Control4® Wireless Thermostat by Aprilaire®

Safety and Installation Guide

Control4®

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Safety and Installation Guide
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Supported model

C4-THERM-WH Thermostat

Important safety instructions

Warning! Install in accordance with all national and local electrical codes.

Warning! This product is not intended for use with line-voltage baseboard heaters.

Caution! Improper use or installation can cause **loss/damage of property**.

Important: Operate within the limits of this device as specified in this *Control4 Wireless Thermostat by Aprilaire Safety and Installation Guide* and *Control4 Wireless Thermostat by Aprilaire User Guide.*

Important: Using this product in a manner other than outlined in this document voids your warranty. Further, Control4 is *not* liable for any damage incurred with the misuse of this product. See the warranty information in the *Control4 Wireless Thermostat by Aprilaire User Guide* or on the Control4 website at **www.control4.com/warranty.**

General description

This Control4® Thermostat enables intelligent HVAC and Indoor Air Quality control as part of a Control4 automated system. This thermostat uses the ZigBee® (802.15.4) wireless networking standard to communicate with the Control4 system.

The Control4 Thermostat features a backlit LCD that displays the temperature, HVAC status, Indoor Air Quality control status, fan status, hold status, and HVAC operating mode. The home screen allows temperature setpoint adjustments, HVAC mode change, various hold options, fan control, and access to the Indoor Air Quality control screens. The Indoor Air Quality control screens can be used to control ventilation, humidification, or dehumidification. The thermostat can operate as a stand-alone control if it loses communication with the Control4 system.

Box contents

- Thermostat
- Wired outdoor temperature sensor
- 4 AA batteries
- 4 screws
- 4 wall anchors
- Warranty card
- *Control4 Wireless Thermostat by Aprilaire Safety and Installation Guide* (this document)

Supported systems

- One- or two-stage conventional heat/cool system
- One- or two-stage heat pump with up to two stages of auxiliary or emergency heat
- Optional heat-only or cool-only operation
- Configurable for electric or fossil fuel heating
- Millivolt heat
- Hydronic heat

Installation

Installation location recommendations

Thermostat should be mounted:

- On an interior wall, in a frequently occupied space.
- Approximately 5′ (about 1.5 meters) above the floor.
- At least 18″ (about 0.5 meter) from an outside wall.
- Thermostat can be mounted to a vertical, single gang, electrical junction box.

Do not mount thermostat:

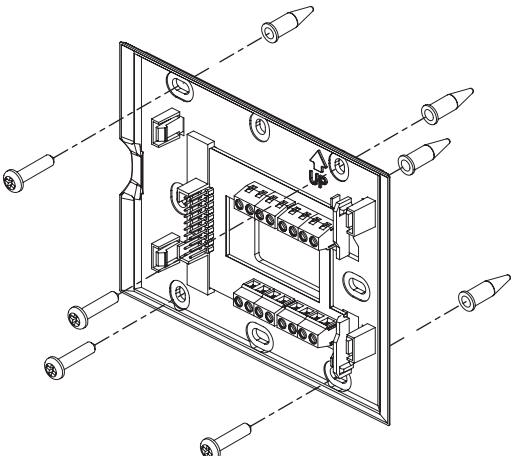
- Behind doors, in corners, or other dead air spaces.
- In direct sunlight, near lighting fixtures, or other appliances that give off heat.
- On an outside or unconditioned area wall.
- In the flow of a supply register, in stairwells, or near outside doors.
- On a wall with concealed pipes or ductwork.

If replacing an existing thermostat

- If your existing thermostat is configured using system settings, record the existing system settings so they can be referenced when setting the HVAC Installer system settings for this thermostat. For detailed instructions on how to access and read the system settings for your existing thermostat, refer to the installation instructions for that thermostat.
- Turn off power to the thermostat.
- Remove the thermostat from the wall, but do not disconnect the wires yet.
- Check the number of wires attached to the existing thermostat. Wrap the bare ends of any unused wires in electrical tape to prevent them from shorting to other wires.
- If the existing thermostat has a letter identifying each wire, use a piece of tape to label each wire with the corresponding letter. The labels can be used to later identify the wires for your new thermostat.
- Disconnect the wires from the existing thermostat, taking care that none of the wires fall back into the wall.

Thermostat mounting

1. Remove the rear mounting plate from the thermostat.
2. Pull wires through the opening on the back of the thermostat.
3. Position and level the mounting plate of the thermostat on the wall, and mark the hole locations with a pencil.
4. Drill 1/4″ (6.35 mm) holes and insert the supplied anchors (drywall only).
5. Place the mounting plate over the anchors, then insert and tighten the screws.
6. Seal the wire entry holes to prevent drafts affecting temperature readings.



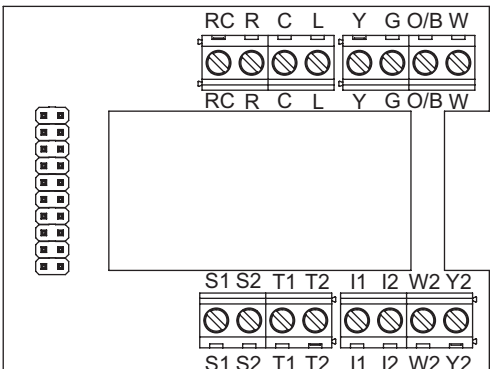
Wiring terminal

Wire specifications:

18-24 gauge thermostat wire

Installation notes:

- Ensure that power at the HVAC equipment is off.
- Loosen screw terminals, insert stripped wire, and re-tighten.
- Push the excess wire back into the opening and plug the wall opening to prevent drafts.



I1 & I2—Indoor Air Quality control output

C—Common (optional when powered by batteries)

O/B—Reversing valve

Y—First-stage cooling / compressor

Y2—Second-stage cooling / compressor

G—Fan

RC—24VAC supply cooling[1]

R—24VAC supply heating[1]

W2—Second-stage heat / auxiliary

W—First-stage heat / auxiliary

L—System fault indicator (optional) (heat pump only)

S1 & S2—Outdoor temperature sensor (included)

T1 & T2—Remote temperature sensor (optional)

[1] Jumper between RC & R is used in single-transformer systems (see wiring diagrams).

Outdoor temperature sensor (included)

Outdoor temperature can be measured by attaching the included sensor to the S1 and S2 terminals. The outdoor sensor must be enabled in the thermostat's *Installer Setup* menu.

Heat pump models can use the outdoor temperature to effectively utilize the heat pump:

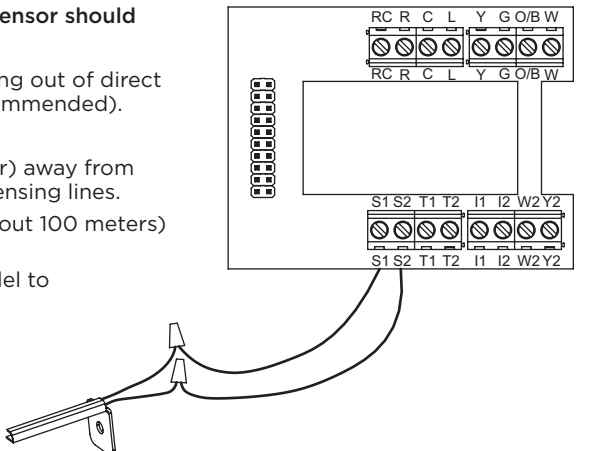
- When the outdoor temperature is less than the Low Balance Point, the heat pump is locked out and only auxiliary heating is used.
- When the outdoor temperature is higher than the High Balance Point, the auxiliary heating is locked out and only the heat pump is used to provide heating.

Indoor Air Quality functions can use the outdoor temperature sensor to:

- Control humidification setpoint based on outdoor temperature to prevent condensation.
- Lock out humidification for temperatures over 60°F (15.6°C) or below -30°F (-34.4°C).
- Lock out ventilation based on high and/or low outdoor temperatures.

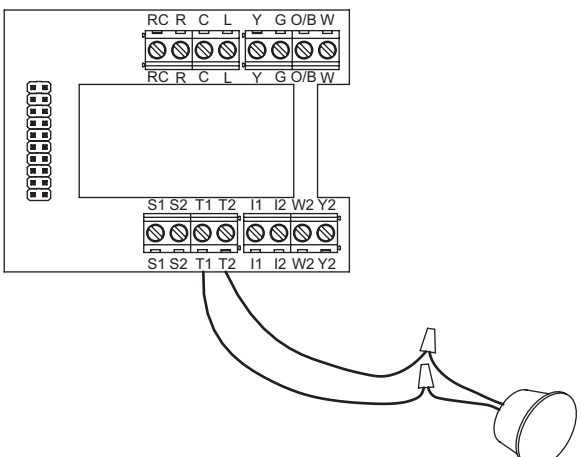
The outdoor temperature sensor should be mounted:

- On the side of the building out of direct sunlight (north side recommended).
- Above snow line.
- At least 3′ (about 1 meter) away from exhaust vents and condensing lines.
- Using less than 300′ (about 100 meters) of wire.
- Do not route wires parallel to 120VAC lines.



Remote temperature sensor (optional)

A remote temperature sensor can be used if the thermostat is going to be mounted in a concealed location. Additionally, Control4 programming can be utilized to switch between the on-board temperature sensor and the remote temperature sensor, allowing the temperature reading to come from different areas based on time of day or daily activity. An AC-FMTS1-W flush mount or AC-DOTS1-W surface mount remote temperature sensor can be attached to the T1 and T2 terminals and mounted in a recommended area. The remote sensor must be enabled in the thermostat's *Installer Setup* menu. When the remote sensor is selected as the primary sensor (System Setting 14 [**Primary Sensor**]), it overrides the internal sensor.



The remote temperature sensor should be mounted:

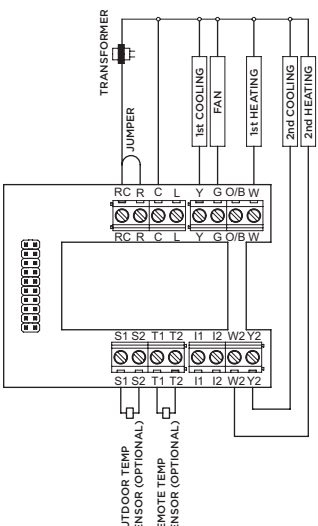
- On an interior wall, in a frequently occupied space.
- About 5′ (1.5 meters) above the floor.
- At least 18″ (about 0.5 meter) from an outside wall.
- Using less than 300′ (about 100 meters) of wire.

Do not mount the remote sensor:

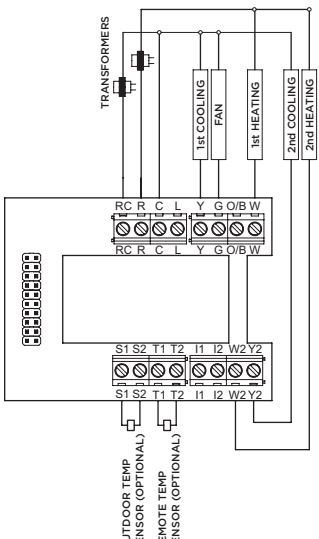
- Behind doors, in corners, or other dead air spaces.
- In direct sunlight, near lighting fixtures, or near other appliances that give off heat.
- On an outside or unconditioned area wall.
- In the flow of a supply register, in stairwells, or near outside doors.
- On a wall with concealed pipes or ductwork.
- Parallel to 120VAC lines.

Conventional heat/cool wiring diagrams

Single transformer (use jumper wire)

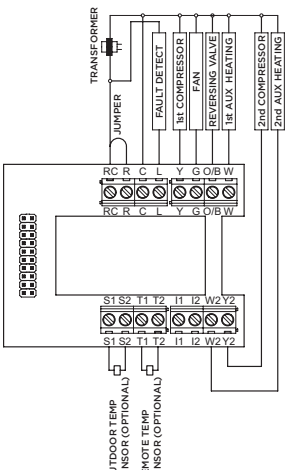


Two transformers (remove jumper wire)

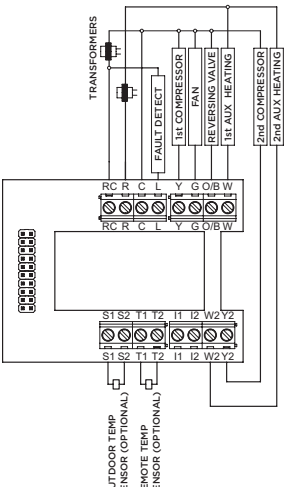


Heat pump wiring diagrams

Single transformer (use jumper wire)



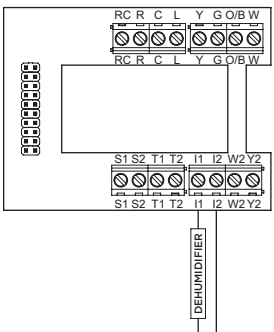
Two transformers (remove jumper wire)



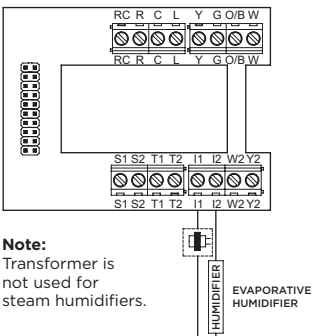
Note: The O/B terminal must be configured for O or B operation by setting system setting 01 (Reversing Valve) to **O—On in Cooling** or **B—On in Heating**.

Indoor Air Quality equipment wiring diagrams

Dehumidifier wiring



Humidifier wiring

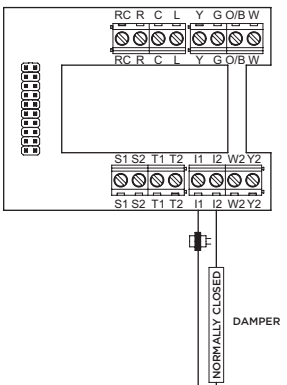


Note:
Transformer is not used for steam humidifiers.

Note: The I1/I2 output is a dry contact closure. The humidifier wiring diagram assumes the control is powering a solenoid valve. The dehumidifier wiring diagram is for a normally open dry contact input. See the individual humidifier or dehumidifier installation instructions for product-specific wiring details or contact your HVAC specialist for additional information.

Indoor Air Quality equipment wiring diagrams

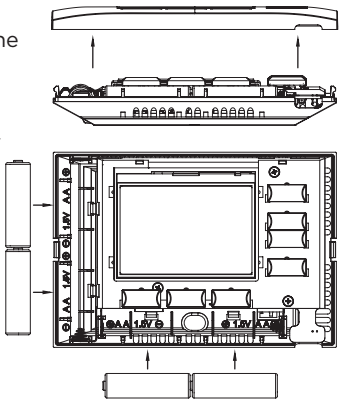
Ventilation wiring



Note: The I1/I2 output is a dry contact closure. The ventilation diagram assumes the control is for a normally closed damper. See the individual ventilation installation instructions for product-specific wiring details or contact your HVAC specialist for additional information.

Power and battery replacement

This thermostat can be AC powered, battery powered, or both. The thermostat uses four alkaline AA batteries. Batteries are optional but strongly recommended if your thermostat was wired to run on AC power when installed. Batteries allow the thermostat to communicate with the Control4 system even if the HVAC system loses power. The battery indicator on the LCD will blink to indicate that batteries should be inserted. If the thermostat will be AC powered, the thermostat should be powered from 24VAC before installing batteries to confirm AC power is present.



For heat pump systems, the C terminal must be connected to the common of the 24VAC transformer for the system fault indicator to operate.

The thermostat has a memory backup that saves the thermostat settings in case of a power interruption. The system settings will be retained, but the clock resets after both battery and AC power are removed. Clock synchronization comes from the connection to the Control4 system. To access the batteries for replacement, remove the bezel as shown.

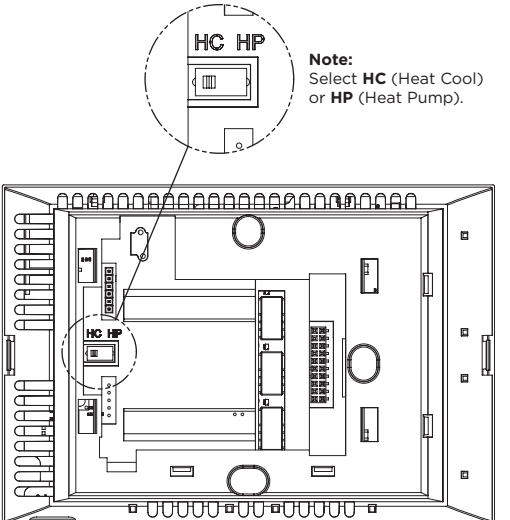
Important: When batteries are replaced, all four batteries should be replaced with new alkaline AA batteries. Do not mix old and new batteries.

Setup and testing

Equipment Type selection switch

This thermostat has the option of being used in heat pump or heat/cool systems. Use the Equipment Type selection switch on the back of the thermostat housing to select this option. This setting is displayed in the thermostat's *Installer System Settings* menu under *Equipment Type*.

Note: The thermostat reboots within 10 seconds after the switch position is changed.

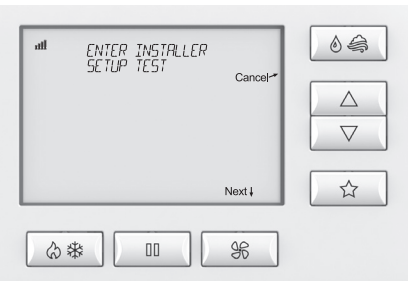


Installer Setup menu

To enter the Installer Setup menu and select equipment to set up:

In the *Installer Setup* menu, you can select **HVAC** or **Indoor Air Quality Setup**. If *Indoor Air Quality Setup* is selected, you can then set up Air Cleaning, Humidification, Dehumidification, or Ventilation.

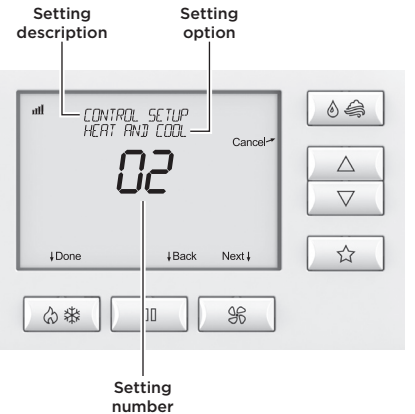
1. Press the button to set system to **OFF**.
2. Press and hold the button to enter Installer Mode.



3. Press the △ or ▽ buttons to select **SETUP**.
4. Press the button (Next) to enter Installer Setup.
5. Press the △ or ▽ buttons to change the menu selections.
6. Press the button (Next) to accept the menu selection.

Change system settings

1. Press the button (Next) or the button (Back) to page through settings.
2. Press the △ or ▽ buttons to adjust the setting.
3. Press the button (Done) to save and exit, or the button (Cancel) to exit without saving.
4. The thermostat will discard changes and exit if nothing is pressed within 60 seconds.
5. To reset the system settings to default, set system setting number 31 (Restore Defaults) to **Yes**.



HVAC Installer system settings table

The following table contains the system settings and their details. Default settings are shown in **bold**. Some settings are only available based upon the value of other settings.

HVAC Installer system settings table

System setting	Description	Factory default setting (bold) and setting range
00. Equipment Type	Equipment type set by *Equipment Type* selection switch.	**Heat/Cool** Heat Pump
01. Reversing Value	Selects **O** or **B** operation for the O/B output.	**O—On in Cooling** B—On in Heating
02. Control Setup	Used to lock out heating or cooling outputs (only available when *Equipment Type* is **Heat/Cool**).	**Heat and Cool** Heat Only Cool Only
03. Number of Stages	Number of equipment stages.	**One** Two
04. Aux Heat Stages	Number of auxiliary heat equipment stages.	**One** Two
05. Temperature Scale	Sets the thermostat for **Fahrenheit** or **Celsius** operation.	**Fahrenheit** Celsius

HVAC Installer system settings table

System setting	Description	Factory default setting (bold) and setting range
06. Heat/Cool: Fan Control in Heating Heat Pump: Auxiliary Equipment Type	Heat/Cool: Determines if the thermostat or equipment controls the fan in heating. Heat Pump: Auxiliary equipment type.	**Gas/Oil Heat** (Equipment Controls Fan) Electric Heat (Thermostat Controls Fan)
07. Extended Fan—Heat	Extends the fan run time after a heat call ends.	**Disable** Enable (90 second extension)
08. Extended Fan—Cool	Extends the fan run time after a cool call ends.	**Disable** Enable (90 second extension)
09. Internal Temperature Sensor Offset	Field adjustment of internal temperature sensor.	**0°** (no offset applied) -4°F to +4°F (-2°C to +2°C)
10. Internal Relative Humidity (RH) Sensor Offset	Field adjustment of internal humidity sensor.	**0%** (no offset applied) -5% to +5%
11. Auto Changeover	Enables or disables the option of setting the system mode to *Auto*. When the system mode is set to *Auto*, the thermostat can automatically switch between heating and cooling to maintain a room temperature that is between the heat and cool setpoints.	Disable **Enable**

HVAC Installer system settings table

System setting	Description	Factory default setting (bold) and setting range
12. Deadband	Auto season changeover deadband.	**3°F or 1.5°C** 2°F to +9°F (1°C to 4.5°C)
13. Remote Sensor	Selects if the wired remote sensor is installed.	**No** Yes
14. Primary Sensor	Selects the primary sensor to be used for temperature control.	**Built In** Remote
15. Secondary Sensor	Selects the sensor to be used for control if the primary sensor fails. Remote will only be presented as an option if *Remote Sensor* is set to **Yes**.	**None** Remote Built In
16. Outdoor Sensor	Selects if an outdoor sensor is installed or if the thermostat receives an outdoor sensor value from the Control4 system.	**Not Installed** Wired Control4 Value
17. Compressor Min Off Time	Minimum off time for compressor protection.	**5 minutes** 1 to 5 minutes
18. Heating Min Off Time	Minimum off time for heating.	**2 minutes** 1 to 5 minutes
19. Equipment Min On Time	Minimum on time for heating or cooling.	**2 minutes** 1 to 5 minutes
20. Auto Changeover Time	Minimum time between heating and cooling calls.	**4 minutes** 1 to 5 minutes

HVAC Installer system settings table

System setting	Description	Factory default setting (bold) and setting range
21. First Stage Differential	Temperature difference from the setpoint required to turn on the first stage of heating or cooling.	**1°F or 0.5°C** 1°F to +9°F (0.5°C to 4.5°C)
22. Second Stage Differential	Temperature difference required to stage from the first stage of heating or cooling to the second.	**1°F or 0.5°C** 1°F to +9°F (0.5°C to 4.5°C)
23. Third Stage Differential	Temperature difference required to stage from the second stage of heating to the third.	**1°F or 0.5°C** 1°F to +9°F (0.5°C to 4.5°C)
24. Fourth Stage Differential	Temperature difference required to stage from the third stage of heating to the fourth.	**1°F or 0.5°C** 1°F to +9°F (0.5°C to 4.5°C)
25. Stage Rate	Accumulation of equipment run time used for determining equipment staging. Off = Ignores accumulated runtime in staging decision. 1 = More rapid staging of equipment (comfort). 5 = Slower staging of equipment (economy).	**2** 1 to 5 or Off
26. Progressive Recovery	Enables or disables progressive recovery. If progressive recovery is enabled, the equipment will turn on before the next scheduled event so that the space reaches the desired schedule temperature at the start of the next event.	Disable **Enable**

HVAC Installer system settings table

System setting	Description	Factory default setting (bold) and setting range
27. Low Balance Point	Low balance point is the outdoor temperature at which the compressor will be locked out and only auxiliary heat will be used for heating. This option is not displayed unless *Outdoor Sensor* is set to **Wired** or **Control4 Value** and *Equipment Type* is set to **Heat Pump**.	**20°F or -6°C** 10°F to 50°F (-12°C to 12°C) or Off to ignore.
28. High Balance Point	High balance point is the outdoor temperature at which the auxiliary heat will be locked out and only the compressor will be used for heating. This option is not displayed unless *Outdoor Sensor* is set to **Wired** or **Control4 Value** and *Equipment Type* is set to **Heat Pump**.	**65°F or 18°C** 40°F to 85°F (3°C to 30°C) or Off to ignore.
29. Reset Service Reminders	Clears the Change Air Filter, HVAC Service, and Dehumidifier Service reminders if they are active and resets the corresponding service timer. Clears the Change Water Panel reminder if it is active. If the reminder is set to **300 hours** or **600 hours**, the service timer is reset.	**No** Yes
30. HVAC Service Reminder	Elapsed time to display the *HVAC Service Reminder* message.	**Off** 1 to 12 months or Off to disable.
31. Restore Defaults	Resets all thermostat settings back to factory default.	**No** Yes

Indoor Air Quality system settings tables

The following tables contain the Indoor Air Quality system settings and their details. Default settings are shown in bold. Some settings are only present dependent upon the value of other settings.

The use of the included outdoor temperature sensor (recommended) enables additional Indoor Air Quality functionality. If the outdoor temperature sensor was not enabled in the HVAC system settings, HVAC system setting 16 (Outdoor Sensor) will be presented before entering the Indoor Air Quality system settings.

Refer to the *User Guide* for further information about thermostat features.

Air cleaning system settings table

System setting	Description	Factory default setting (bold) and setting range
Air Cleaner Installed	Selects if an air cleaner is installed.	**No** Yes
Change Air Filter Reminder	Elapsed time to display the “Change Air Filter” message.	**Off** 1 to 12 months or “Off” to disable

Humidifier system settings table

Note: A humidifier can be installed only if ventilation is not installed and *Dehumidifier Control* is not set to **Whole Home**.

System setting	Description	Factory default setting (bold) and setting range
Humidifier Installed	Selects if a humidifier is installed. (If set to **No**, no other humidifier settings are available.)	**No** Yes
Humidifier Mode	Selects **Auto** or **Manual** mode. Auto mode controls humidity based on the humidity setting and outdoor temperature. Manual mode controls humidity based on the %RH setpoint. (Auto mode is available only if Outdoor Sensor is set to **Yes**.)	**Auto** Manual
Humidity Setpoint Deadband	Selects the minimum difference between the humidifier and dehumidifier setpoints. (Only available if Humidifier Installed is set to **Yes**, and Dehumidifier Control is set to **Air Conditioner**. Available in both setups.)	10 Percent RH 10 to 20 Percent RH
Humidifier Operation	Selects when humidification is allowed to occur relative to heating and fan operation.	**Heat Only** Heat or Fan Forces Fan
Change Water Panel Reminder	Selects when the "Change Water Panel" message is displayed.	**Off** 1 Per Season 2 Per Season 300 Hours 600 Hours

Humidifier system settings table

Note: A humidifier can be installed only if ventilation is not installed and *Dehumidifier Control* is not set to **Whole Home**.

System setting	Description	Factory default setting (bold) and setting range
Reminder Month (Change Water Panel Reminder set to **1 Per Season**) First Reminder Month (Change Water Panel Reminder set to **2 Per Season**)	If Change Water Panel Reminder is set to **1 Per Season**: Determines the month the "Change Water Panel" message is displayed. If Change Water Panel Reminder is set to **2 Per Season**: Determines the first month the "Change Water Panel" message is displayed.	**October** November December January February March April May June July August September
Second Reminder Start Month	Determines the second month the "Change Water Panel" message is displayed. (Only available when Change Water Panel Reminder set to **2 Per Season**.)	October November December **January** February March April May June July August September

Dehumidifier system settings table

Note: Dehumidifier Control can only be set to **Whole Home** if ventilation and humidification are not installed.

System setting	Description	Factory default setting (bold) and setting range
Dehumidifier Control	Selects method of dehumidification. (If set to **None**, no other dehumidifier settings are available.)	**None** (no dehumidification installed) Whole Home Air Conditioner
Humidity Setpoint Deadband	Select the minimum difference between the humidifier and dehumidifier setpoints. (Only available if *Humidifier Installed* is set to **Yes**, and *Dehumidifier Control* is set to **Air Conditioner**. Available in both setups.)	10 Percent RH 10 to 20 Percent RH
Lockout Dehumidifier During Cooling	Selects if dehumidification is disabled during a cooling call. (Only available if *Dehumidifier Control* is set to **Whole Home**.)	No **Yes**
Dehumidifier Forces Fan	Selects if dehumidification can turn on the fan. (Only available if *Dehumidifier Control* is set to **Whole Home**.)	No **Yes**
Dehumidifier Service Reminder	The period for displaying the “Dehum Service Reminder” message. (Only available if *Dehumidifier Control* is set to **Whole Home**.)	**Off** 1 to 12 months or “Off” to disable
Dehumidifier Overcooling Limit	Selects the amount of overcooling that can occur for dehumidification. (Only available if *Dehumidifier Control* is set to **Air Conditioner**.)	**3°F (1.5°C)** 1°F to 3°F (0.5°C to 1.5°C)

Ventilation system settings table

Note: Ventilation can be installed only if humidification is not installed and *Dehumidifier Control* is not set to **Whole Home**.

System setting	Description	Factory default setting (bold) and setting range
Fresh Air Vent Installed	Selects if ventilation is installed. (If set to **No**, no other ventilation settings are available.)	**No** Yes
Fresh Air Forces Fan	Selects if ventilation forces the fan on.	No **Yes**
Fresh Air Setup	Selects if ventilation is configured through the **ASHRAE** setup or **Timed**. If **ASHRAE** setup is selected, the hourly ventilation time is calculated using the ASHRAE recommendations. If **Timed** setup is selected, the hourly ventilation time is determined based on the *Fresh Air Time* value.	**Timed** ASHRAE
Fresh Air Time	Selects the number of minutes per hour that ventilation will be active. (Only available if *Fresh Air Setup* is set to **Timed**.)	**30 MIN/HR** 5 to 55 MIN/HR
High Limit Outdoor Temp	Selects if ventilation is disabled when the outdoor temperature exceeds the outdoor high limit. (Only available if *Fresh Air Setup* is set to **Timed** and an outdoor temperature sensor is installed.)	**No** Yes
Outdoor High Limit	Sets the high temperature limit for ventilation. (Only available if *High Limit Outdoor Temp* is set to **Yes**.)	**100°F (38°C)** 90°F to 100°F (32°C to 38°C)

Ventilation system settings table

Note: Ventilation can be installed only if humidification is not installed and *Dehumidifier Control* is not set to **Whole Home**.

System setting	Description	Factory default setting (bold) and setting range
Low Limit Outdoor Temp	Selects if ventilation is disabled when the outdoor temperature exceeds the outdoor low limit. (Only available if *Fresh Air Setup* is set to **Timed** and an outdoor temperature sensor is installed.)	**No** Yes
Outdoor Low Limit	Sets the low temperature limit for ventilation. (Only available if *Low Limit Outdoor Temp* is set to **Yes**.)	**10°F (-12°C)** -10°F to 30°F (-24°C to 0°C)
High Limit Indoor RH	Selects if ventilation is disabled when the indoor RH exceeds the indoor RH limit. (Only available if *Fresh Air Setup* is set to **Timed**.)	**No** Yes
Indoor RH Limit	Sets the high indoor RH limit for ventilation. (Only available if *High Limit Indoor RH* is set to **Yes**.)	**60%** 50% to 70%
Number of Bedrooms	Selects the number of bedrooms to be used for the ASHRAE calculation. (Only available if *Fresh Air Setup* is set to **ASHRAE**.)	**3 Bedrooms** 1 to 6 Bedrooms
Number of Occupants	Selects the number of occupants to be used for the ASHRAE calculation. (Only available if *Fresh Air Setup* is set to **ASHRAE**.)	**4 Occupants** 1 to 10 Occupants

Ventilation system settings table

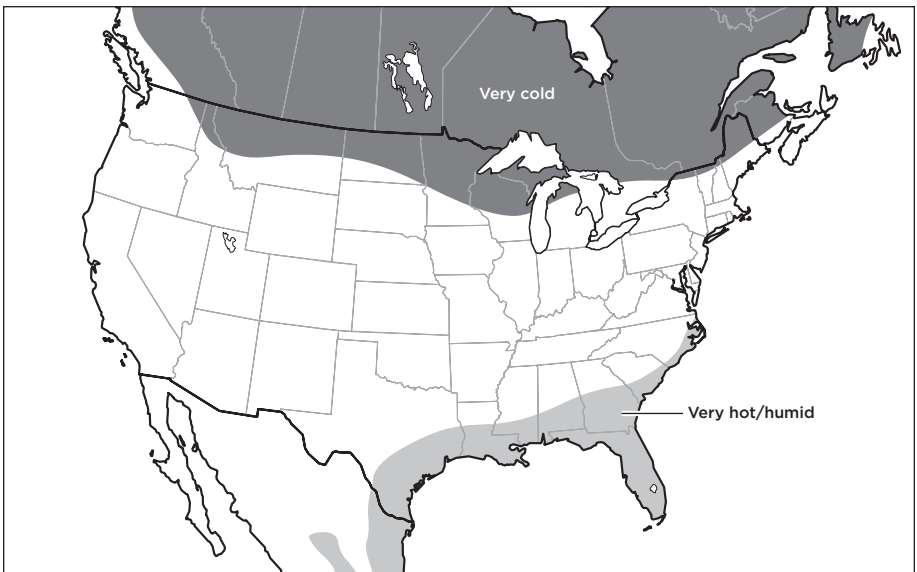
Note: Ventilation can be installed only if humidification is not installed and *Dehumidifier Control* is not set to **Whole Home**.

System setting	Description	Factory default setting (bold) and setting range
Home Size	Selects the home size to be used for the ASHRAE calculation. If multiple ventilation systems are used, this should be set to the size of the zone that this thermostat is controlling. (Only available if *Fresh Air Setup* is set to **ASHRAE**.)	**2500 SQ FT** 1000 to 5000 SQ FT
Fresh Air CFM	Selects the ventilation CFM to be used for the ASHRAE calculation. (Only available if *Fresh Air Setup* is set to **ASHRAE**.)	**60 CFM** 30 to 200 CFM
Select Climate	Selects the climate to be used for the ASHRAE calculation. (Only available if *Fresh Air Setup* is set to **ASHRAE**.) To determine what region you are in, refer to the map on the following page.	**Normal** Very Hot/Humid Very Cold
ASHRAE Cycle Time	Displays the Fresh Air Time calculated by the ASHRAE standard. (Only displayed if *Fresh Air Setup* is set to **ASHRAE**.)	Minutes/Hour

Note: In ASHRAE setup, temperature and humidity limits are disabled.

Note: Refer to manuals for humidifier, dehumidifier, air cleaner, and ventilation products for recommended installation and operation.

Climate map for ASHRAE Fresh Air Setup

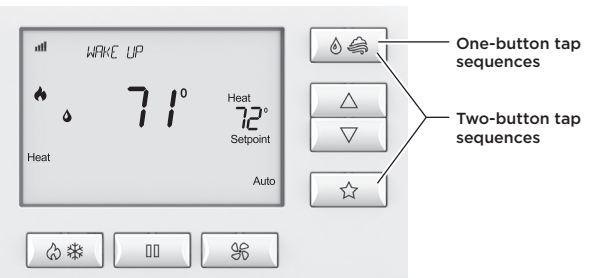


Managing the ZigBee network connection

The thermostat utilizes special button tap sequences for managing the ZigBee network connection. The button tap sequences are defined in the table. Button tap sequences that require one button should use the button on the top right of the thermostat. Button tap sequences requiring two buttons should use the button and the ☆ button on the bottom right of the thermostat.

Function	Button Sequence
Identify	4
ZigBee Channel	Hold for 1 second
Reboot	15
Factory Reset*	9-4-9
Leave Mesh and Reset*	13-4-13

**The thermostat's HVAC and Indoor Air Quality system settings will not be reset.*



System Test menu

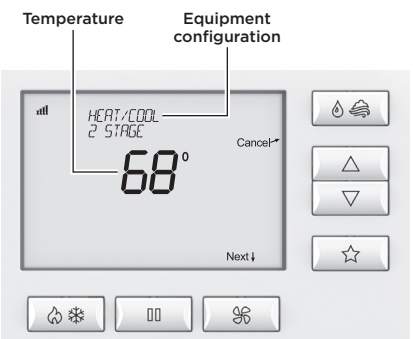
The System Test menu is used to test a system after installation. The outputs of the thermostat can be manually activated to test their function. The instructions below show how to enter the test mode and turn outputs on and off.

To use the System Test menu:

1. Press the button to set the system to **OFF**.
2. Press and hold the button to enter Installer Mode.
3. Press the △ or ▽ buttons to select **TEST**.
4. Press the button (Next) to enter Installer Test. The first screen of the installer test displays the equipment configuration.
5. Press the button (Next) to enter the first installation test or the button (Cancel) to exit.

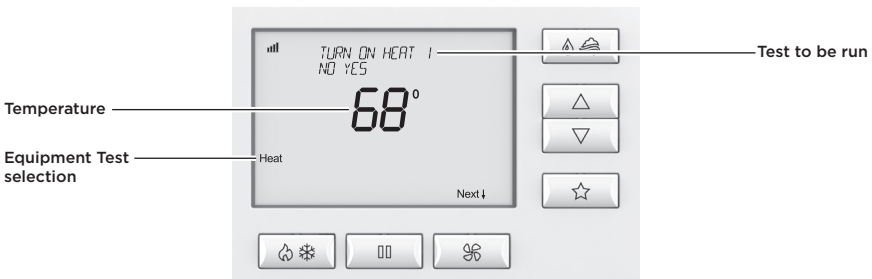
System Test steps:

Heating equipment test
Cooling equipment test
Fan equipment test
Humidification equipment test
Dehumidification equipment test
Ventilation equipment test



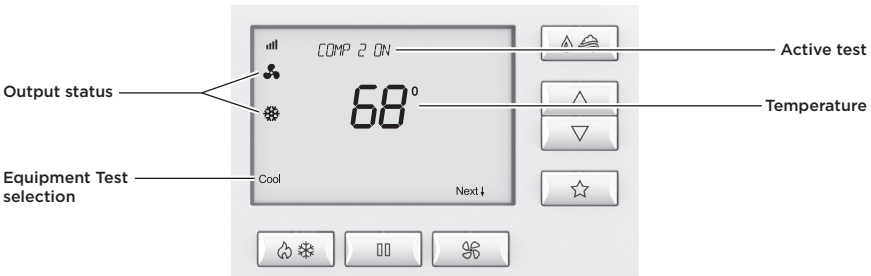
Each equipment test begins with the option of turning on the output or stage as shown below.

1. Press the △ or ▽ button to change the selection.
2. Press the button (Next) to accept the selection and proceed to the next step.
3. If **YES** is selected, the thermostat tests the corresponding output. If **NO** is selected, the thermostat proceeds to the next step.



4 While the equipment test is active, the corresponding test information is shown.

5 Press the button (Next) to accept the selection and proceed to the next test selection.



System Test tables

Heat/cool heating equipment test

Heat type		W	W2	Y	Y2	G
Gas	First-stage test	ON				
Gas	Second-stage test	ON	ON			
Electric	First-stage Test	ON				ON
Electric	Second-stage test	ON	ON			ON

Heat pump heating equipment test (electric heat)

Compressor stages	Aux stages		W	W2	Y	Y2	O/B set to		G
							O	B	
1	1	First-stage test			ON			ON	ON
1	1	Second-stage test	ON		ON			ON	ON
2	1	First-stage test			ON			ON	ON
2	1	Second-stage test			ON	ON		ON	ON
2	1	Third-stage test	ON		ON	ON		ON	ON
1	2	First-stage test			ON			ON	ON
1	2	Second-stage test	ON		ON			ON	ON
1	2	Third-stage test	ON	ON	ON			ON	ON
2	2	First-stage test			ON			ON	ON
2	2	Second-stage test			ON	ON		ON	ON
2	2	Third-stage test	ON		ON	ON		ON	ON
2	2	Fourth-stage test	ON	ON	ON	ON		ON	ON

Note: System variable 01, O/B operation selects O or B.

Heat pump heating equipment test (gas heat)

Compressor stages	Aux stages		W	W2	Y	Y2	O/B set to		G
							O	B	
1	1	First-stage test			ON			ON	ON
1	1	Second-stage test	ON					ON	
2	1	First-stage test			ON			ON	ON
2	1	Second-stage test			ON	ON		ON	ON
2	1	Third-stage test	ON					ON	
1	2	First-stage test			ON			ON	ON
1	2	Second-stage test	ON					ON	
1	2	Third-stage test	ON	ON				ON	
2	2	First-stage test			ON			ON	ON
2	2	Second-stage test			ON	ON		ON	ON
2	2	Third-stage test	ON					ON	
2	2	Fourth-stage test	ON	ON				ON	

Note: System variable 01, reversing valve selects O or B operation.

Heat/cool cooling equipment test

	W	W2	Y	Y2	G
First-stage test			ON		ON
Second-stage test			ON	ON	ON

Heat pump cooling equipment test

					O/B set to		
	W	W2	Y	Y2	O	B	G
First-stage test			ON		ON		ON
Second-stage test			ON	ON	ON		ON

Note: System variable 01, reversing valve selects O or B operation.

Fan equipment test

W	W2	Y	Y2	G
				ON

Humidification equipment test

I1/I2	G
ON	ON

Dehumidification equipment test

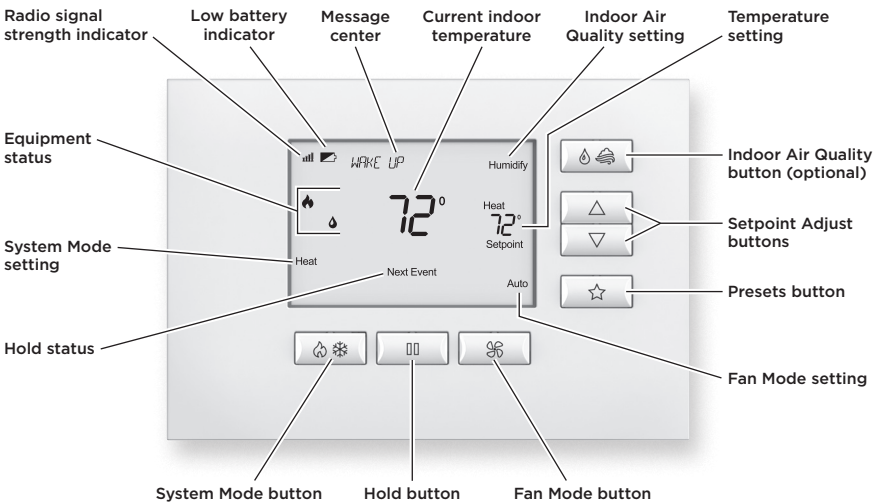
I1/I2	G
ON	ON

Ventilation equipment test

I1/I2	G
ON	ON

Quick reference to controls and display

Home screen



Note: Backlight is activated with the first button press and automatically turns off.

Troubleshooting

Display is blank.

- Check the circuit breaker and reset it if necessary.
- Make sure the heating and cooling system's power switch is on.
- Make sure the furnace door is closed securely.
- If the thermostat is battery powered, make sure that fresh AA alkaline batteries are correctly installed.

Temperature settings do not change.

Make sure heating and cooling temperatures are being set to acceptable ranges:

- Heat: 40° to 90°F (4° to 32°C).
- Cool: 50° to 99°F (10° to 37°C).

Heating system does not respond (appears on screen).

- Check for 24VAC at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the heating equipment to find the cause of the problem.
- Check for 24VAC between the heat terminal (W) and the transformer common. If 24VAC is present, the thermostat is functional. Check the heating equipment to find the cause of the problem.
- Check for loose or broken wires between the thermostat and the heating equipment.

Cooling system does not respond (❄ appears on screen).

- Check for 24VAC at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the cooling equipment to find the cause of the problem.
- Check for 24VAC between the cooling terminal (Y) and the transformer common. If 24VAC is present, the thermostat is functional. Check the cooling system to find the cause of the problem.
- Check for loose or broken wires between the thermostat and the cooling equipment.

Fan does not turn on in a call for heat.

- Check *Installer System Setting 06* (Fan Control) to make sure the fan control is properly set to match the type of system (see page 22).

Heat pump issues cool air in heat mode or warm air in cool mode.

- Check *Installer System Setting 01* (O/B Operation) to make sure the reversing valve operation matches the heat pump.

Heat/Cool both on at the same time.

- Check the **Equipment Type** selection switch to make sure it is set to match the installed heating/cooling equipment (see page 21).
- Make sure the heating and cooling wires are not shorted together.

Heating equipment is running in cool mode.

- Check the **Equipment Type** selection switch to make sure it is set to match the installed heating/cooling equipment (see page 21).

is not displayed.

- Make sure that *Installer System Setting 02* (Control Setup) is set correctly.
- Change the *System Mode* to **Heat**, and set the temperature level above the current room temperature.

is not displayed.

- Make sure that *Installer System Setting 02* (Control Setup) is set correctly.
- Change the *System Mode* to **Cool**, and set the temperature level below the current room temperature.

Humidifier does not operate in Auto Mode.

- Make sure that *Installer System Setting 16* (Outdoor Sensor) is set to **Yes**.
- Verify that the outdoor sensor is functioning correctly. If the sensor failed, you will see a “CHECK OUTDOOR SENSOR” message displayed in the message center.

Error codes

If the thermostat enters an error mode, all outputs are turned off. The thermostat attempts to recover every 10 minutes.

Error code	Message	Error description
01	"SENSOR ERROR"	Primary sensor failure with no secondary sensor assigned.
02		Primary and secondary sensor failure.
03	"EEPROM ERROR"	Error in permanent memory.

Thermostat features

- Up to 4-stage heat and 2-stage cool operation.
- Indoor air quality control.
  - Humidification (automatic or manual control).
  - Dehumidification.
  - Event-Based™ air cleaning.
  - Ventilation with temperature and humidity limits.
- Temperature control.
- Message center provides feedback and instructions.
- Dual power option (24VAC or battery).
- Air filter, humidifier, dehumidifier, and HVAC service reminders.
- Programmable fan control with fan circulation mode.
- Easy-to-use temperature control can override program schedule at any time.
- Progressive recovery ensures proper temperature at the start of a program event.
- Built-in compressor protection prevents damage to your equipment.
- System test mode.

Specifications

Environment	
Temperature	Operating: 32° to 120°F (0° to 48.9°C) Shipping: -30° to 150°F (-34.4° to 65.5°C)
Relative humidity	Operating: 5% to 90% R.H. (non-condensing)

Electrical	
Operating voltage	24VAC (19.2–28.8VAC)
Current	Maximum: 2.5A (total), 1.0A (single output) Maximum surge current: 5A
Power supply	Dual power. Can be battery- or 24VAC-powered. When both sources are available, the battery is used as backup power.
Battery power	Battery power: AA size alkaline battery x 4 Battery life: Approximately 12 months

Thermal	
Outdoor and Remote temperature sensor	Maximum distance: 300 feet (about 100 meters)
Room temperature measurement	Display range: 32° to 99°F (0° to 40°C)
Outdoor temperature measurement	Display range: -40° to 130°F (-40° to 55°C)
Setpoint temperature range	Heat: 40° to 90°F (4° to 32°C) Cool: 50° to 99°F (10° to 37°C)
Setpoint humidity range	Humidification: 10% to 50% R.H. Dehumidification: 40% to 90% R.H.

U.S. Patent Number 8,146,376 (and other patents pending).

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