

Google Nest Learning Thermostat 3rd generation

Pro Installation and Configuration Guide



How to use this document

What is this document

This Installation and configuration guide includes additional information a ~~Pro~~ professional installer needs to install and service the Nest Learning Thermostat 3rd generation. It's not fully comprehensive, but it covers the most necessary information. It also includes links and resources to additional information.

Who is this document for

This document is intended for any individual working with Nest thermostats in a professional capacity, with a primary focus on HVAC professionals. However, it will also be useful to professionals in other industries such as builders, home security, custom integration, energy efficiency, and electrical. This document provides valuable information for a wide range of roles within these industries, including technicians, installers, sales representatives, managers, engineers, architects, support personnel, operations staff, and their respective wholesale partners. However, when we use the term "pro" in this document, we are specifically referring to HVAC technicians or installers.

Tips to get the most out of this document

1. Some section headers are links to Google support pages with more detailed information about the feature or function.
2. The table of contents contains hyperlinks to the pages and sections within the document. Use these to quickly navigate to the section with information you are looking for.
3. There is a glossary at the end of this document that contains links to the pages where these terms are found within the document as well as links to Google support articles about that term
4. Save this document as a PDF on your phone or tablet so you can reference it when you need it. Share it with your colleagues and partners who work with Nest thermostats.



Table of Contents

1. [General Information](#)

- a. Getting started with Nest Learning Thermostat
- b. Nest Pro Program
- c. Key Features and Functions
- d. HVAC System Compatibility

2. [Technical Specifications](#)

- a. Technical Information
- b. Power Requirements
- c. What's in the box

3. [Installation Overview](#)

- a. Installation Features
- b. Installation Overview
- c. Configuring with Pro Setup
- d. Configuring Complex Systems
- e. Installation Step by Step

5. [Wiring Diagrams cont.](#)

- a. Conventional Systems
- b. Heat Pump Systems
- c. Dual Fuel Systems
- d. Multi-Speed Fans
- e. Humidifiers and Dehumidifiers
- f. Unique Wiring Situations

6. [Troubleshooting](#)

- a. Handling Unusual Wiring
- b. Common Wire and Power Sharing
- c. How To and Reference
- d. Wiring Errors
- e. General Troubleshooting Quick Reference

7. [Glossary and Additional Help](#)

Getting started with Nest Learning Thermostat

You are probably familiar with the Nest Learning Thermostat if you are referencing this document. However, your customer may not be, or you may be new to a company that offers Nest thermostats. This page will provide some important links and information to get a full understanding of the Nest Learning Thermostat.

Helpful Links for you

<u>Beginners Guide to Nest Thermostats</u>	<u>Nest Pro Support Articles</u>
<u>Nest Thermostat Settings Menu</u>	<u>Nest Thermostat Information Menu</u>
<u>How to tell which Nest thermostat you have</u>	<u>What you'll see on a Nest Thermostat</u>
<u>Manage Home and Products in the Nest App</u>	<u>Troubleshoot Nest thermostat help codes</u>
<u>Learn about the Nest Power Connector</u>	<u>Learn about Nest Learning Thermostat USB Port</u>

Nest Pro Program

What is the Nest Pro Program

The Nest Pro program is designed to provide great benefits for professional installers like special pricing, Pro-exclusive extended warranty, Nest Pro Rewards, and Pro specific support. As a registered Nest Pro, this also unlocks the HVAC monitoring feature which helps Nest Pros stay connected to their customers all year round.

What is a Nest Pro ID?

Your Nest Pro ID is your company's unique 6-digit ID. Find it at the top right corner of your Nest Pro dashboard. And make sure your technicians know your Nest Pro ID and enter it in on every install to unlock big benefits for you and your customers.

HVAC monitoring, built into all Nest thermostats, looks out for system issues and lets customers know when something might be wrong. If your technicians enter your Nest Pro ID at each installation, customers will get an HVAC monitoring alert with your company's contact info. So it's easy for them to get in touch when they need you most.

Important: If you haven't already, select "Receive HVAC monitoring repair requests from customers" on your settings page to opt in to have your company's contact information surfaced on the alerts.

Other Nest Pro Benefits

Enter your Nest Pro ID at each installation to automatically earn points for each thermostat you install.¹ For non-thermostat devices, just submit a claim from your Nest Pro dashboard to earn your points. Use reward points to invest in your business with more Nest products to boost your bottom line. Or treat yourself or your employees to name-brand merchandise, theme park tickets, fun experiences, and so much more.

Enter your Nest Pro ID at installation to unlock extended warranties on all Nest thermostats, only available on devices installed by Nest Pros.

How to sign up

Signing up to be a Pro is simple and takes very little time. Visit g.co/nestpro to sign up and become a Pro, unlocking key tools, tips, training, and more for your business.

Nest Pro Warranty Details

Nest Pro Warranty Eligibility

When a Nest thermostat is purchased from and installed by a registered Nest Pro, it includes an extended Pro Warranty. The Pro-exclusive warranty adds 3 years of additional coverage, totaling 5 years of warranty coverage.

Entering the Pro ID during the installation will activate the customer's extended warranty when the following criteria has been met:

- The thermostat was sold and installed by a registered Nest Pro.
- The Nest Pro ID was inputted during the setup installation.
- The thermostat is connected to Wi-Fi and added to the customer's Nest account.

Nest Pro Warranty Process

The customer has the option to submit a warranty claim directly with Google online using the [Warranty Checker](#).

This will require shipping the unit to Google and may leave the customer without a thermostat without a temporary solution. The warranty process may be different depending on the issue reported.

A Nest Pro can also replace Nest thermostats according to the warranty process specific to the wholesaler where they purchased the device. This allows the Nest Pro to replace the thermostat, return the affected device to their wholesaler, and receive credit.

Please reach out to your place of purchase for their specific warranty process.

HVAC Monitoring

What is HVAC Monitoring?

HVAC monitoring is a feature of Nest thermostats that can help homeowners identify potential issues with eligible heating, ventilation and air conditioning (HVAC) systems. If a potential issue is detected, we'll send the homeowner an alert via email and/or a Google Home app notification.

How HVAC Monitoring Works

Sometimes, HVAC systems show warning signs that they are having issues. For example, if it takes longer than usual to cool a home, there might be a problem with the cooling system (AC). Google Nest may send the homeowner an email alert or a Home app notification when if a warning sign is detected.

The alert email or notification will tell the homeowner what their Nest thermostat noticed and which system (heating or cooling) may be affected. If a Pro ID was entered during the set-up of a Nest thermostat, the homeowner will also be shown contact information for the contractor company who installed it.

Important: HVAC monitoring is not meant to replace the diagnosis of a qualified HVAC professional. We make no endorsement, representation, or warranty about the health of the HVAC system. There may still be other issues with the HVAC system that may not trigger an alert to the homeowner.

How do you enable HVAC Monitoring

HVAC monitoring will only include the contractor's contact information if they are registered Nest Pro. A person with legal signing authority for the contractor company can register for a Pro ID at g.co/nestpro. During enrollment, the legal signing authority must opt-in to have the company's info surface to the customer. Post enrollment, the administrator of the Nest Pro account can also opt-in by adjusting the Settings under "HVAC Monitoring Repair Requests."

HVAC monitoring alerts will surface the information of a contractor company if they are enrolled in HVAC monitoring and a Pro ID is entered on the thermostat.

If a Google account is used, the homeowner will always get urgent alert notifications, but they can opt out of urgent email alerts, early warning emails or Google Home app notifications by turning them off within the app.

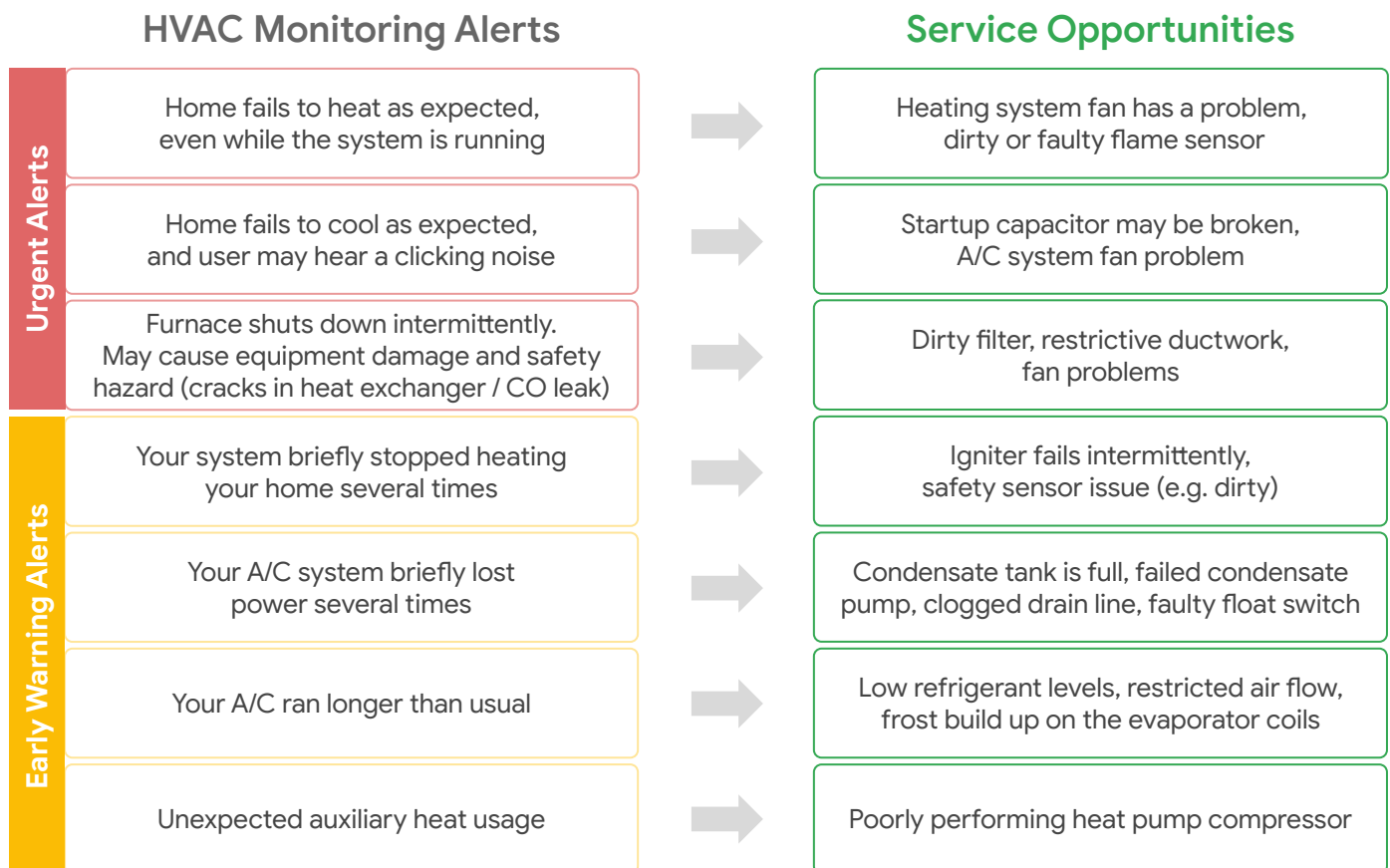
If a homeowner uses a non-migrated Nest Account, they can only get urgent or early warning emails. The homeowner can turn off early warning emails by opting out in the footer of those emails.

However, homeowners cannot opt out of HVAC urgent alerts since they raise serious system issues that they need to be aware of.

Types of Alerts

If a Nest thermostat detects a potential issue that may require immediate attention, Google Nest will send the homeowner an urgent alert as soon as a problem is detected. For example, if a homeowner turns on their heating system but their home became colder, this may indicate a severe HVAC problem.

If Google Nest detects an issue that should be fixed soon, an early warning alert will be sent to the homeowner within a week of detecting the problem. For example, if a homeowners A/C is running longer than usual, this may indicate it needs to be serviced.



Important: Nest HVAC monitoring is not meant to replace the diagnosis of a qualified HVAC professional. We make no endorsement, representation, or warranty about the health of your HVAC system. You may still experience issues with your HVAC system that we don't alert you to.

Key Features and Functionality

[Auto-Schedule](#)

Auto-Schedule uses a series of algorithms and weighted pattern recognition to create a temperature schedule. At first, every adjustment you make is incorporated into the schedule, but over time your Google Nest thermostat will only incorporate patterns of changes.

Your thermostat listens attentively to your temperature changes at first. But later on, when your schedule is set and initial learning is complete, you'll need to make adjustments on more than one day to have an effect.

Auto-Schedule chooses temperatures that have been set by a person at least once.

If you make similar adjustments a couple of days in a row, Auto-Schedule will match these adjustments to one another and create temperature set points accordingly.

Auto-Schedule uses pattern-matching to determine if that's what you want on each day, each weekday, or the same day each week.

Temperature changes you make on the thermostat or in the app have exactly the same effect on the schedule.

If you don't like a temperature that your thermostat is set to, you can either teach your thermostat a new schedule by turning the ring a few times until it learns, or you can make manual adjustments to the schedule.

Manual changes you make to the schedule won't be affected by Auto-Schedule.

Nest thermostats learn a different schedule for each temperature mode. If you have both heating and cooling, your thermostat will create separate schedules for Heat, Cool, and Heat•Cool.

You will have 3 different schedules for Cool Mode, Heat Mode, and Heat Cool Mode.

Auto-Schedule learning is on by default, but it's just one option for scheduling temperatures on your Nest thermostat.

Within the first 10 days, the Nest Learning thermostat will note what changes the customer makes to their thermostat or app to create a schedule based on those changes.

If Auto-Schedule is disabled, a manual schedule can still be created on the thermostat, through the app, and/or online.

For more information on how to manually change your schedule, click [here](#).

Home/Away Routines

You can automate home devices and take care of everyday tasks based on your location with Home & Away Routines in the Google Home app or with Google Home for web. If you have an existing Nest Account and wish to use this feature, it's recommended that you migrate to a Google Account.

You can create Routines in the Home app or as a scripted automation in Google Home for web that can use presence sensing to automatically adjust your home devices when someone comes home and when everyone's away.

Presence in the home is determined using input from your phone's location (if you opt in) and sensors in your smart devices, so you don't have to manually turn your devices on and off or rely on a fixed schedule. You can decide which devices, including your phone, will determine presence.

You'll need to use the Home app to set up Home & Away Routines. Migrate your Nest Account to a Google Account, if you haven't already done so. Set up your smart devices in the Home app, if needed and follow the app instructions to set up Home & Away routines.

Note: *If you use both the Nest app and the Home app, Home & Away Routines will work seamlessly with the Nest App's Home/Away Assist. In the Home App, "Home & Away Routines" is the new name for "Home & Away," and "presence sensing" is the new name for "Home/Away Assist," but they work the same way.*

For more information on the differences between Home/Away assist and Home/Away Routines, please click [this link](#).

Eco temps

Eco Temps are the upper and lower threshold temperatures that the thermostat will use when a house is unoccupied if Home/Away Assist is enabled.

Your Nest thermostat gives you a temperature range you can select from when you set an Eco Temperature. The Eco Temperature ranges you can choose from are: 40-70°F (4-21°C) for heating mode and 76-90°F (24- 32°C) for cooling mode.

A customer can manually set their thermostat to Eco Mode (the mode in which the thermostat will observe Eco Temps) if they choose to have the Home/Away assist feature disabled, but will have to manually take the thermostat out of Eco mode if done.

When you manually switch to Eco, your thermostat will ignore all scheduled temperatures until you manually switch it back to heating or cooling.

If your thermostat automatically switched to Eco Temperatures because everyone was away, It will switch back to your normal temperatures when someone comes home.

Early On

Allows you to schedule your thermostat around when you want to reach a set point instead of when you want to start running your system.

Early On cannot be used to schedule a setpoint when returning from Eco temps using Home/Away Routines.

HVAC Monitoring

HVAC monitoring is a thermostat feature that can help identify potential issues with eligible heating and air conditioning (HVAC) systems. If a potential issue is detected, we will send the customer an alert via email or a Google Home app notification.

For a list of the different issues HVAC monitoring can detect please see our help center [here](#).

As a Nest Pro, your information can be surfaced to the customer whenever an HVAC alert is triggered. For more information about how to become a Nest Pro, visit our [Nest Pro website](#).

Heat Pump Balance

Optimizes how often you need to use expensive auxiliary heat. Just choose whether you want more comfort, more savings, BALANCED or OFF, and Heat Pump Balance will automatically adjust when AUX comes on by intelligently adjusting the Aux Heat lockout temperature.

Heat Pump Balance will also adjust the Auxiliary upstage timer based on your choice of Comfort vs Savings.

Heat Pump Balance must be disabled to manually set the auxiliary lockout temp. You are still able to change the compressor lockout even if Heat Pump Balance is enabled.

To use Heat Pump Balance, your thermostat must also be connected to Wi-Fi. If it isn't, you can use Early-On, but your thermostat won't take specific measures to avoid expensive AUX heating.

If you have a dual fuel system, you won't be able to use Heat Pump Balance. You have to set a lockout temperature manually in the Nest thermostat Equipment menu.

True Radiant

Avoids large temperature swings and gives you a predictable schedule. Nest may learn that to reach its target setpoint, it should turn the boiler off early to avoid a huge temperature overswing as the system continues to radiate heat, and it will also maintain temperatures better by turning back on early to ramp up before it gets too cool.

Sunblock

Direct sunlight can cause a thermostat's temperature sensor to heat up, so it may think that the ambient temperature in the room is higher than it actually is.

With Sunblock enabled, the feature will compensate for the direct sunlight to keep your home more comfortable and more true to the real temperature inside.

You will see the icon above on your thermostat screen and app when Sunblock is active.

Cool to Dry

Allows your compressor and fan to run longer after it has satisfied a cooling setpoint to remove excess humidity from the home.

Cool to Dry can be used with any air conditioner or heat pump, but works differently depending on whether or not your system has its own dehumidification mode.

If you have a standalone humidifier or dehumidifier, you won't find this option on your thermostat.

To set an exact humidity percentage for your Nest thermostat to try to maintain, you will need to have a standalone dehumidifier set up in your thermostat.

Cool to Dry will only cool your home to 3°F below your current set temperature when you are home, or 5°F lower when you are away and your thermostat is set to Eco Temperatures. This means Cool to Dry may not always reach a specific humidity level before it has to shut off.

Because Cool to Dry may not always reach your target humidity, you'll only be able to set an approximate target humidity level, represented by the number of water drops you see on your thermostat. That's why you won't see a specific percentage in your humidity settings.

Airwave

Airwave turns the compressor off a little before reaching the target temperature. Then it runs the fan alone until it reaches the temperature you want.

Airwave learns exactly how much cooling can be done with the compressor off. It automatically shuts off your compressor at the right time to help maximize your savings.

Airwave might not activate if there is excess humidity identified by the built-in humidity sensor in the thermostat (45% RH). In more humid climates, Airwave might never activate.

Nest Leaf

The Nest Leaf icon appears on your thermostat (and in the Home app or Nest app) to tell you when your thermostat is set to an energy-saving temperature. The Leaf encourages you to choose energy-saving temperatures that are a little lower or higher than what you've set in the past.

Time to temperature

Estimates how long your system takes to heat and cool your home from a manual change to the thermostat, or through the app.

Time to temperature is based on prior heating and cooling cycles, and will continue to learn how the equipment performs during heating and cooling to give you more accurate estimates.

Time to Temperature estimates will only appear for temperatures that you've manually set with the thermostat or the Nest or Home app.

Your Nest Learning Thermostat won't display a Time-to-Temperature estimate if continuous heating or cooling is needed to maintain the temperature that you've selected, or if the temperature fluctuates unexpectedly.

Safety Temperature

Safety Temperatures can protect your home during extremely cold or hot weather. With Safety Temperatures, when your home reaches a set temperature limit, your thermostat will turn on heating or cooling even if the thermostat is set to Off. This can help ensure that your pipes won't freeze or your home won't overheat.

Thermostat Lock

Locking your Google Nest Learning Thermostat prevents people from changing settings or changing the temperature outside of a restricted range with the thermostat.

Anyone who shares access to your home with the Home or Nest app will still be able to change the temperature and settings or unlock your thermostat with the app.

You can lock your thermostat in the Settings menu on your thermostat, or with the Home or Nest app. To unlock a thermostat, you need to enter the four digit PIN code on the thermostat, or use the app.

When a Nest thermostat is locked, it will still heat or cool to any temperatures in your schedule, even if they are outside of the locked temperature range. It will also follow your Eco Temperatures.

Utility Rebates and Programs

Nest thermostats are eligible for rebates through local utility providers. Some rebates require enrollment in programs and features that work on Nest thermostats such as Rush Hour Rewards. For more information about Rush Hour Rewards, visit [this link](#). For other energy saving features and programs, visit [this link](#) or check out the glossary for links to specific features.

How do we determine outdoor temperature?

We use a Wi-Fi connection to source local weather data. If the thermostat is not connected to Wi-Fi it will not be able to read the outdoor temperature.

The Nest Learning Thermostat 3rd gen is not compatible with outdoor temperature sensors.

Outdoor temperatures are an important factor for Compressor Lockout temps, Aux Lockout temps, and Dual Fuel Breakpoint.

The lockout temperatures are only enforced when the Nest Thermostat is connected to Wi-Fi so it can track outdoor temperatures. If Wi-Fi is not enabled, auxiliary heat and alternate heat (in the case of dual fuel systems) will come on automatically when it takes longer than expected to reach the current target temperature.

Tip: Provide the full address when configuring the thermostat to get the most accurate local weather data.

Staging:

When there is a call for heating/cooling, the thermostat will not engage a second stage unless the temperature goes in the opposite direction within the first 15 minutes.

If the temperature does not go in the opposite direction from the call to heat/cool, the thermostat will wait 60 minutes for conventional heating to upstage, or 2 hours for cooling.

The second stage of heating or cooling will turn on when you adjust the set point 3.3°F beyond the current temperature, while the third stage will need a change of at least 7°F to activate.

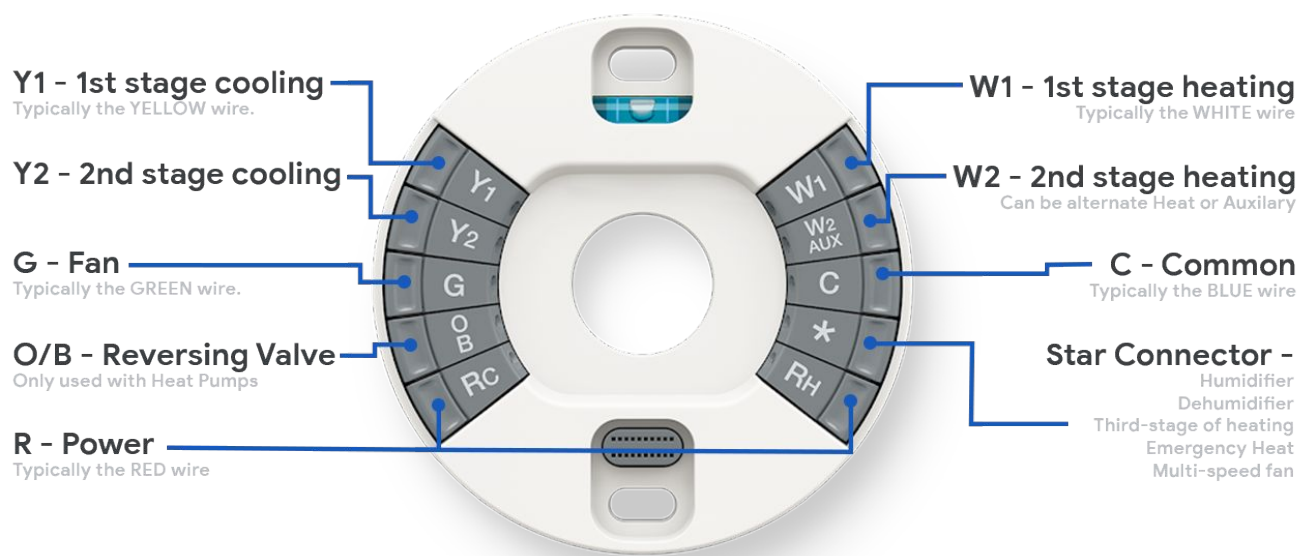
At the start of a heat cycle, auxiliary heat is disabled due to the upstage timer. If the temperature decreases to 0.5C (1F) below the temperature at the start of the heating cycle, then the upstage timer is ignored and aux is enabled until the target temperature is reached. After this point, a droop of 0.1C is enforced for re-enabling aux during the same HVAC cycle.

HVAC System Compatibility

System Compatibility

Works with 95% of 24V systems: gas, electric,
oil, forced air, heat pump & radiant
Heating: 1, 2 and 3 stages (W1, W2, W3)
Cooling: 1 and 2 stages (Y1, Y2)
Power (C, Rh, Rc)

Fan (including multi-speed) (G or G1,G2,G3)
Humidifier or dehumidifier (HUM, DEHUM)
Heat pump: with auxiliary/alternate and
emergency heat (O/B, AUX, ALT, E)



Wire Terminals

- Y1
- Y2
- G
- O/B
- RC
- W1
- W2/AUX
- C
- * (star)

Networking Requirements

Wi-Fi is required for software updates and remote control with the Nest App Wi-Fi
802.11 b/g/n, 2.4 GHz and 5 GHz
Secure: AES-128, SSL/TLS, WEP,
WPA/WPA2
For more information about compatible networks, visit [this link](#)

Conventional Connectors		Heat Pump with Aux Heat Connectors		Heat Pump with Dual Fuel Connectors	
Y1	Stage 1 compressor relay	Y1	Stage 1 compressor relay	Y1	Stage 1 compressor relay
Y2	Stage 2 compressor relay, 2nd-speed fan relay	Y2	Stage 2 compressor relay	Y2	Stage 2 compressor relay
G	Fan relay	G	Fan relay	G	Fan relay
O/B	Not used	O/B	Changeover valve relay	O/B	Changeover valve Relay
Rc	24VAC power from cooling transformer*	Rc	Not used	Rc	24VAC power from cooling transformer
W1	Stage 1 heat relay	W1	Not used	W1	Stage 1 Heat Relay
W2/AUX	Stage 2 heat relay	W2/AUX	Auxiliary Heat Relay	W2/AUX	Stage 2 heat relay
C	24VAC Common wire	C	24VAC Common wire	C	24VAC Common wire
Star*	Stage 3 heat (W3), Humidification (HUM), or dehumidification (DEHUM), 3rd speed fan relay	Star*	Emergency heat (E), humidification (HUM), dehumidification (DEHUM)	Star*	Emergency heat (E), humidification (HUM), dehumidification (DEHUM)
Rh	24VAC power from heating transformer	Rh	24VAC power from transformer	Rh	24VAC power from heating transformer

<p>Power:</p> <ul style="list-style-type: none"> Built in lithium-ion battery Uses less than 1 kWh/month Voltage requirement: 20-30V AC Max VA- 5VA Battery Voltage- 3.6V or higher required for Wi-Fi connection and updates 	<p>These values can be found in the Technical Information Menu on the thermostat. (Divide VOC and VIN values by 1.414 to get the RMS voltage)</p> <ul style="list-style-type: none"> VOC- 29-42V (with or without C wire) VIN- 29-42V (With or without C wire) lin- 100-200 mA (with C Wire) OR 20-40mA (Without C wire Present)
<p>Sensors:</p> <ul style="list-style-type: none"> Temperature (10 sensors) +/- .5°F Humidity +/- 3%RH Near-field activity Far-field activity Ambient light Nest utilizes local weather data over Wi-Fi instead of outdoor temperature sensors 	<p>Display:</p> <ul style="list-style-type: none"> 24-bit color LCD 480x480 resolution at 229 pixels per inch (PPI) 5.3 cm (2.08 in) diameter
<p>Box contents:</p> <ul style="list-style-type: none"> Display Base Trim kit Mounting screws Wire labels Installation guide Welcome guide 	<p>Size and weight:</p> <p>Display:</p> <ul style="list-style-type: none"> Mass = 205.4 g / 7.25 oz Diameter = 8.4 cm / 3.30" Height = 2.69cm / 1.06" <p>Base:</p> <ul style="list-style-type: none"> Mass = 38.3 g / 1.35 oz Diameter = 7.6cm / 3" Height = 1.1 cm / 0.42" <p>Assembled (Display + Base):</p> <ul style="list-style-type: none"> Mass = 243.7 g / 8.6 oz Diameter = 8.4cm / 3.3" Height = 3.08 cm / 1.21" <p>Trim Plate:</p> <ul style="list-style-type: none"> Width = 15.04cm / 5.92" Height = 11.04cm / 4.35"

Installation Features

System Match

When you first install the Nest Thermostat, it checks to see what wires you've inserted into the base's connectors and prompts you for additional information where needed.

Pro Setup

Pro Setup lets Nest Pros configure advanced settings to set up complex systems, including dual-fuel systems, humidifiers/dehumidifiers, and multi-speed fans. Pro Setup also activates a customer's extended warranty if the Nest Thermostat is purchased from and installed by a Pro.

Silent Relays

Nest Thermostats use solid-state switching instead of relays so there's no noise when it switches on or off. You will *not* hear any "clicking" during system testing and activation.

Press Connectors

Connecting the HVAC system wiring to the Nest Thermostat base is easy using the press connectors. Simply insert the wire into the connector as far as it will go until the press connector stays in the down position.

Multifunctional Star * Connector

The Star connector on the Nest Thermostat can control several different applications. If you insert a wire into this terminal, the Nest Thermostat will ask you to select the application and will control it based on your selection. For a list of compatible applications that can be inserted into the Star connector, see the wiring diagrams below.

Installation Overview

What is in this section

The next three pages of this document will provide an overview of the installation process of the Nest Learning Thermostat. After the overview, there is much more detailed information about the available terminals, standard presets and ranges, how to configure complex systems, and step by step instructions to configure the thermostat.

Installation process with and without Wi-Fi

The Nest Learning Thermostat can be set up and installed in locations that do not have Wi-Fi or where there is no customer present to add the thermostat to their Nest App. In these circumstances the thermostat will be configured entirely on the device.

If there is Wi-Fi present but the customer is not available, you can connect the thermostat to the available Wi-Fi network using the device. This will skip some configuration steps and allow the thermostat to update the software if necessary.

If the customer is present and there is Wi-Fi available, you can connect the thermostat to the customers Nest App when prompted. This is the fastest way to configure the thermostat and will ensure the customer is comfortable with the thermostat when the device has been configured.

The Step-by-step instructions in this document will cover how to configure the thermostat in all of these scenarios.

1. Confirm system compatibility

- a. Before opening the Nest Learning Thermostat package, check all of the wires connected to the current thermostat against the list of available connectors on the Nest Thermostat box, or use the [Compatibility Checker](#) to show you exactly where to connect each wire.

2. Briefly test the HVAC system

- a. Test the heating, cooling, fan and other system features with the current thermostat before installing the Nest thermostat so you can address any existing issues.
- b. At times, outdoor weather conditions may prohibit testing of heating or cooling. In those cases, inform the customer that you cannot test and ask the customer about the system's operation and performance.

3. Turn off power to the HVAC system

- a. Turn off the power to the system to protect yourself and the equipment. Locate the circuit box and check to see if the circuits are labeled or if there is a circuit directory. Turn off all HVAC system circuits.
- b. If you cannot determine which circuits belong to the HVAC system turn off the main circuit breaker after obtaining permission from your customer. Confirm the power is off by attempting to activate the HVAC system using the existing thermostat.

4. Remove the old thermostat

- a. Before removing the old thermostat, take a quick picture of the wiring with your phone in case you need it for reference. Disconnect the wiring and remove the old thermostat. Use the wire labels included in Nest Thermostat Installation Guide if needed. You don't need to hang on to any old jumper wires going from Rh (sometimes just called R) to Rc. Nest will automatically jump these two connectors.

5. Offer the customer installation finishing options

- a. You may need to cover up holes, old paint or marks left by the old thermostat. Ask your customer if they prefer to repair the wall themselves or if they want to have the Nest trim plate installed. Let the customer know that the trim plate can be painted to match the wall.

6. Install the Nest Thermostat

- a. Run the wires through the center of the Nest Thermostat base and attach it to the wall using the screws provided. Do not use a power drill on the screws. Over tightening the screws can damage the circuitry in the Nest base. For paneling, plaster-and-lath, or if there is a stud behind the thermostat, pre-drill a hole using a 3/32" bit first.
- b. Use the built-in level for proper alignment. Trim or re-strip any wires as necessary and connect them to their corresponding terminals on the base. Make sure the wire is straight and the connector button stays down after inserting it.

7. Configure the Thermostat with Pro Setup

- a. Most of the Pro Setup questions are easy for a professional to answer, but your customer should answer some of the questions like preferred temperatures and Wi-Fi passwords.
- b. See Step-by-step instructions for details on how to handle installations where the customer isn't present or there is no Wi-Fi available.
- c. Pro Setup Questions
 - Eco Temperatures
 - Thermostat Room Name
 - Heat Pump Settings
 - Humidity Settings

8. Allow the Nest Thermostat to update

- a. If there's a necessary software update, the Nest Thermostat will start downloading it as soon as it connects to the internet. The update can take several minutes depending on the speed of the internet connection, so take advantage of this time to explain some of Nest Thermostat's key features to your customer.

9. Test heating and cooling

- a. This is vital to any installation in order to prevent a callback. After setting up the Nest Thermostat, run each part of the system for a few minutes. This will ensure that the Nest Thermostat is installed correctly and there aren't any HVAC compatibility issues.
- b. The thermostat will require Wi-Fi to fully test the equipment and report any errors. If Wi-Fi is unavailable, you can still engage equipment through the test function or manually
- c. See page 64 for additional details on performing post-installation testing.

10. Help your customer pair the Nest Thermostat with the Nest App

- a. If your customer already has a Nest product and is using the Nest App, show them how to add the thermostat to their Nest account. If it's your customer's first Nest product, show them how to download the Nest App, create an account and then add the Nest Thermostat.

11. Pair the Nest Thermostat to the Google Home App for additional features

- a. The Google Home app will allow the customer to use voice control with the Google Assistant as well as advanced routines and automations.
- b. The customer will just need to sign into the Google Home app with the same Google Account used in the Nest App

12. Adjust necessary equipment settings

- a. For complex equipment systems, additional settings may need to be adjusted. To access these equipment settings press the thermostat to access the quick view menu, navigate to SETTINGS > EQUIPMENT > then select the necessary equipment.
- b. Some features may be found under the NEST SENSE menu on the thermostat.
- c. See the complex equipment configuration on page 25 section for more details

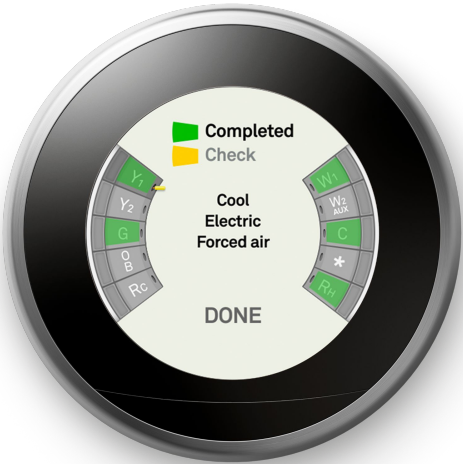
Configuring with Pro Setup

When you set up the Nest Thermostat for the first time, you'll be asked if you're a professional installer. If you answer "PRO," you'll receive Pro Setup options. Pro Setup can also be accessed at any time after the Nest Thermostat is installed through the SETTINGS menu. To enter Pro Setup on the Nest Thermostat after the initial setup go to SETTINGS > EQUIPMENT > CONTINUE > CONTINUE > PRO SETUP. In both cases you will need to enter your Pro ID which can be found next to your username on the Nest Pro website.

Pro Setup lets you configure how the Nest Thermostat controls each wire connected to it. When you first enter Pro Setup, you'll see an image of the connectors on the Nest base. Connectors with wires will be highlighted in green or yellow. Green indicates that the wire has only one setting. Connectors highlighted yellow have multiple options. The Nest Thermostat selects default settings for these connectors, but you'll want to verify or modify these settings to make sure it is controlling each wire appropriately.

To configure a wire, just turn the thermostat ring to highlight a connector and press to select it. Each wire will show Type , which describes the function of that wire. In most cases the Type cannot be changed - it's dictated by the wiring configuration and by whether or not the system is dual fuel. The Type for the Star connector is always customizable.

Connectors that control a heating or cooling function will also have a Source setting (to identify the type of fuel used to heat or cool), a Delivery setting (to describe how heating or cooling is distributed throughout the home) and a Fan setting (to activate the fan if required). Depending on the wire configuration, the Source or Delivery settings may have only one default option.



The Fan default is Don't activate . This means that the Nest Thermostat will rely on the system to activate the fan when the furnace (W1) is running. If you test the furnace and notice that the fan is not activating, change this option to Activate . The Fan setting will only change fan activation when the furnace (W1) is running, the fan will continue to activate normally during other functions.

Source	Delivery	Fan
Gas Electric Oil Propane (LP) Geothermal	Forced Air In-Floor radiant Radiators Electric baseboard (electric source only)	Activate Don't activate

Key wiring and compatibility notes

Boilers

Must use an external transformer for a source of constant 20-30 VAC when using the power connector. If the boiler is DC powered, you must install a SSR between the transformer and terminal block

Zone Panels

We will not work with zoned systems in which the thermostat does the activation and deactivation of the zoned dampers; usually indicated by “L” terminals. Many zone panels will require an upgraded transformer when using a Smart Thermostat such as the Nest Learning Thermostat. Check the requirements of the specific zone panel or board being used.

Emergency Heat

A wire must be present in the “Star[★]” terminal to engage emergency heat.

Variable Speed Systems

The Nest thermostat does not modulate voltage, therefore cannot control variable speeds on the thermostat side. If the Equipment can modulate itself with a non-proprietary 24VAC input, then the Nest Thermostat will work but will require adjustments to settings to ensure efficient operation of the equipment.

Unsupported Wires

Some common terminals that we do not work with are non-standard HVAC terminals; if you see terminals labeled 1, 2, 3, or A, B, or D, there is a pretty good chance we do not work with the equipment.

There are some terminals that might fall under the standard HVAC terminals that we can treat a little differently. HVAC equipment that has sensors wired to it usually have an “S” terminal designation. Since the Nest Learning Thermostat does all its sensor data via Wi-Fi and local weather data, we do not need to wire in the “S” wire. In this case, if all other terminals are standard HVAC wiring, you can proceed as normal, and you will just cap off the “S” wire and not use it.

Standard Presets and Feature Ranges

Function	Notes
Droop	1°F
Dead band	Intelligently set between .7°F and 1°F
Heat Pump Balance	Heat Pump Balance Default Setting: Balanced Options: Max Comfort, Max Savings, Balanced, Off
Heat Pump Aux Upstage Timer	Based on Heat Pump Balance setting 60 minutes (Max Comfort) 90 minutes (Balanced) 120 minutes (Max Savings)
Conventional Equipment Upstage Timer	60 Minutes for non-heat pump heating 2 hours for cooling
Compressor Lockout	Compressor Lockout Default Temp: -25°F Range: -25°F to 32°F OR Always
Auxiliary Heat Lockout <i>Only when heat pump balance is disabled</i>	Auxiliary Heat Lockout Default Temp: 40°F Range: 0°F to 90°F or Always (always use Aux heat)
Dual Fuel Breakpoint <i>Switchover temp</i>	Dual Fuel Breakpoint Default Temp: 30°F Range- 10°F to 50°F, Always or Never
Safety Temps	Safety Temps for Heating Default Temp: 40°F Safety Temps for Cooling Default Setting: Off Range: 35°F - 105°F
Eco Temps	Eco Temps Heat Default Temps: 56°F Range: 0°F to 70°F, or Off Eco Temps Cool Default Temps: 82°F Cooling Range: 76°F to 90°F, or Off

How to configure complex systems

Heat Pump Systems

Configuring O/B Wire- Orientation and Activation

The majority of heat pumps use an “O” orientation, so when setting up a heat pump, this will be the default orientation during configuration. This can be changed in the equipment settings of the thermostat.

To reduce noise from the reversing valve, we allow you to choose whether or not to energize the O/B reversing valve during each cycle, or seasonally (when changing between heating and cooling)

Nest Learning thermostat defaults to energizing seasonally to help reduce wear and tear on the reversing valve, but can be configured to be energized each cycle.

Two Stage Heat Pumps

The Nest Thermostat will automatically recognize your customer's system as a two-stage heat pump if you've connected Y1, Y2, and O/B wires. Nest Thermostat assumes the Y1 wire will be used to activate 1st stage heating and cooling for your heat pump.

Use Pro Setup to configure the Y2 wire to be used for 2nd stage cooling and heating, 2nd stage cooling only, or 2nd stage heating only as well as specify the delivery mechanism (such as forced air or radiant).



Duel Fuel Systems

If there's an O/B wire and one or more W wires connected to the Nest thermostat (which indicates that the system uses a heat pump with an additional heating source), Pro Setup will first ask if the heating system is dual fuel or single fuel.

For single fuel, any wires inserted into the W1, W2/AUX, or Star (if W3 is chosen) connectors will be treated as auxiliary heat that will be used simultaneously with the heat pump when needed.

Pro Setup will automatically configure the auxiliary heat wire for an electric forced air system. The 3rd generation Nest Thermostat can only support one wire for auxiliary heat; additional auxiliary heat wires are not supported.

For dual fuel, any wires inserted into the W1, W2/AUX, or Star (if W3 is chosen) connectors will be treated as alternate heat that will be used instead of the heat pump when needed. Use Pro Setup to indicate the source (gas, electric, geothermal, etc) as well as the delivery mechanism (forced air, radiant, etc) for each of the W wires connected. The Nest Thermostat supports two wires for alternate heat; additional alternate heat wires are not supported.



Multi Speed fans

The Nest Learning Thermostat is compatible with most multi-speed fans (up to 3 speeds) on systems that use standard 24 volt wiring. It will control the fan differently depending on how many fan wires are connected.

If your customer has a multi-speed fan with a single wire, the system will control the fan speed, not the Nest thermostat. This means they'll be able to use the Nest Learning Thermostat to adjust the temperature and turn the fan on or off , but they won't be able to manually control the fan speed.

If there's more than one fan wire installed, the Nest Learning Thermostat will automatically set the fan speed. Your customer will also be able to select a speed in the Fan menu.

Not all multi-speed fan wires are compatible with Nest thermostats. Compatible wires will have labels similar to the following:: G, G1, G2, G3, GL, GM, or GH

When using multiple fans speeds some HVAC functions will become unavailable. For example, since the Y2 connector is used for fan speed 2 a second stage of cooling cannot be configured. Stage 3 heat, emergency heat and humidifier/dehumidifier will become unavailable when a third fan speed is used.

High voltage forced air systems with fans, and proprietary systems with fans are not compatible with the Nest Thermostat.

Fan Activation on Forced Air systems

Depending on your fuel source selection, you'll need to determine when the fan activates for your customer's heating system. Some systems will activate the fan automatically when the thermostat calls for heat. Some systems will rely on the thermostat to activate the fan.

The default setting for fan control on the W1 wire is Don't activate because most forced air gas heating systems will activate the fan automatically when the furnace (W1) is activated.

If you test the furnace and the fan doesn't activate, change this option to Activate . The thermostat will then call for both the furnace (W1) and fan (G) when heating.



Humidifiers and Dehumidifiers

The Nest Thermostat supports whole-home humidifiers and dehumidifiers that connect to it with one or two low voltage wires. There are multiple Pro Setup settings for the wire in the Star connector to control a humidifier or dehumidifier. Whenever a humidifier/dehumidifier is attached you'll need to select whether or not the fan should activate.

If you have a standalone Dehumidifier or Humidifier, you will be able to set a specific Humidity percentage in the equipment page of the thermostat or in the Nest or Google Home App.

If you have a system with a Dehumidify mode, you will use [Cool to Dry](#) to set a humidity target rather than a specific humidity percentage.

Compatible wires have one of the following labels:

- H, Hum, Hum1, H2, Hum2
- D, DH, Dhum, Dehum, D2, DH2, Dhoom2, Dehum2

Regardless of whether your customer's humidifier or dehumidifier has one wire or two, you will need to figure out if it can be activated on its own or if it requires heating or cooling to be on at the same time. You'll also need to determine other settings, such as whether the fan is required during operation.

The Nest Thermostat Star terminal is a powered terminal. If you're connecting a humidifier/dehumidifier that requires unpowered terminals, add a 24 VAC relay suitable for HVAC equipment use. Consult humidifier/dehumidifier installation manual for wiring requirements.

Important Note: In dual transformer installations (installations with both Rc and Rh wires) it's important to note that different wires attached to the thermostat will use different power sources. The Rc wire will provide power to the Y1, Y2, G, and O/B terminals. The Rc wire will also charge the thermostat using the C terminal. The Rh wire will provide power to W1, W2/AUX, and Star connectors. Never connect wires from dual transformer systems to connectors from the opposite transformer.



Humidifier

Pro Setup will show an Activate setting to specify whether heat needs to be activated for humidification to turn on. Bypass humidifiers should use the Hum. + heat option while steam, independent, or on demand humidifiers should use the Hum. only option.

Dehum with A/C

Also known as AC integrated dehumidifiers, these systems require cooling to be activated to turn on dehumidification.

Dehum Standalone

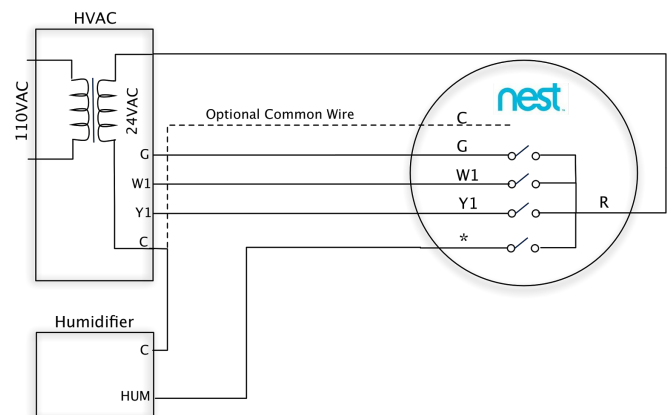
These dehumidifiers can be turned on independently and do not require heating or cooling to be active. Pro Setup will show a “To dehum” option where you can choose whether the Star wire should be energized or not to turn on dehumidification.

Humidifier Configurations

Stand Alone Humidifier, 1 wire

This system has a humidifier that is separate from the HVAC system. Install the hum wire directly into the * terminal.

Correctly ground the other wire from the Humidifier. No relay is recommended.

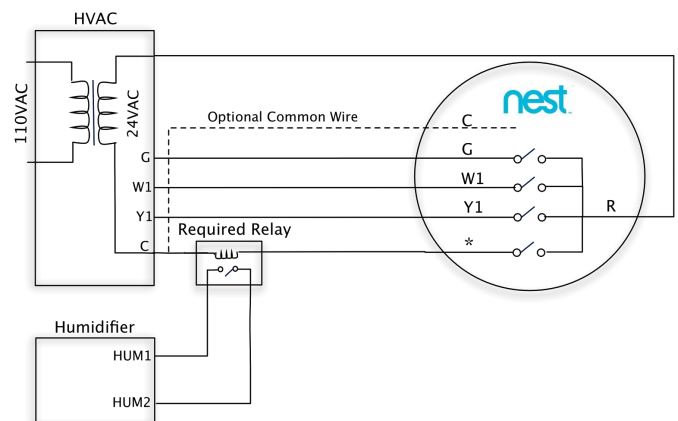


Stand Alone Humidifier, 2 wire

This system has a humidifier that is separate from the HVAC system. Install the 2 hum wires directly into the relay.

Run the single wire from the relay to the * terminal.

Nest recommends the White Rodgers 90-290Q or similar 24VAC HVAC relay



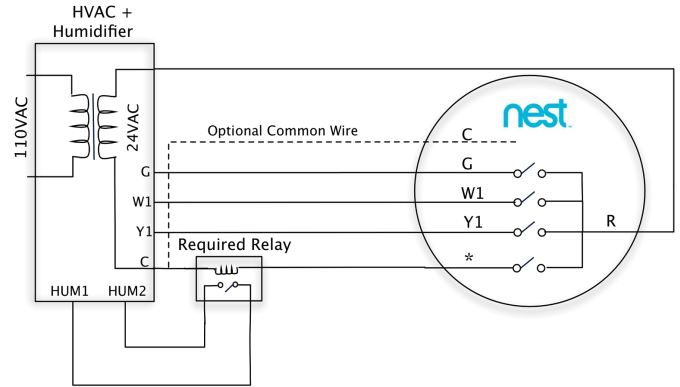
Built-in Humidifier system, 2 wire

This system has a humidifier built into its HVAC system and 2 separate hum wires.

Install the 2 hum wires directly into the relay

Run the single wire from the relay to the * terminal.

Nest recommends the White Rodgers 90-290Q or similar 24VAC HVAC relay.

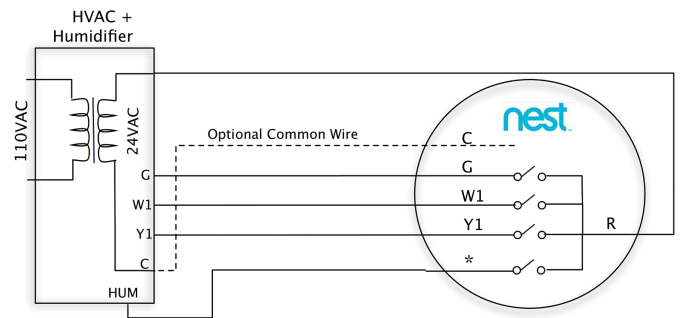


Built-in Humidifier system, 1 wire

This system has a humidifier built into its HVAC system and only 1 hum wire.

Connect the hum wire from the built-in system directly to the * terminal.

No relay is recommended.



Installation Step by Step

On the thermostat

1) Language: Confirm preferences



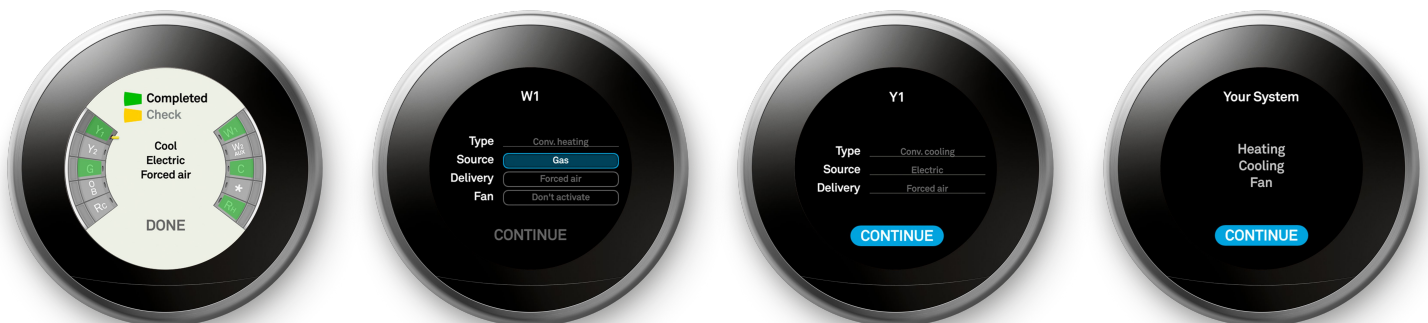
2) Equipment: Select “Pro” and “Enter Pro ID”

Selecting “Pro” will provide more setup options. You don’t need to be a Nest Pro to select this option.



3) Equipment: Configure and confirm available settings for all wires.

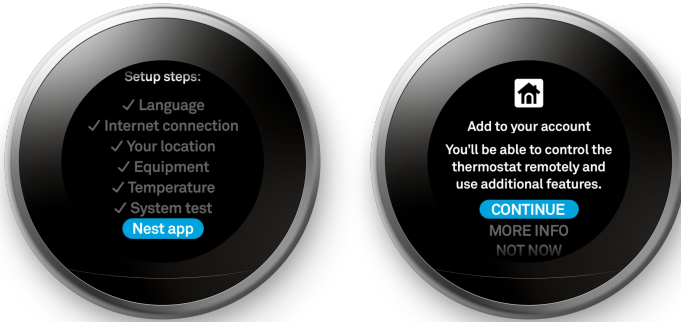
Wires highlighted in yellow will require you to view the setup options before continuing. Wires highlighted in red indicate the thermostat is not detecting power. See troubleshooting section for more details.



- 4) **Nest App:** Add the thermostat to the Nest App on customer's phone, or select "Not Now" to proceed with configuring the thermostat without using the customer's phone. This will require you to input more information manually on the thermostat, and can be done with or without Wi-Fi.

For Step-by-Step instructions to configure the thermostat without a phone, see [page 35](#).

For Step-by-Step instructions to add the thermostat to the Nest app see the following page.



- 5) **System Test:** The Nest Learning Thermostat will be ready to use after completing the system test. The system test will be available once you have successfully added the thermostat to the Nest App or you have successfully completed the on-device setup process. Note- To proceed with the system test, the thermostat must be connected to Wi-Fi. If Wi-Fi is not available at the time of installation, you can skip the official test and manually test the system using steps outlined on [page 64](#) in the "How to Section"



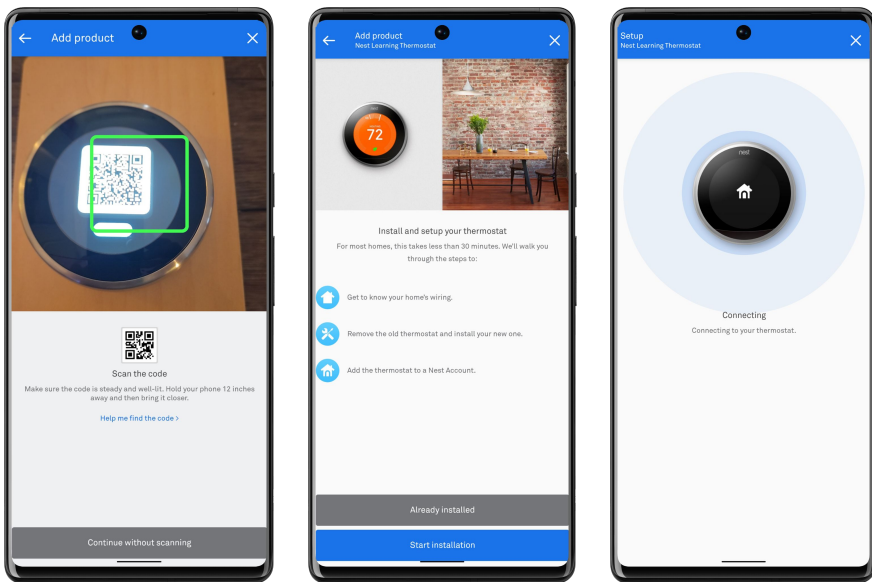
- 6) **Completed:** When the thermostat shows the large setpoint, the Nest Learning Thermostat is configured and ready to use.



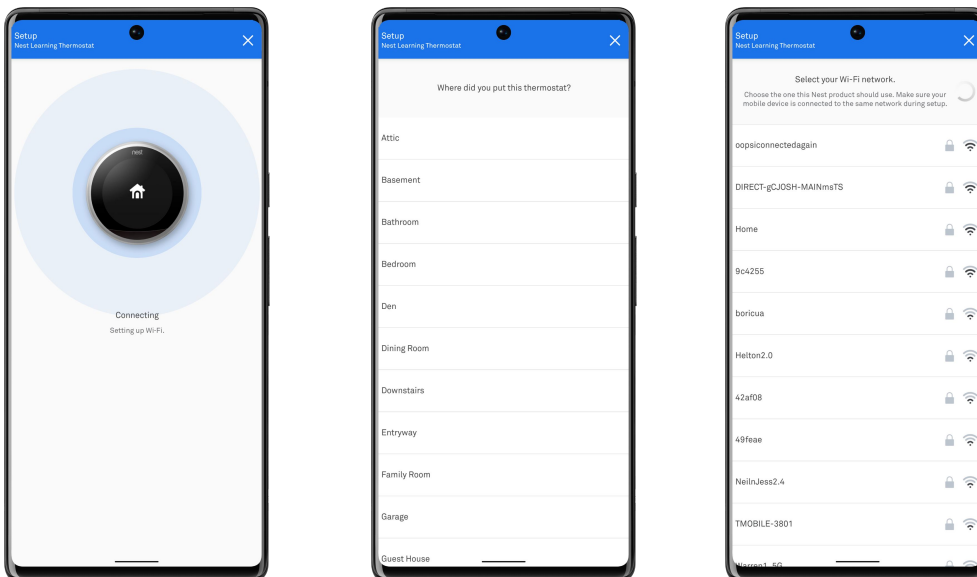
Installation Step by Step- Nest App

On the Nest App:

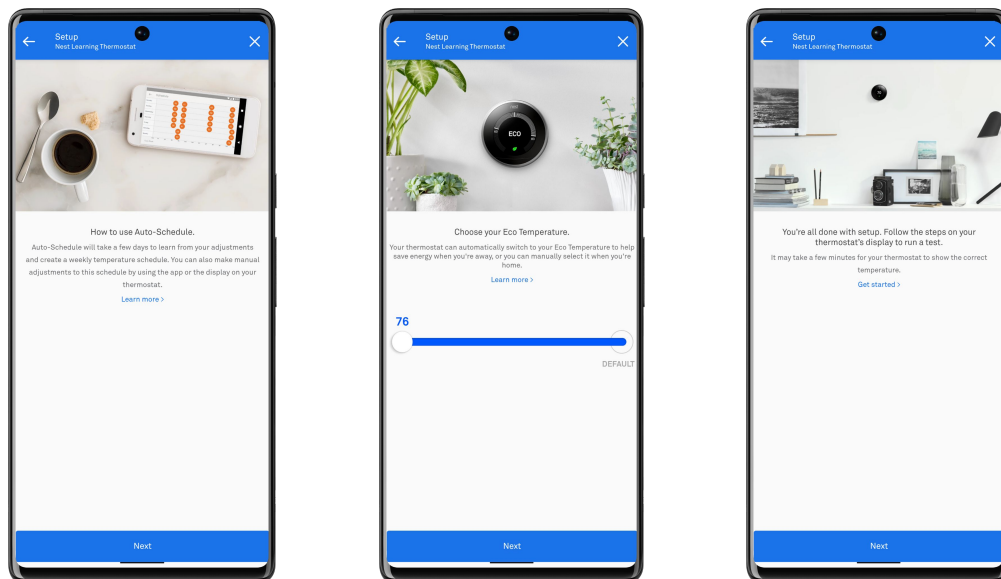
- 1) Add Product:** Select “Add Product” in the Settings Tab or the Home Screen then Scan the QR code on the thermostat screen, or on the back of the thermostat. You can also use the “Entry Key” instead of the QR code which can be found on the back of the thermostat. Select “Already Installed” to skip the instructions for how to install the thermostat.



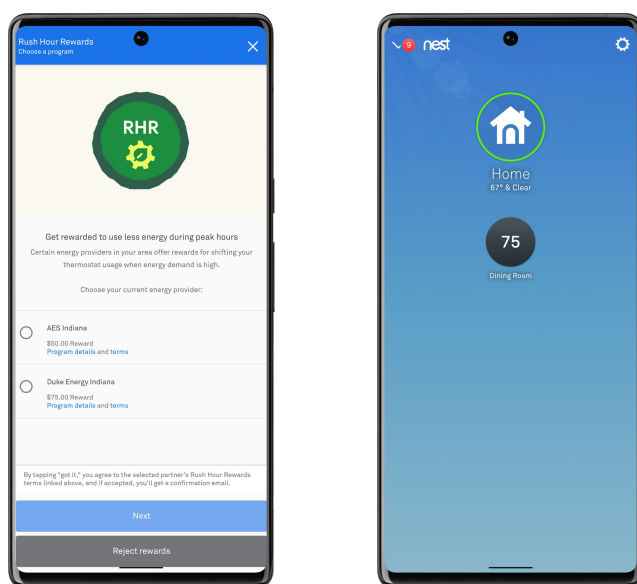
- 2) Connect thermostat to Wi-Fi:** Select the Customer’s Wi-Fi network from the list of available networks. Type in the password and wait for a confirmation screen. Once paired to Wi-Fi, choose “where” the thermostat is placed from the available options. This location will serve as the name of the thermostat and the Room assignment.



- 3) **Feature Overview:** The Nest Learning Thermostat will explain the Auto Schedule feature and what to expect over the next few days. It will then ask you to confirm the Eco Temperatures for the thermostat. Once you've adjusted the Eco Temperatures, you are ready to proceed with the system test on the thermostat.



- 4) **Rush Hour rewards or rebates:** Some customers will be offered rebates based on their location. Some rebates require enrollment in Rush Hour Rewards. Make sure customers read through details of these offers before enrolling. They can usually sign up at a later date if the customer would like to learn more before enrolling. If there are no rebate offers, or once the customer completes or skips enrollment, the thermostat will be ready to use when it shows the thermostat in the app with a setpoint.



Installation Step by Step- On Device

On the thermostat

- 1) **Internet Connection:** If you do not add the thermostat to the app when prompted, you will be asked to connect the thermostat to a Wi-Fi network. If there is Wi-Fi available, you should see the available networks, and input the password. Connecting the thermostat to Wi-Fi at this stage will allow you to skip some steps. If there is no Wi-Fi available, you can skip this step and proceed to the next steps.



- 2) **Location:** Without Wi-Fi, the thermostat will need to know where the device is located and what type of building it is in to control the equipment properly. Select the location, building type, and the current time and date



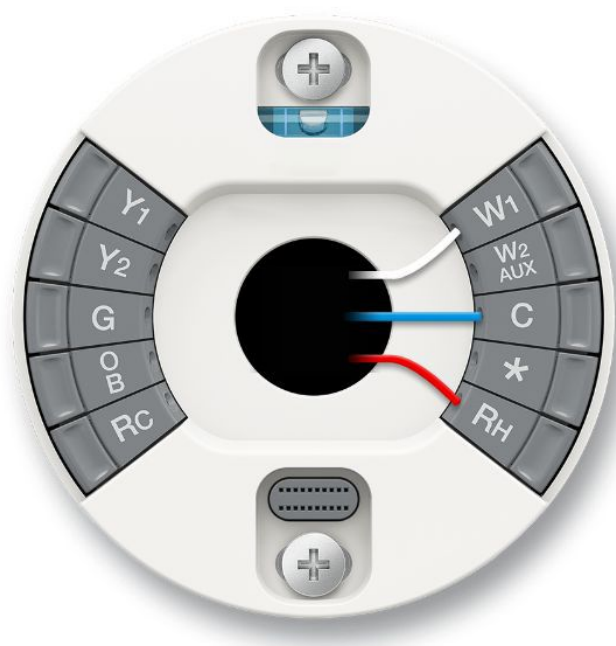
- 3) **Temperature Preferences and Test:** Choose whether the equipment should run in Heating or Cooling mode to start. Then choose the Eco Temperatures the stat will observe. There may be additional settings to configure for more complex equipment such as Dual Fuel Lockout temps. Once settings have been set, you will be prompted to test the thermostat.



Wiring Diagrams - Conventional

Conventional 1 stage heating

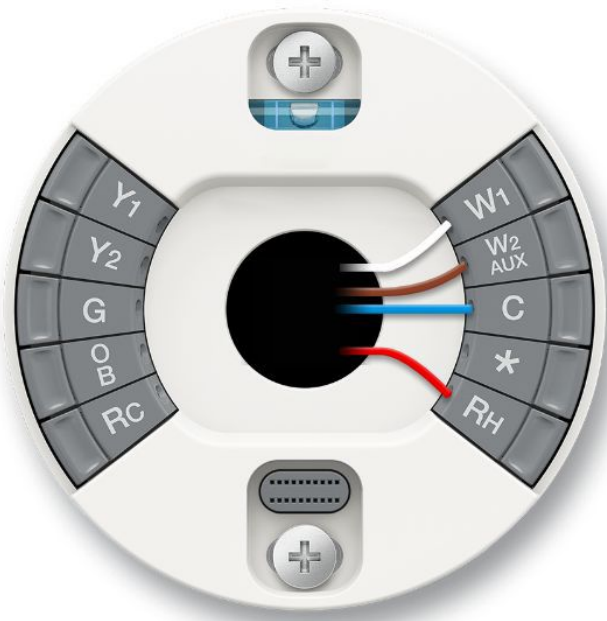
Wire Label	Function
Y1	
Y2	
G	
O/B	
Rc	
W1	Heat Relay (Stage 1)
W2/AUX	
C	24VAC Common Wire
*	
Rh	24VAC power from heating transformer



Install Notes: Use for personal/or system notes

Conventional 2 stage heating

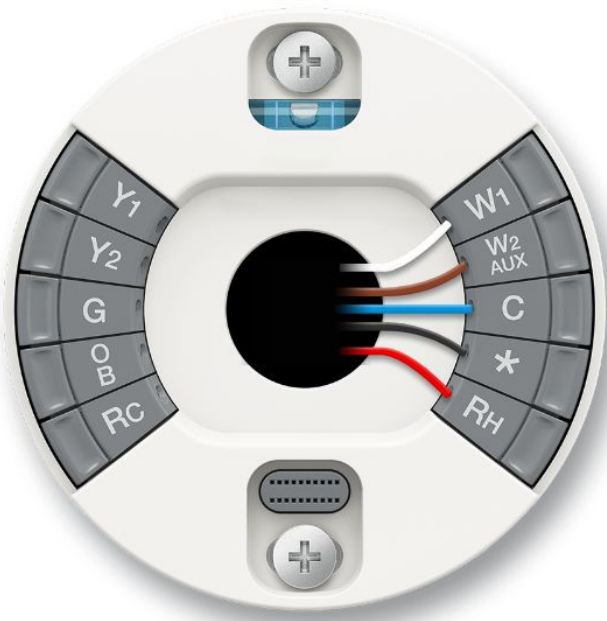
Wire Label	Function
Y1	
Y2	
G	
O/B	
Rc	
W1	Heat Relay (Stage 1)
W2/AUX	Heat Relay (Stage 2)
C	24VAC Common Wire
*	
Rh	24VAC power from heating transformer



Install Notes: Use for personal/or system notes

Conventional 3 stage heating

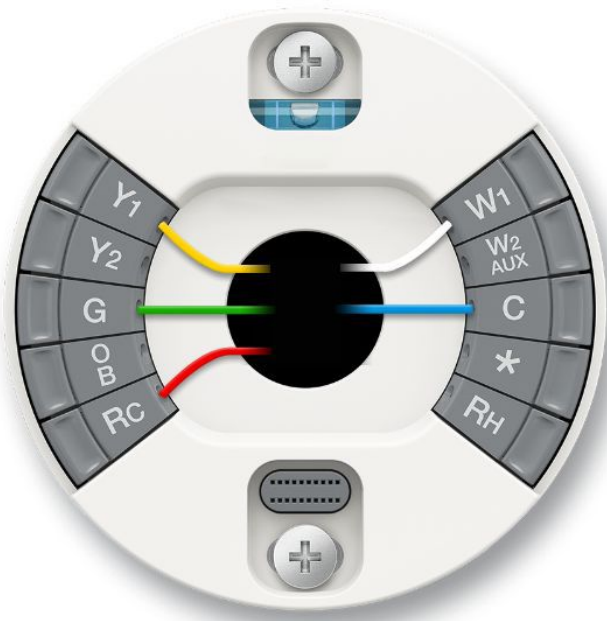
Wire Label	Function
Y1	
Y2	
G	
O/B	
Rc	
W1	Heat Relay (Stage 1)
W2/AUX	Heat Relay (Stage 2)
C	24VAC Common Wire
*	Heat Relay (Stage 3)
Rh	24VAC power from heating transformer



Install Notes: Use for personal/or system notes

Conventional 1 stage heating, 1 stage cooling

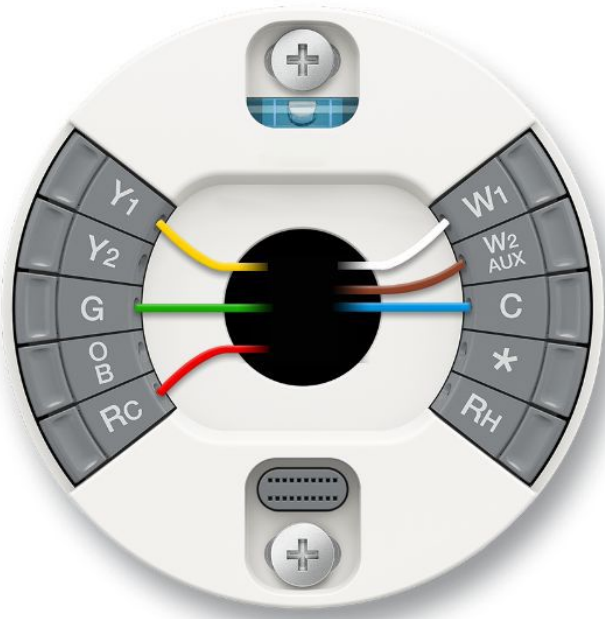
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	
G	Fan Relay
O/B	
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	
C	24VAC Common Wire
*	
Rh	



Install Notes: Use for personal/or system notes

Conventional 2 stage heating, 1 stage cooling

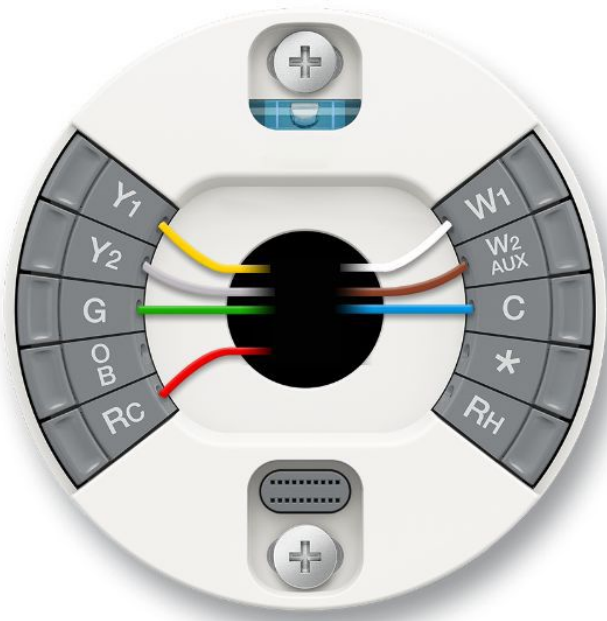
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	
G	Fan Relay
O/B	
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	Heat Relay (Stage 2)
C	24VAC Common Wire
*	
Rh	



Install Notes: *Use for personal/or system notes*

Conventional 2 stage heating, 2 stage cooling

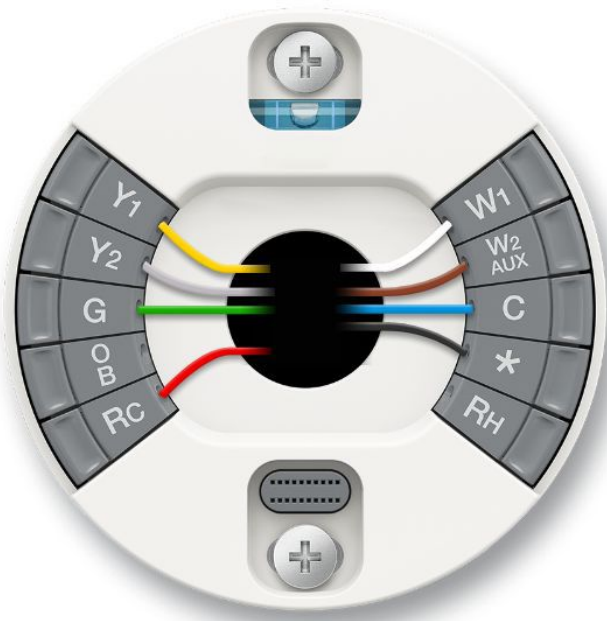
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	Compressor Relay (Stage 2)
G	Fan Relay
O/B	
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	Heat Relay (Stage 2)
C	24VAC Common Wire
*	
Rh	



Install Notes: *Use for personal/or system notes*

Conventional 3 stage heating, 2 stage cooling

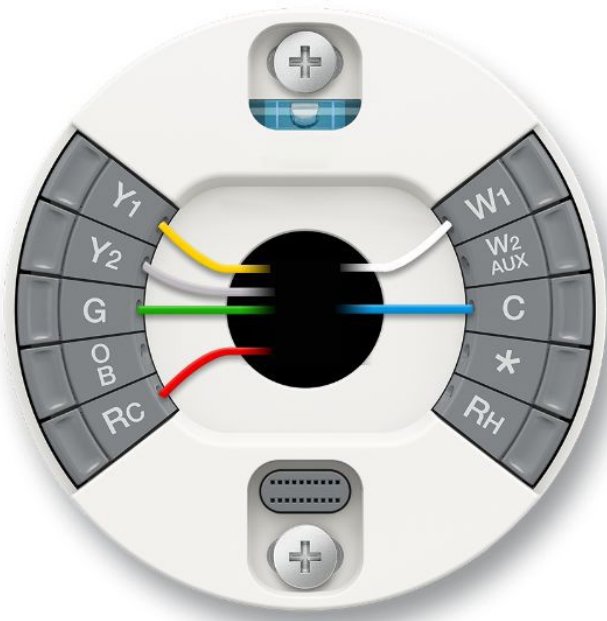
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	Compressor Relay (Stage 2)
G	Fan Relay
O/B	
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	Heat Relay (Stage 2)
C	24VAC Common Wire
*	Heat Relay (Stage 3)
Rh	



Install Notes: Use for personal/or system notes

Conventional 1 stage heating, 2 stage cooling

Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	Compressor Relay (Stage 2)
G	Fan Relay
O/B	
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	
C	24VAC Common Wire
*	
Rh	

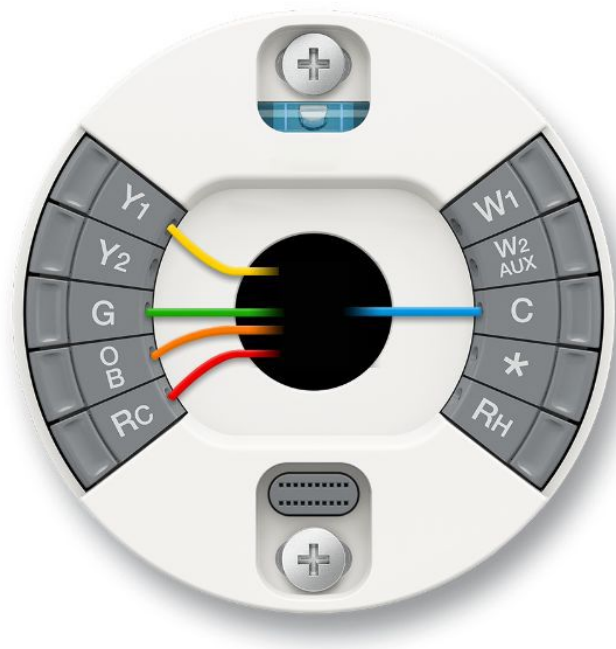


Install Notes: *Use for personal/or system notes*

Heat Pumps

1 stage heat pump

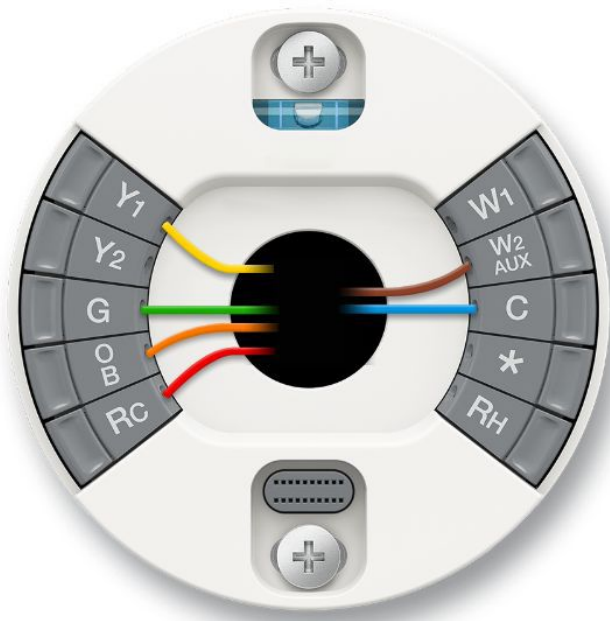
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	
W2/AUX	
C	24VAC Common Wire
*	
Rh	



Install Notes: Use for personal/or system notes

1 stage heat pump with Aux heat

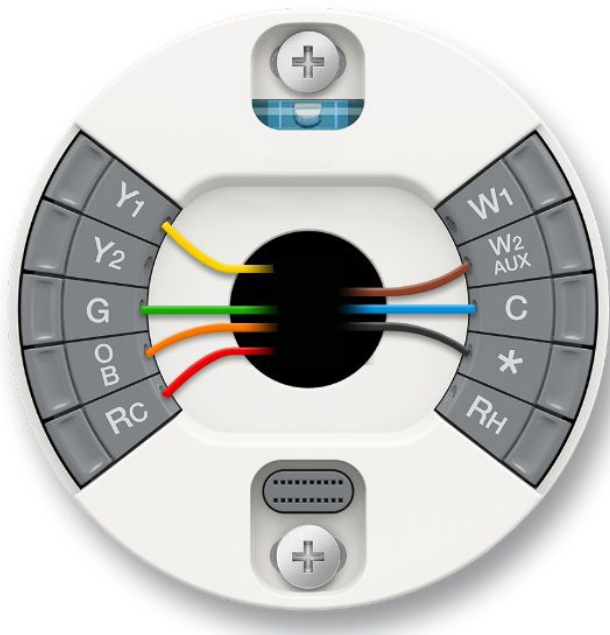
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	
W2/AUX	Auxiliary Heat Relay
C	24VAC Common Wire
*	Heat Relay (Stage 3)
Rh	24VAC power from heating transformer



Install Notes: Use for personal/or system notes

1 stage heat pump with Aux and Emergency heat

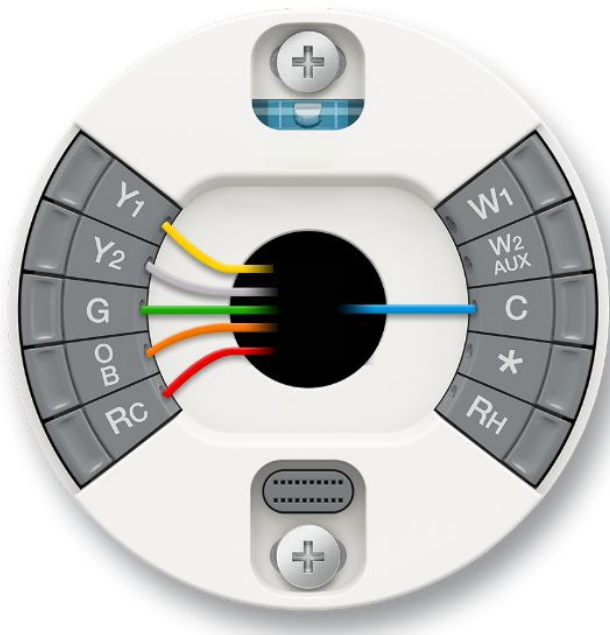
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	
W2/AUX	Auxiliary Heat Relay
C	24VAC Common Wire
*	E Heat
Rh	



Install Notes: Use for personal/or system notes

2 stage heat pump

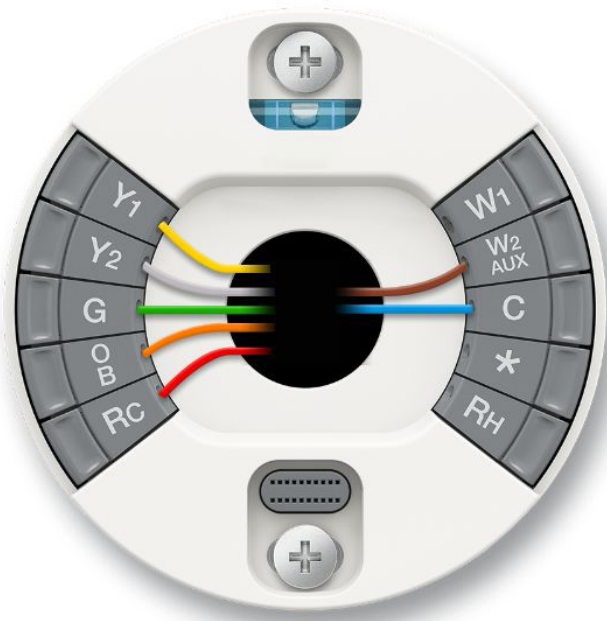
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	Compressor Relay (Stage 2)
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	
W2/AUX	
C	24VAC Common Wire
*	
Rh	



Install Notes: Use for personal/or system notes

2 stage heat pump with Aux heat

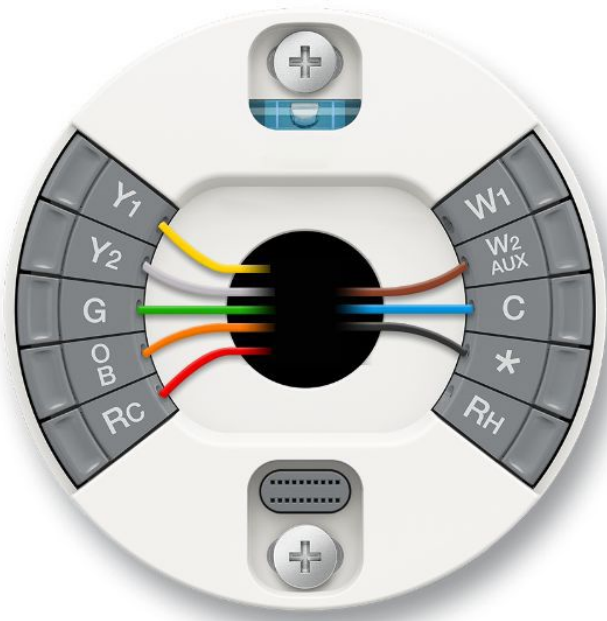
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	Compressor Relay (Stage 2)
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	
W2/AUX	Auxiliary Heat Relay
C	24VAC Common Wire
*	
Rh	



Install Notes: *Use for personal/or system notes*

2 stage heat pump with Aux and Emergency heat

Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	Compressor Relay (Stage 2)
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	
W2/AUX	Auxiliary Heat Relay
C	24VAC Common Wire
*	E Heat
Rh	

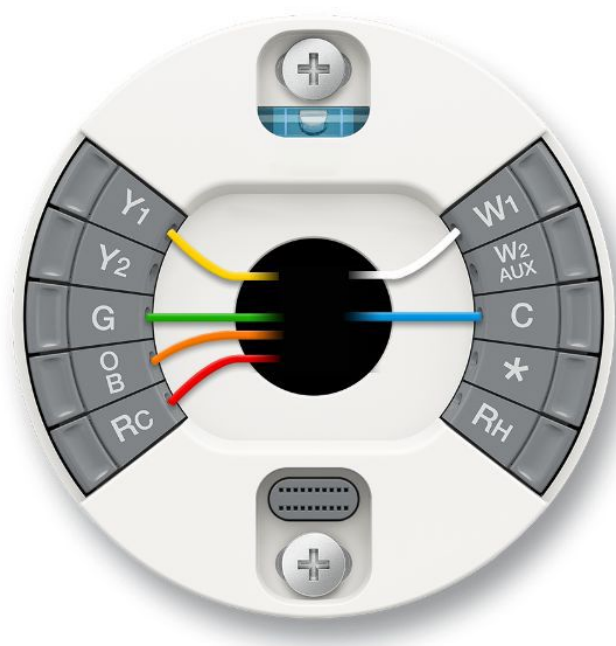


Install Notes: Use for personal/or system notes

Dual Fuel

1 stage heat pump, 1 stage heat

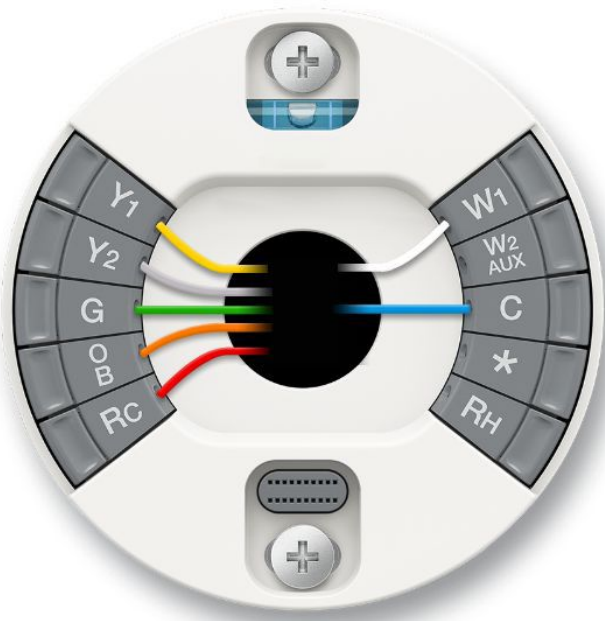
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	
C	24VAC Common Wire
*	
Rh	



Install Notes: Use for personal/or system notes

2 stage heat pump, 1 stage heat

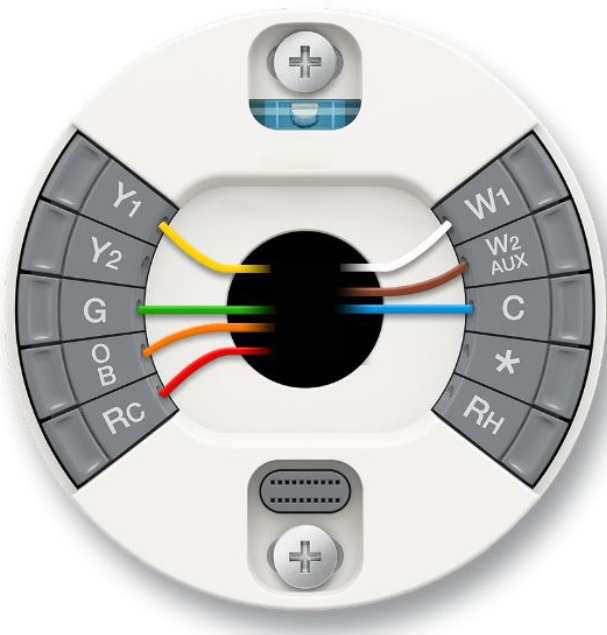
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	Compressor Relay (Stage 2)
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	
C	24VAC Common Wire
*	
Rh	



Install Notes: *Use for personal/or system notes*

1 stage heat pump, 2 stage heat

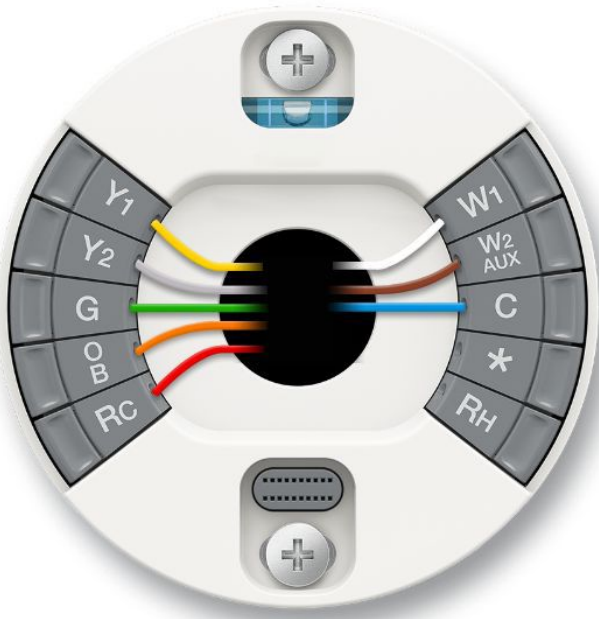
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	Heat Relay (Stage 2)
C	24VAC Common Wire
*	
Rh	



Install Notes: Use for personal/or system notes

2 stage heat pump, 2 stage heat

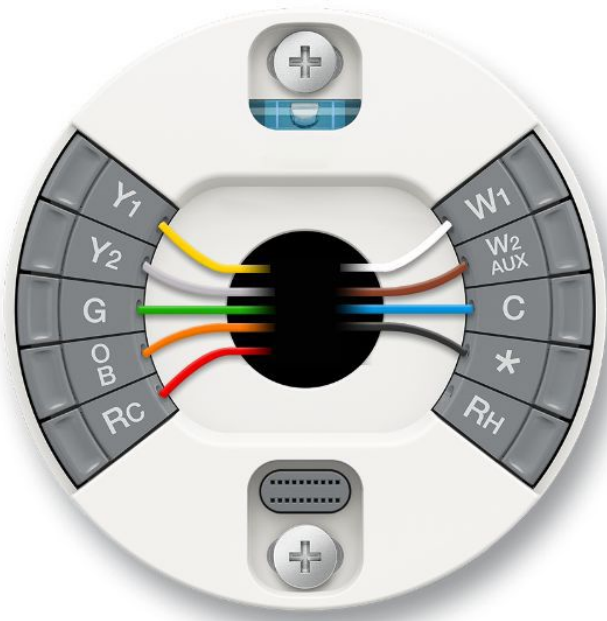
Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	Compressor Relay (Stage 2)
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	Heat Relay (Stage 2)
C	24VAC Common Wire
*	
Rh	



Install Notes: Use for personal/or system notes

2 stage heat pump, 2 stage heat with Emergency heat

Wire Label	Function
Y1	Compressor Relay (Stage 1)
Y2	Compressor Relay (Stage 2)
G	Fan Relay
O/B	Heat Pump Changeover Valve
Rc	24VAC power from cooling transformer
W1	Heat Relay (Stage 1)
W2/AUX	Heat Relay (Stage 2)
C	24VAC Common Wire
*	E Heat
Rh	

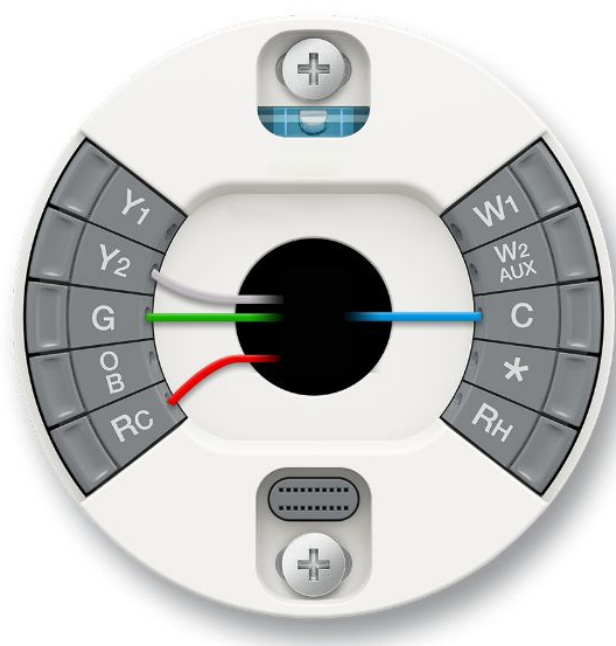


Install Notes: Use for personal/or system notes

Fan Control

2 speed fan

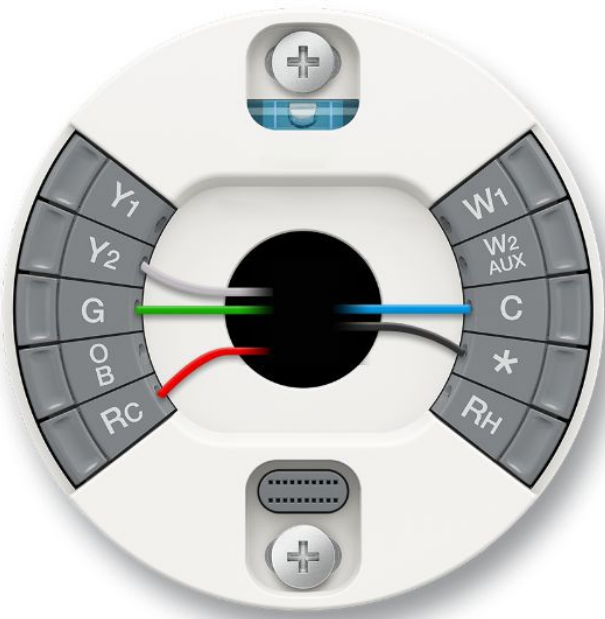
Wire Label	Function
Y1	
Y2	2nd-speed fan relay
G	Fan Relay
O/B	
Rc	24VAC power from cooling transformer
W1	
W2/AUX	
C	24VAC Common Wire
*	
Rh	



Install Notes: Use for personal/or system notes

3 speed fan

Wire Label	Function
Y1	
Y2	2nd-speed fan relay
G	Fan Relay
O/B	
Rc	24VAC power from cooling transformer
W1	
W2/AUX	
C	24VAC Common Wire
*	3rd-speed fan relay
Rh	

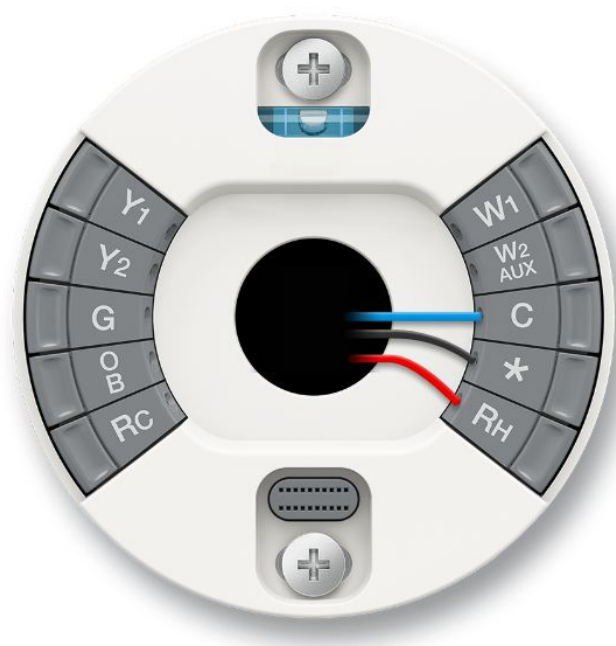


Install Notes: Use for personal/or system notes

Hum or Dehum

Hum or Dehum

Wire Label	Function
Y1	
Y2	
G	
O/B	
Rc	
W1	
W2/AUX	
C	24VAC Common Wire
*	HUM/DHUM
Rh	24VAC power from heating transformer



Install Notes: Use for personal/or system notes

Troubleshooting

Handling Unusual Thermostat Wiring

When a B or X wire is a common wire

Most thermostat manufacturers use C to designate the connector for the common wire. However there are some Trane, American Standard, and York thermostats use B for the common wire.

The NEMA standard designated the B wire as one of the change-over wires for some heat pump manufacturers. This is a simple issue to address:

1. If you're installing a Nest thermostat to control a heat pump system and the current thermostat has both an B and a C, connect B to the Nest O/B connector and connect the C to the Nest C connector.
2. If you're installing a Nest thermostat to control a heat pump system and the current thermostat has both an O and a B, connect O to the Nest O/B connector and connect the B to Nest's C connector.
3. If you're installing a Nest thermostat to control a heat pump system and the current thermostat only has a B wire, connect B to the Nest O/B connector.
4. If you're installing a Nest thermostat to control a conventional system (non heat pump) and you see a B wire connected to the current thermostat, that B is a common wire and should be connected to the C connector on the Nest base.

Important Note: If you have a B wire that is actually a common wire, not following the rules above can lead to blowing a fuse on your HVAC controller board and, most likely, damaging the Nest Thermostat.

When X, W1 or W2 is an AUX wire

Some heat pump installations may have the auxiliary heat connection labelled as X, W1 or W2 on the thermostat.

You should verify that the X wire on the old thermostat is not a common wire. Once you're sure , you can assume that the X is the auxiliary heat and should be inserted into the AUX/W2 connector on the Nest Thermostat.

Compressor and Auxiliary Heat Lockout Temperatures for Heat Pumps Requires Wi-Fi

The lockout temperatures are only enforced when the Nest Thermostat is connected to Wi-Fi so it can track outdoor temperatures. If Wi-Fi is not enabled, auxiliary heat and alternate heat (in the case of dual fuel systems) will come on automatically when it takes longer than expected to reach the current target temperature.

See this link [Learn about Heat Pumps and Auxiliary Heat](#) for more details.

If the Nest thermostat isn't getting enough power from W or Y and there is no Common ("C") wire

While we find that in the vast majority of homes the Nest Thermostat can charge its built in battery by power sharing from the regular heating and cooling wires. But in some cases a common wire is needed to deliver consistent power to the Nest Thermostat while allowing normal operation of the heating and cooling system. If there is a common (C) wire installed the Nest Thermostat will not power share.

If your system can't deliver consistent power to your thermostat to keep its battery charged or correctly control heating and cooling, you may experience one or more of these symptoms:

- Reduced thermostat battery life
- Thermostat display won't turn on
- Thermostat motion sensing is disabled
- Your thermostat occasionally disconnects from Wi-Fi
- Your system unexpectedly turns on or off
- Your system is making strange noises: chattering, stuttering, clicking or thumping
- Heating or cooling is always on, and won't turn off
- Heating or cooling repeatedly turns on and off in a short period
- A "Delayed" or "Starts in" message often appears on your Nest thermostat's screen (for example: "Heating is delayed for 2:30 mins")
- The system fan is always running or won't turn on
- The system fan turns on and off repeatedly in a short period
- You get an E1, E297, N260 or N261 error code

See the next page for detailed power requirements and how to interpret them.

There are four options to solve a Power Issue:

1. Use the Nest Power Connector to provide constant power.
2. Use a spare wire as a common wire.
3. Add a resistor to an existing Y or W wire
4. Pull a new common wire.

See page 62 for details and instructions about these four solutions.

Power Requirements and Details

Battery- If your thermostat isn't receiving enough power to charge the battery and it falls below 3.6V, your thermostat will turn off Wi-Fi, delay software updates, and disable the screen to preserve the battery charge and delay shutting down completely. 3.7V is required to install a software update. 3.6V is required for the display to turn on when you approach. The preferred voltage of the stat is around 3.9v.

[Appropriate Power readings](#) - Can be found on the thermostat under "Technical Details"

Value found on Thermostat	With Common	Without Common or Power Connector
Voc (Voltage open circuit)	29 to 42V	29 to 42V
VIN (Voltage input)	29 to 42V	29 to 42V
Iin (Current Intensity input)	200 mA	20 to 40 mA
Note: These values are not RMS voltage. You can divide the Voc or VIN by 1.414 to get an approximate RMS voltage the stat is reading. Always confirm voltage with a multimeter.		

Iin Readings and What They Mean

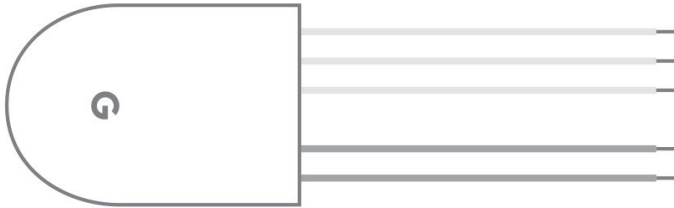
Power Sharing- A quick way to tell if the thermostat is engaging in power sharing is by checking the Iin value in the technical details setting on the thermostat. The value will be followed by a letter in parentheses, which indicate the following. Note: The thermostat will not power share during the first 90 seconds of a call for heating or cooling.

- (a) - The system is currently actively power sharing across the Y wire to charge the internal battery
- (i) - The system is currently power sharing across an inactive wire to charge the internal battery (ex. The system is heating, and you are power sharing across the Y wire)
- (c) - Power Sharing is not occurring because a C-Wire is installed
- (o) or (x) - Power Sharing is not occurring and the thermostat has lost power or cannot complete the power sharing circuit

1. Nest Power Connector

If your thermostat has power-related issues, like the battery draining too quickly or Wi-Fi constantly disconnecting, you can typically fix them by connecting a common wire (C wire) or by installing the Nest Power Connector. Either one will provide a stable power source for your Nest thermostat when your system can't deliver enough consistent power to it.

Please Note: A Power Connector is needed for each thermostat in a Zoned system.



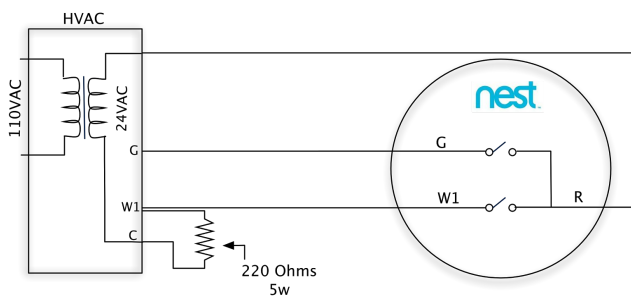
2. Use a spare wire as common wire

The easiest way to solve the problem is by using a spare wire in the thermostat wire as a common wire. Simply connect one end of the unused wire to the Common ("C") terminal in the HVAC controller and the other end to the thermostat's C terminal.

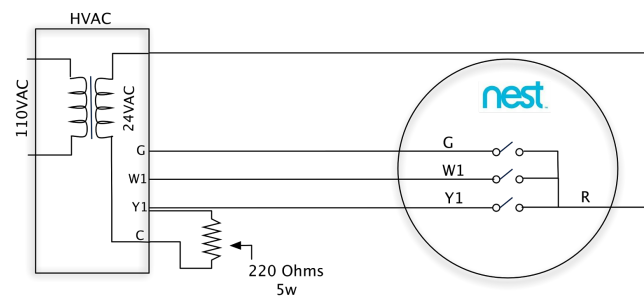
3. Add a resistor to an existing Y or W wire

We've found that many Y and W wire circuits that cannot supply enough power can be strengthened by bridging the Common terminal at the HVAC equipment to W or Y through a 220-ohm, 5W resistor.

In a heat-only system, you need to bridge from common C to W. In a HVAC system with a Y wire, you must bridge from common C to Y. (Nest can only charge from W when Y is not connected.)



Heat only systems



Heating and cooling systems

4. Pull a new C wire

Replace the thermostat wiring bundle to provide an extra wire to be used as common. Advise your customer that this will require extra work and therefore an additional cost.

Reference Materials

“How To” Quick Reference Guide

Action:	Steps:
Tips on providing a good customer experience	<p><u>Demonstrate how to use the Nest Thermostat:</u></p> <ul style="list-style-type: none"> • Basic temp changes • Home/eco mode manual switching • Switching between heat/cool modes, etc. • Changing the temperature schedule • Running the fan <p><u>Explain key functions of the thermostat</u></p> <ul style="list-style-type: none"> • Explain rebates and rewards offers in your area • Explain Auto-Schedule behavior and the initial learning period • Explain features like Energy History and Home Report • Explain how to add additional family members
Configuring Nest Thermostat for the installation location and HVAC system	<p>Just after installation, the Nest Thermostat will guide you through a set up interview, where you will configure it for the heating and cooling system it’s controlling and for the home or business where it’s installed.</p> <p>The set up interview will also guide you through connecting to the customer’s Wi-Fi network, establishing the location through zip code, and establishing if the place of installation is a home or business. All of this information helps the Nest Thermostat to build a schedule that is best suited for the customer’s needs.</p>
Use Pro Setup to configure your customer’s HVAC system	<p>Pro Setup allows professionals to configure how the Nest Thermostat controls each wire connected to the base. Pro Setup is required when using dual fuel systems (e.g. heat pump with furnace), humidifiers and dehumidifiers.</p> <p>Pro Setup also offers configuration choices for other types of systems such as two-stage heat pumps and emergency heat. It is available to installation professionals during and after installation and allows them to specify how the Nest Thermostat should control the HVAC system.</p>

Action:	Steps:
<p>Testing the basic operation after installation</p>	<p><u>Use System Test function in Equipment settings</u></p> <p>You can use the System Test function in the Equipment settings to engage each individual equipment component. If the thermostat is not connected to Wi-Fi, you will need to manually activate equipment by following the steps below.</p> <p><u>Activate heating and cooling</u></p> <p>Simply turn the ring to set the current set point above or below the current ambient temperature in the room. You'll need to switch to and from heating and cooling modes as you do this.</p> <p><u>Switching modes</u></p> <p>To switch to and from heating and cooling modes, follow these steps:</p> <ol style="list-style-type: none"> 1) Press the ring to bring up the menu 2) Select the Heating and Cooling icon 3) Turn the ring to select HEAT or COOL 4) Press the ring again to select <p>Note: To protect the heating and cooling systems it controls, Nest Thermostat's minimum on-off times for manual temperature adjustments are 2.5 minutes for heat pumps and air conditioning systems.</p>
<p>Testing second stage or auxiliary heat after installation</p>	<p><u>Conventional Heating</u></p> <p>Before Nest Thermostat activates Time-to-Temperature, second stage heat will turn on when the setpoint is 4°F or greater than the room's ambient temperature</p> <p><u>Heat Pumps</u></p> <p>Auxiliary heat will turn on when the setpoint is 4°F and the outdoor temperature is below 50°F, the default auxiliary heat lockout temperature. Auxiliary lockout can be turned off in the Heat Pump section of Equipment Settings in order to test auxiliary heat.</p> <p>To test second stage or auxiliary heat at installation, just raise the temperature 4°F in heating mode with the auxiliary lockout turned off. Once Time to Temperature is activated, the Nest Thermostat will use this feature to manage second stage and auxiliary heat.</p>

Action:	Steps:
Switch between Heating, Cooling, and Heat•Cool mode	<p><u>To switch to and from heating and cooling modes, follow these steps:</u></p> <ol style="list-style-type: none"> 1) Press the ring to bring up the menu 2) Select the Heating and Cooling icon 3) Turn the ring to select HEAT, COOL, HEAT • COOL, or OFF 4) Press the ring again to select
Heat Pump: Setting compressor and auxiliary lockout temperatures	<p>Both auxiliary and compressor lockout temperatures can be changed in the Heat Pump section of the Equipment Settings menu. By default, the Nest Thermostat will lock out the auxiliary heater when the outdoor temperature is above 50°F but will not lockout the compressor at any temperature.</p> <p>The lockout temperatures are only enforced when the Nest Thermostat is connected to Wi-Fi so it can track outdoor temperatures.</p> <p><u>To access the Heat Pump section of Equipment settings:</u></p> <ol style="list-style-type: none"> 1) Press the ring to bring up the menu 2) Turn the ring and select SETTINGS 3) Turn the ring and select EQUIPMENT 4) Turn the ring and select HEAT PUMP
Heat Pump: Change heat pump valve orientation	<p><u>Follow these steps:</u></p> <ul style="list-style-type: none"> • Press the ring to bring up the menu • Turn the ring and select SETTINGS • Turn the ring and select EQUIPMENT • Turn the ring and select HEAT PUMP

Action:	Steps:
Adjust ECO Heating and Cooling Temperatures	<p>These temperatures are set as the final step during the setup interview.</p> <p><u>To adjust:</u></p> <ol style="list-style-type: none"> 1) Press the ring to bring up the menu 2) Turn the ring and select SETTINGS 3) Turn the ring and select ECO <p>Turn the ring to set the HEAT TO temperature. Press the ring to set the COOL TO temperature. Press the ring again when done.</p>
Adjust Safety Temperatures	<p>No matter the schedule, the Nest Thermostat will never let the home go above or below the safety temperatures.</p> <p><u>To adjust them, follow these steps:</u></p> <ol style="list-style-type: none"> 1) Press the ring to bring up the menu 2) Turn the ring and select SETTINGS 3) Turn the ring and select EQUIPMENT 4) Turn the ring and select SAFETY TEMP
Restart or reset the settings on the thermostat	<p>You may need to reset the settings if:</p> <ul style="list-style-type: none"> • You need to restart the thermostat • Reset Nest Sense features • To help with troubleshooting Wi-Fi issues • The thermostat needs to be reconfigured <p><u>Follow these steps to access the RESET settings:</u></p> <ol style="list-style-type: none"> 1) Press the ring to bring up the menu 2) Turn the ring and select SETTINGS 3) Turn the ring and select RESET 4) Select one of the following options: CANCEL, RESTART, SCHEDULE, AUTOAWAY, NETWORK, ALL SETTINGS

Action:	Steps:
Setting fan speeds for systems with multi-speed fans	<p><u>Follow these steps:</u></p> <ol style="list-style-type: none"> 1) Press the ring to bring up the menu 2) Select the Fan icon 3) Choose System fan speed 4) Select the fan speed you'd like to use when your system is heating or cooling your home. You can choose Low, Medium, High or Auto, depending on your system's wiring. 5) Choose Done to set your system's fan speed
How to Engage Emergency Heat	<p><u>Follow these steps:</u></p> <ol style="list-style-type: none"> 1) Press the thermostat ring to bring up the Quick View menu. 2) Go to Settings Nest settings icon and then Equipment. 3) Select Continue when the wiring diagram appears. 4) Select Continue a second time when you find a summary of your system. 5) Select Emer. Heat. 6) Select Emer. Heat again (Nest Learning Thermostat) or Turn On (Nest Thermostat E) to confirm that you'd like to turn emergency heat on. <p>Tip: In order to engage E. Heat on the Nest Learning Thermostat, you MUST have a wire in the * terminal configured as emergency heat.</p>
How to Add or Verify your Pro ID is linked to the thermostat	<p><u>Follow these steps:</u></p> <ol style="list-style-type: none"> 1) Press the thermostat ring to bring up the Quick View menu. 2) Go to Settings Nest settings icon and then Nest Pro 3) If your Nest Pro information is visible, it has been linked to the thermostat 4) If it hasn't been added during installation, select, "Enter Nest Pro ID" 5) Enter your 6 digit Pro ID which can be found in the top right of your nest pro dashboard 6) If another Nest Pro's contact information is already on the thermostat, you will have the option to replace it with yours. <p>Tip: Customers can view your contact information by navigating to the Nest Pro section in the settings menu. They can also find it in the Nest App in the Contacts page of the Settings Menu. They can also find it in the Google Home App in the Support section of the Settings Tab.</p>

Action:	Steps:
<p>Downloading the Nest App, creating an account and pairing the Nest Thermostat</p>	<p><u>To download the Nest App and create an account follow these steps:</u></p> <ol style="list-style-type: none"> 1) Download the Nest App on your customer's phone or tablet from the Apple App Store or Google Play 2) Open the Nest App and tap Sign up 3) Enter the customer's email address 4) Have your customer enter a password 5) Read and agree to the Nest Terms of Service 6) Have your customer check their email for a "Welcome to Nest" message and instruct them to tap on the included link to activate their Nest Account 7) To pair the Nest Thermostat with the customer's account follow these steps: 8) Press the thermostat's ring to open the Quick View menu 9) Choose SETTINGS 10) Turn the ring to Nest Account and press the ring to select it 11) Select Get Entry Key and write it down 12) Open the Nest App 13) From the home screen, tap the Settings icon 14) Tap Add product 15) Scan the QR code on the back of the thermostat or tap Continue without scanning and then Nest Thermostat 16) Follow the Nest App instructions, when prompted type in the entry key you obtained in step 4 17) You'll see the thermostat appear on the Nest App home screen. Tap the thermostat icon to control it and change settings.
<p>Pairing Nest with your Google Home App</p>	<p><u>To Pair the Nest Learning Thermostat to the Google Home app follow these steps:</u></p> <ol style="list-style-type: none"> 1) Download the Google Home App on your customer's phone or tablet from the Apple App Store or Google Play 2) Open the Google Home App and sign in with the same account used for the Nest App 3) Read and agree to Google's Terms of Service 4) Have the customer check the top right to make sure the house is the same as in the Nest App 5) Make sure Nest devices show up under the "Devices" tab 6) Your customer is now able to control their Nest devices in their Google Home App

Wiring error quick reference guide

If the Nest Thermostat senses a problem with the wiring, you'll receive an "E" error. These errors must be fixed before setup can continue. "N" errors are not as critical and setup will continue but certain features may not work. "W" errors indicate there is an issue with the Wi-Fi connection.

"E" errors related to wires not being detected can be the result of a wire not being fully inserted into the connector or terminal. Ensure all wires are fully inserted and the connector buttons are in the down position before performing additional troubleshooting.

Important Note: *These errors may change with future software updates. Visit support.google.com for the latest information.*

Error #	Description:	What's going on?
E72	No power wires detected Rh or Rc wire is required	You'll see this error when either a Rh or Rc wire was not installed or the Rh or Rc wire that was installed isn't powered.
E73	No power to Rc wire detected	You'll see this error if you've installed both an Rc wire and The Nest Thermostat isn't electrically detecting it.
E74	No power to Rh wire detected	You'll see this error if you've installed both an Rh wire and The Nest Thermostat isn't electrically detecting it.
E75	No heating or cooling wires detected W1 or Y1 wire is required	The Nest Thermostat cannot detect any wires inserted into W1 or Y1. At least one of these is required.
E77	Y1 wire not detected. Heat pump requires a Y1 wire	The Nest Thermostat is physically detecting a wire in the O/B connector. This connector is exclusively used for heat pumps which also require a Y1 wire to be attached.
E78	Additional wire(s) required. AUX/W2 detected by itself	The Nest Thermostat is physically detecting a wire in the AUX/W2 connector. Supported configurations that use this connector also include a W1 wire or an O/B + Y1 wire.
E79	No power to C wire detected	The Nest Thermostat is physically detecting a wire in the C connector, but isn't detecting any power to it.
E80	No power to Y1 wire detected	The Nest Thermostat is physically detecting a wire in the Y1 connector but isn't detecting any power to it.
E82	No power to W1 wire detected	The Nest Thermostat is physically detecting a wire in the W1 connector but isn't detecting any power to it.

Error #	Description:	What's going on?
E83	Heat pump can have at most one auxiliary heat wire	The Nest Thermostat was previously setup as a single fuel system with auxiliary heat put it's detecting both W1 and AUX/W2 wires that aren't supported in that configuration.
E84	Dual fuel requires an alternate heat wire	The Nest Thermostat was previously setup as a dual fuel system but it's not detecting a W1, AUX/W2 or * (W3) wire that is required to have alternate heat.
E85	Dual fuel can have at most two alternate heat wires	The Nest Thermostat was set up as a dual fuel system, but the W1, AUX/W2 and * (W3) wires are configured as alternate heat wires.
E86	Heat pump can have at most one auxiliary heat wire	The Nest Thermostat was previously setup as a single fuel system with auxiliary heat, but it's detecting W1, AUX/W2 and * (W3) wires that aren't supported in that configuration.
E87	Heat pump can have at most one auxiliary heat wire	The Nest Thermostat was previously setup as a single fuel system with auxiliary heat, but it's detecting W1 and * (W3) wires that aren't supported in that configuration.
E88	Heat pump can have at most one auxiliary heat wire	The Nest Thermostat was previously set up as a single fuel system with auxiliary heat, but it's detecting AUX/W2 and * (W3) wires that aren't supported in that configuration.
E89	Y2 wire without Y1 wire	The Nest Thermostat is physically detecting a Y2 wire but not a Y1 wire that is required for 2 stage conventional cooling systems or 2 stage heat pumps.
E90	W3 wire without W2/AUX wire	The Nest Thermostat is physically detecting a * (W3) wire but not a W2/AUX wire that is required for 3 stage conventional heating systems.
E91	E wire without O/B wire	The Nest Thermostat is physically detecting a * (E) wire but not an O/B wire. O/B is a heat pump wire and Nest only supports the use of emergency heat with heat pump systems.

Error #	Description:	What's going on?
E92 E93 E94 E95 E96 E97 E98 E99 E100 E101	Your Nest may have tripped an internal fuse and Nest needs to be replaced	The Nest Thermostat either has wires that aren't fully inserted into the connectors or has tripped an internal fuse.
E102 E103 E104 E105 E106 E107 E108	The Nest Thermostat has an overcurrent error	The Nest Thermostat may be wired incorrectly, or your system may be incompatible.
E109	G2 detected. G1 wire is also required	The Nest Thermostat is physically detecting a G2 (fan) wire in the Y2 connector, but it's not detecting a wire in the G connector. Both wires are required for a multi-speed fan.
E110	G2 wire detected. Remove W2/AUX wire	<p>The Nest Thermostat is physically detecting a wire in the W1 connector, a wire in the AUX/W2 connector, and a G2 (fan) wire in the Y2 connector. This indicates you have more than one stage of heat and more than one fan speed.</p> <p>The Nest Thermostat does not support multiple stages of heat and multiple fan speeds at the same time.</p>
E111	G2 wire detected. Remove E wire	The Nest Thermostat has detected a G2 (fan) wire in the Y2 connector, and an emergency heat wire in the connector. The Nest Thermostat doesn't support a multi-speed fan and emergency heat together.
E112	G wire detected. G1 and G2 also required	The Nest Thermostat is physically detecting a G3 (fan) wire in the connector, but it isn't detecting a G2 (fan) wire in the Y2 connector or a wire in the G connector. All three wires are required for a three speed fan.

Error #	Description:	What's going on?
E113	G2 and O/B wire conflict	The Nest Thermostat has detected a G2 (fan) wire in the Y2 connector, and a wire in the O/B connector. This wiring indicates a multi-speed fan and a heat pump. The Nest Thermostat doesn't support this kind of system.
N71	Power wire Rc detected. Not connected	The Nest Thermostat isn't electrically detecting the Rc wire, but one is connected to the Nest base.
N72	Power wire Rh detected. Not connected to equipment	The Nest Thermostat isn't electrically detecting the Rh wire, but one is connected to the Nest base.
N73	No power to W1 wire detected	The Nest Thermostat isn't electrically detecting the W1 wire, but one is connected to the Nest base.
N74	No power to Y1 wire detected	The Nest Thermostat isn't electrically detecting the Y1 wire, but one is connected to the Nest base.
N75	No power to AUX/W2 wire detected	The Nest Thermostat isn't electrically detecting the AUX/W2 wire, but one is connected to the Nest base.
N76	No power to G wire detected	The Nest Thermostat isn't electrically detecting the G wire, but one is connected to the Nest base.
N77	No power to O/B wire detected	The Nest Thermostat isn't electrically detecting the O/B wire, but one is connected to the Nest base.
N78	No power to Y2 wire detected	The Nest Thermostat isn't electrically detecting the Y2 wire, but one is connected to the Nest base
N79	No power to * wire detected	The Nest Thermostat isn't electrically detecting the * wire, but one is connected to the Nest base.
W1	Nest can't continue to connect to your Wi-Fi network	The Wi-Fi access point may now fully support a Wi-Fi standard known as power saving mode.
W2	Failed to connect	The Wi-Fi access point may have security settings enabled that prevent the Nest Thermostat from connecting.
W3	Failed to connect	The Wi-Fi access point is not providing a network IP address to the Nest Thermostat.
W4	Failed to connect	The Nest Thermostat is connected to the wireless network but not to the internet.

Troubleshooting Quick Reference Guide:

Symptom:	What's going on:	Steps to fix:
<p>Nest doesn't turn on after installation</p> <p>Red LED blinking on front</p>	<p>The internal battery is low and needs to charge.</p>	<p>If you leave it where it is, it will slowly charge and eventually turn on. This can take an hour or two.</p> <p>If you have a micro-USB cable and wall charger you can charge it more quickly over USB.</p>
<p>Nest doesn't turn on after installation</p> <p>No LED blinking on the front of the unit</p>	<p>The power was never turned back on.</p>	<p>Use normal electrical troubleshooting techniques to isolate the issue to either the fuse/breaker box or a fuse on the HVAC controller board.</p>
<p>Unit seems to be running backwards (HEAT PUMP)</p>	<p>If it is heating when it is supposed to be cooling and visa versa, the orientation of the heat pump is probably incorrect.</p>	<p><u>Follow these steps to change the heat pump orientation:</u></p> <ol style="list-style-type: none"> 1) Press the ring to bring up the menu 2) Turn the ring and select SETTINGS 3) Turn the ring and select EQUIPMENT 4) Turn the ring and select HEAT PUMP
<p>Forgot Lock Code</p>	<p>Customer has forgotten the lock code to their Nest Thermostat</p>	<p>The Nest Thermostat can be remotely unlocked by logging onto the Nest Account paired with their device from the Nest Web app or from the Nest Mobile app.</p>
<p>Connectivity Issues</p>	<p>There are many things that could affect connectivity.</p>	<p>To find steps to troubleshoot connectivity issues, please see our support page here.</p>

Troubleshooting Quick Reference Guide:

Symptom:	What's going on:	Steps to fix:
Fan doesn't come on	Either there is an issue with the air handler or with the Nest Thermostat.	<p>First, check the wiring to make sure the wires are in the right place and the wire tips are straight and fully inserted into the connectors.</p> <p>If that doesn't work, turn off HVAC breakers and pull out the Rh and the G wires. Carefully hold them together with the copper ends touching for 10-20 seconds.</p> <p>If the fan turns on there may be a hardware issue with the device, so please contact Pro Support.</p> <p>If the fan did not turn on, there is an issue with the heating and cooling system unrelated to the Nest thermostat.</p>
Your customer is seeing a question mark on their Nest Thermostat when they use one of the Nest apps	<p>The Nest app will show a question mark over the thermostat when the Nest servers can't communicate with the device. This may happen if:</p> <p>The customer's Internet Service Provider is down</p> <p>The customer's router is incompatible with the Nest Thermostat</p> <p>The Nest servers are down or undergoing maintenance</p>	<p>First, you should verify that the customer's internet connection is working and that their Wi-Fi network is online.</p> <p>If it is, check the Nest system status at status.nest.com. Nest will publish maintenance or outage information there.</p> <p>The last thing to check is if the customer's Wi-Fi router is compatible with the Nest Thermostat.</p> <p>Wi-Fi troubleshooting help can be found here: Troubleshoot Wifi and Connection Issues</p>

Glossary

[Airwave](#) - 11

[Alternate Heat](#) - 13, 26, 59, 70

[Auto Changeover](#)

(Heat/Cool Mode) - 13, 63

[Auto-Schedule](#) - 8, 63

[Auxiliary Heat](#) - 10, 13, 24, 26, 59, 64, 65, 70, 71

[Auxiliary Lockout](#) - 10, 64, 65

[Common Wire](#) - 15, 59, 60, 61, 62

[Compatibility](#) - 14, 19, 20, 23

[Compatibility Checker Tool](#) - 19

[Compressor Lockout](#)

[Temperature](#) - 13, 24, 35, 59, 65

[Configuration](#) - 22, 25, 29, 63, 69, 70

[Cool to Dry](#) - 11, 28

[Dehumidifier Systems](#) - 11, 17, 27, 28, 29, 63

[Delivery Options](#) - 22, 25, 26

[Dual Fuel](#) - 10, 13, 22, 24, 26, 59, 63

[Dual Fuel Breakpoint](#) - 13, 24

[Early On](#) - 10

[Eco Temps](#) - 9, 10, 11, 12, 20, 24, 34, 35

[Emergency Heat](#) - 14, 15, 23, 27, 63, 67, 70, 71

[Energy History](#) - 63

[Fan Compatibility](#) - 27

[Farsight](#)

[Filter Reminders](#) - 7

[Furnace Heads Up](#) - 7

[Google Assistant](#) - 21

[Google Home App](#) - 6, 9, 10, 12, 21, 28, 67, 68

[Heat Pump Balance](#) - 10, 21, 24

[Home/Away Assist](#) - 9

[Home/Away Routines](#) - 9, 10, 21

[Humidifier Systems](#) - 11, 17, 27, 28, 29, 30, 63

[HVAC Monitoring](#) - 4, 6, 7, 10

[Jumper Wires](#) - 19

[Maintenance Band](#)

(Dead Band) - 24

[Micro-USB Port](#) - 73

[Nest App](#) - 9, 12, 14, 18, 21, 32, 33, 67, 68, 74

[Nest Battery; Internal](#) - 16, 60, 61, 62, 73

[Nest Leaf](#) - 12

[Nest Power Connector](#) - 23, 60, 61, 62

[Nest Pro ID](#) - 4, 5, 6, 22, 31, 67

[Nest Renew](#) - 13

[Nest Sense](#) - 21, 66

[Nest Temperature Sensor](#) - 11, 13, 16

[Nest Thermostat Sensors \(built in\)](#) - 16

[OB Reversing Valve](#) - 25

[OpenTherm](#)

[Power sharing](#) - 60, 61

[Presence Sensing](#) - 9

[Pro Set up](#) - 17, 20, 22, 25, 26, 28, 29, 63

[Pro Warranty](#) - 5

[Rush Hour Rewards](#) - 13, 34

[Safety Temperatures](#) - 12, 24, 66

[Seasonal Savings](#)

[STAR Connector](#) - 17, 22, 26, 28, 29

[Sunblock](#) - 11

[System Match](#) - 17

[Upstage Timer](#) - 10, 13, 24

[Temperature Modes](#) - 8, 9, 11, 28, 35, 63, 64, 65, 72

[Thermostat Lock](#) - 12

[Time Delay \(Delay on Make\)](#) - 60

[Time To Temperature](#) - 12, 64

[True Radiant](#) - 10

[Weather Aware](#) - 13, 19, 23

[Wi-Fi Network](#) - 5, 10, 13, 14, 16, 18, 20, 23, 32, 33, 35, 59, 60, 61, 62, 63, 64, 65, 66, 69, 72, 74

[Zoned Systems](#) - 23, 62