off**
- 0 Fahrenheit**
- 1 Celsius**
- 5 Five-minute compressor off time** **\*\*See page 9**  
[Other options: 0, 1, 2, 3 or 4-minute off time]

## Installer system test

After completing the installer setup above, press the ▲ button again to begin a system test (see next page).

## Installer system test

Follow the procedure below to test the heating and cooling system.



- 1 Set **SYSTEM** switch to Heat.
- 2 Press ▼ to turn on and check systems (see table, below).
- 3 Press ▼ until systems turn off.
- 4 Set **SYSTEM** switch to Em Heat and repeat steps 2-3 above.
- 5 Set **SYSTEM** switch to Cool and repeat steps 2-3 above.
- 5 Press and hold ▼ ▲ to terminate test at any time.

### System Test

#### 10 Heating system

- 0 Compressor and fan turn off.
- 1 Compressor and fan turn on.
- 2 Auxiliary heat turns on.

#### 20 Emergency heat

- 0 Heat and fan turn off.
- 1 Heat and fan turn on.
- 2 Auxiliary heat turns on.

#### 30 Cooling system

- 0 Compressor and fan turn off.
- 1 Compressor and fan turn on.

#### 70 Thermostat information (for reference only)

- 71 Software revision number (major revisions)
- 72 Software revision number (minor revisions)
- 73 Configuration identification code (major)
- 74 Configuration identification code (minor)
- 75 Production configuration date code (week)
- 76 Production configuration date code (year)



#### CAUTION: EQUIPMENT DAMAGE HAZARD

Compressor protection (minimum off time) is bypassed during testing. To prevent equipment damage, avoid cycling the compressor quickly.

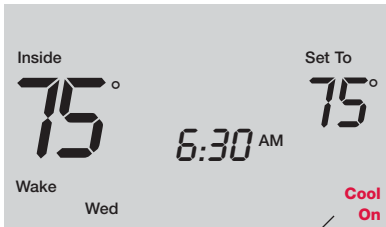
## Adaptive Intelligent Recovery™ (Setup Function 13)

Adaptive Intelligent Recovery eliminates guesswork when setting your schedule. It allows the thermostat to “learn” how long your furnace and air conditioner take to reach the temperature you want.

Just set your program schedule to the time you want the house to reach your desired temperature. The thermostat then turns on the heating or cooling at just the right time to reach your scheduled temperature at your scheduled time.

For example: Set the Wake time to 6 am, and the temperature to 70°. The heat will come on before 6 am, so the temperature is 70° by the time you wake at 6.

## Built-in compressor protection (Setup Function 15)



Message flashes until safe restart time has elapsed

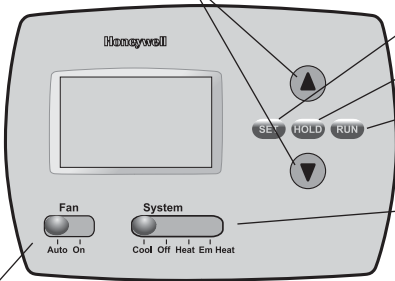
This feature helps prevent damage to the compressor.

Damage can occur if the compressor is restarted too soon after shutdown. This feature forces the compressor to wait for a few minutes before restarting.

During the wait time, the message Cool On or Heat On will flash on the display. When the safe wait time has elapsed, the message stops flashing and the compressor turns on.

## Quick reference to controls

### Temperature adjustment



- **Set:** Press to set time/day/schedule
- **Hold:** Press to override programmed temperature control.
- **Run:** Press to resume program schedule

### System switch

- **Cool:** Thermostat controls only the cooling system.
- **Heat:** Thermostat controls only the heating system.
- **Off:** Heating and cooling systems are off.
- **Em Heat:** Thermostat controls emergency and auxiliary heat. Compressor is locked out.

### Fan switch

**On:** Fan runs continuously.  
**Auto:** Fan runs only when heating or cooling system is on.

## Quick reference to display screen

A diagram of the thermostat's LCD display screen. The screen shows 'Replace Batt' at the top left, 'Inside 75°' in the center, '6:30 AM' in the middle, and 'Set To 75°' on the right. Below the temperature, it shows 'Wake Wed' and 'Em Aux Heat On'. Labels with arrows point to various elements: 'Low battery warning' points to 'Replace Batt'; 'Adaptive Intelligent Recovery' points to 'Recovery'; 'Temperature setting' points to 'Set To 75°'; 'System status' points to 'Em Aux Heat On'; 'Current inside temperature' points to '75°'; 'Current program period' points to 'Wake/Leave/Return/Sleep'; and 'Current day/time' points to 'Wed'.

## In case of difficulty

If you have difficulty with your thermostat, please try the suggestions below. Most problems can be corrected quickly and easily.

- |  |  |
|--|--|
| <b>Display is blank</b>  | <ul style="list-style-type: none"><li>• Check circuit breaker and reset if necessary.</li><li>• Make sure heating &amp; cooling power switches are on.</li><li>• Make sure equipment door is securely closed.</li><li>• If battery powered, make sure fresh AA alkaline batteries are installed.</li></ul>   |
| <b>Temperature settings do not change</b>                            | <p>Make sure heating and cooling temperatures are set to acceptable ranges:</p> <ul style="list-style-type: none"><li>• Heat: 40° to 90°F (4.5° to 32°C).</li><li>• Cool: 50° to 99°F (10° to 37°C).</li></ul>   |
| <b>Heating system does not respond (“Heat On” appears on screen)</b> | <ul style="list-style-type: none"><li>• Check for 24 Vac at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the heating equipment to find the cause of the problem.</li><li>• Check for 24 Vac between the heat terminal (Y) and the transformer common. If 24 Vac is present, the thermostat is functional. Check the heating equipment to find the cause of the problem.</li><li>• Check for loose or broken wires between the thermostat and the heating equipment.</li></ul> |
| <b>Cooling system does not respond (“Cool On” appears on screen)</b> | <ul style="list-style-type: none"><li>• Check for 24 Vac at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the cooling equipment to find the cause of the problem.</li><li>• Check for 24 Vac between the cooling terminal (Y) and the transformer common. If 24 Vac is present, the thermostat is functional. Check the cooling system to find the cause of the problem.</li><li>• Check for loose or broken wires between the thermostat and the cooling equipment.</li></ul> |
| <b>“Cool On” or “Heat On” is flashing</b>                            | <ul style="list-style-type: none"><li>• Compressor protection timeout is engaged. Wait 5 minutes for the system to restart safely, without damage to the compressor.</li></ul>   |
| <b>“Heat On” is not displayed</b>                                    | <ul style="list-style-type: none"><li>• Set the System switch to <u>Heat</u>, and set the temperature level <u>above</u> the current room temperature.</li></ul>   |
| <b>“Cool On” is not displayed</b>                                    | <ul style="list-style-type: none"><li>• Set the System switch to <u>Cool</u>, and set the temperature level <u>below</u> the current room temperature.</li></ul>   |

## Accessories

Please contact your distributor to order accessories.

Cover plate assembly .....Part Number 50002883-001  
(Used to cover marks left by old thermostats.)

## Specifications

### Temperature Ranges

- Heat: 40° to 90°F (4.5° to 32°C)
- Cool: 50° to 99°F (10° to 37°C)

### Operating Ambient Temperature

- 32° to 120°F (0° to 48.9°C)

### Shipping Temperature

- -20° to 120°F (-28.9° to 48.9°C)

### Operating Relative Humidity

- 5% to 90% (non-condensing)

### Physical Dimensions

- 3-13/16" H x 5-3/8" W x 1-1/4" D
- 97 mm H x 137 mm W x 32 mm D

### Electrical Ratings

| System                       | Voltage (50/60Hz) | Running Current |
|------------------------------|-------------------|-----------------|
| Heat (1 <sup>st</sup> stage) | 20-30 Vac         | 0.02-1.0 A      |
| Emergency heat               | 20-30 Vac         | 0.02-1.0 A      |
| Auxiliary heat               | 20-30 Vac         | 0.02-1.0 A      |
| Cooling                      | 20-30 Vac         | 0.02-1.0 A      |



## **Automation and Control Solutions**

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