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Getting Started
Tools Needed

Small Phillips screwdriver

Drill with ¼" bit (6 mm)

⚠️ CAUTION

To avoid electrical shock and to prevent damage to the furnace, air conditioner, and thermostat, disconnect the power supply before installing or servicing the thermostat or any part of the system. This can be done at the circuit breaker for both the furnace and air conditioner.

- Do not reconnect electricity until work is complete.
- Do not short (jumper) across electric terminals at the control on the furnace or air conditioner to test the system. This can damage the thermostat.
- Your thermostat is a precise instrument. Handle it with care.
- All wiring must conform to local codes and ordinances.
- This thermostat is designed for use with 4AA alkaline batteries and/or 24-volt AC C wire (or a 12- 24 AC or DC source) or millivolt gas systems. Each thermostat relay load should be limited to 1.0 amp; higher amperage can cause damage to the thermostat.
Interior View

Unit Back and Mounting Plate

- Wire terminals

Unit Front

- Screen
- Up Button
- Side Button
- Down Button
- Bottom Edge Light
To avoid having to move your wiring to a new location, mount the thermostat in place of the old thermostat.

- Install the thermostat on an inside wall of an often-used room, about 5 ft. (1.5m) above the floor.
- Do not install where there are unusual heating conditions, such as: in direct sunlight; near a lamp, radio, television, radiator register, fireplace; near hot water pipes in the wall; or near a stove on the other side of a wall.
- Do not locate in unusual cooling conditions, such as: on a wall separating an unheated room; or in a draft from a stairwell, door, or window.
- Do not locate in a damp area. This can lead to corrosion that will shorten the thermostat’s life.
- Do not locate where air circulation is poor, such as: a corner, an alcove, or behind an open door.
- Do not install the thermostat until all construction and painting is complete.
- This thermostat does not require leveling.
Preperation

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Read instructions carefully before removing any wiring from an existing thermostat.</td>
</tr>
<tr>
<td>• Label all wires before disconnecting them from the existing thermostat.</td>
</tr>
</tbody>
</table>

1. Switch off electricity to the heating and cooling systems. This can be done at the circuit breaker.
2. Remove the cover from the existing thermostat. Check for locking screws on the side or front that must be loosened first.
3. Attach provided labels to each wire for identification. Refer to the lettered terminal where the wires attach; do not use the color of the wires.
4. Disconnect wires from the existing thermostat, and wind them around a pencil to keep them from falling back inside the wall.
5. Loosen all mounting screws on the old thermostat and remove it from the wall.

![Diagram showing wires being wrapped around a pencil](image)
Attaching the Mounting Plate to the wall

1. Carefully pull the labeled wires through the center hole in the mounting plate.
2. Position thermostat for best appearance to cover the hole in the wall.
3. Mark first and drill a ¼ in. (6mm) hole at each screw location.
4. If you are mounting the Thermostat to sheet rock or if you are using the old mounting holes, use the plastic anchors provided.
5. Attach the Thermostat to the wall with the screws provided.
Prepare Wires

Make sure your wires are labeled. If necessary, find the “other end” connection for each wire on your heating or air conditioning equipment and note the label there.

1. Fan out wires so that they are aligned with their terminals.
2. Do not bunch wires in front of the mounting plate. Feed any slack back into the wall.

Follow these guidelines for safe and secure wire connections:

- Use at least 2.6 in. of wire for each of your connections to the Thermostat.
- If you do not have enough wire, splice additional wire to allow enough slack.
- Terminals accept wires from 16-22 awg.
- Remove 1/8 in. insulation from the tip of each wire.
- Take care not to damage the labels for each wire.

CAUTION

Do not allow wires to touch each other or other parts on the thermostat.

If you have both RH and RC connections, you must set the RC/RH Switch to OPEN. If you do not have both connections, set the switch to CLOSED.
Connecting Your Wires

Reference the Detailed Wire Diagram on page 23 to identify your wiring diagram and set-up information. If necessary, contact customer support for help.

1. Connect a labeled wire only to a matching lettered terminal.
2. Press the lever next to the terminal letter, then insert the wire in the terminal well.
3. Make sure to insert the wire into the terminal well as far as it will go, then release the lever. The wire should be secure and not pull free easily.

The Thermostat can be externally powered with a power source rated from 12V to 24V, AC or DC, at 100ma or greater. If used, connect to the C and RH terminals (no polarity).

The 24VAC “C” wire is the other side of the 24VAC heating transformer and can be found where the other thermostat wires connect at the wall or at the furnace. Do not use the common or ground side of the line voltage.

The Thermostat runs on 4 AA alkaline batteries, the C wire (if available), or both batteries and the C-wire. If you do not have a C wire, you can run a new wire from the HVAC or use a standard 12-24V [AC or DC] wall transformer.

The C-wire is optional but preferred for all installations.
Power Supply

While the thermostat can run without batteries on C-wire power, you should install batteries as well to provide power to the unit during outages. See the Thermostat Battery Cautions.

1. Install four (4) AA alkaline batteries following the marked polarity in the battery compartments. Insert the battery negative end first against the spring, then push the positive end in.

2. With all the wires connected and the unit attached to the wall, it is time to turn the AC power back on. Reconnect the power at the breaker you used to switch it off. The Thermostat will power-up in the OFF mode.

3. Your Thermostat is not yet configured to operate your HVAC system. You must now connect your thermostat to a Z-Wave Network and configure the HVAC and Heat Source settings.

Battery Installation
THERMOSTAT BATTERY CAUTIONS

- Always use new Alkaline batteries.
- Do not use rechargeable batteries of any type. They will not operate the thermostat properly and may lead to damage.
- Do not mix old and new batteries.
- Do not mix battery types, for example Lithium with Alkaline.
- Do not dispose of batteries in fire. Batteries may explode or leak.
- Always replace the batteries as soon as the “Low Batt” warning flashes. The thermostat is a battery-powered device; you should replace the batteries before they run out, as failure to replace batteries can result in excessive heating or cooling of your house.
- Always replace the batteries once a year, even if the “Low Batt” indicator does not flash. Replacing the batteries also helps to prevent leakage that can corrode and damage the thermostat.
- If you are leaving your home for a month or more, you should replace the batteries as a precaution against battery failure in your absence.
- Failing to replace the batteries when necessary could cause the thermostat to lose power or malfunction. If the thermostat loses power, then the thermostat will not control the temperature, which could result in your HVAC system not functioning as you intended and lead to possible damage from excessive heating or cooling.
- If the thermostat batteries fail with the heat OFF, this can result in NO HEAT and possible frozen or broken pipes and water damage.
- If the thermostat batteries fail with the cool OFF, this can result in NO COOL and could cause possible damage or excessive temperatures.
Setup
You must add the Thermostat to a Z-Wave network. This unit cannot operate without a network connection.

Include the Thermostat to a Z-Wave® Network

The Vivint Element Thermostat is a Z-Wave® compliant thermostat. It has an onboard radio that can be added to an existing Z-Wave® network. This device can be used on a network with products from different vendors.

1. Set your primary controller to INCLUDE mode to add the thermostat as a node on your network (see your specific controller’s User Manual for detailed instructions).

2. The Thermostat main screen shows a welcome message. Press the SIDE button to continue.

3. Press the SIDE button to initiate the inclusion process. This initiates the network connection process.
   - If inclusion fails, the screen says “Failed”. Press the SIDE button to try adding again.

4. When the Thermostat has been successfully included to a Z-Wave network, the screen displays a confirmation check mark. Press the SIDE button to continue. You can now configure the thermostat to work with your HVAC system.

5. Your primary controller indicates that the thermostat was successfully added to its network (see your specific controller’s User Manual for details).

Exclude from a Z-Wave Network

The Vivint Element can be excluded from the Z-Wave network process similar to the inclusion process. Set your primary controller to EXCLUDE.
Z-Wave and Power Supply

The Thermostat’s node type is fixed when it is included to the Z-Wave network; if the C-Wire is not connected and is only battery-powered when including to the network, the Thermostat will remain a frequent listening routing slave (FLiRS) node until it is removed from the network.

When your thermostat is running on battery power, the Z-Wave radio will turn off to help conserve battery life. The Thermostat Z-Wave radio module supports Z-Wave beaming, which allows other devices in the network to wake up the Z-Wave module and accept commands and then go back to sleep.

When your thermostat is running on C-Wire power, the Z-Wave radio will stay on and actively help route messages within the Z-Wave network. The thermostat’s node type is fixed when it is included to the Z-Wave network; if the C-Wire is present and powered when including to the network, the thermostat will remain an always-listening node until it is removed from the network.
Wiring Diagrams
Detailed Wiring Diagrams

### 3 Wire Heat
WIRIES

### 4 Wire Heat
WIRIES

### 5 Wire Heat/Cool
WIRIES

### 6 Wire Heat/Cool
WIRIES

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Go to Page 21
Step-By-Step Wiring Diagrams

3 Wire Heat GAS MILLIVOLT or 24VAC System

1. Connect the R (or RH) wire to the RH terminal. This connects the heat power.
2. Connect the W wire to the W terminal. This connects the heat.
3. If available, connect the C wire to the C terminal.

4 Wire Heat

1. Connect the R (or RH) wire to the RH terminal. This connects the heat power.
2. Connect the W wire to the W terminal. This connects the heat.
3. Connect the G wire to the G terminal. This connects the fan.
4. If available, connect the C wire to the C terminal.
5. Go to “Connect Your Wires” on page 9.

5 Wire Heat/Cool

1. Connect the W wire to the W terminal. This connects the heat.
2. Connect the Y wire to the Y terminal. This connects the cooling compressor.
3. Connect the RH or R wire to the RH terminal. This connects the power.
4. Connect the G wire to the G terminal. This connects the fan.
5. If available, connect the C wire to the C terminal.
6 Wire Heat/Cool

1. Connect the W wire to the W terminal. This connects the heat.
2. Connect the Y wire to the Y terminal. This connects to the cooling compressor.
3. Disconnect the RC and RH terminals by removing the Jumper Wire.
4. Connect the RH wire to the RH terminal and the RC wire to the RC terminal. This connects power.
5. Connect the G wire to the G terminal. This connects the fan.
6. If available, connect the C wire to the C terminal.

Multi-stage Heat & Multi-Stage Cool

The CT200 can handle up to 2 stages of HEAT and 2 stages of COOL.

1. Connect the W and W2 wires to the W and W2 terminals. This connects the stages of HEAT.
2. Connect the Y and Y2 wires to the Y and Y2 terminals. This connects the stages of COOL.
3. Connect the RH or R wire to the RH terminal. This connects the power.
4. Connect the G wire to the G terminal. This connects the fan.
5. If available, connect the C wire to the C terminal.
4 Wire Heat Pump (heat/cool) without Auxiliary Heat

1. Connect the O wire to the O terminal or the B wire to the B terminal. This connects the change-over valve. If you have both O and B, connect only the O wire to the O terminal and DO NOT connect B to B terminal (see the Wire Reference Table on page 23 for Trane terminal labels).
2. Connect the Y wire to the Y terminal. This connects the compressor.
3. Connect the R wire to the RH terminal. This connects the power.
4. Connect the G wire to the G terminal. This connects the fan.
5. If available, connect the C wire to the C terminal.

Multi-stage Heat Pump with Multi-Stage Aux Heat

The CT200 can handle up to 2 stages of Pump compression and 2 stages of AUX heat.
1. Connect O wire to the O terminal or the B wire to the B terminal. This connects the change-over valve. If you have both O and B, connect only the O wire to the O terminal and DO NOT connect B to B terminal (see Wire Reference Table on page X for Trane terminal labels.).
2. Connect the AUX 1 and AUX 2 wires to the AUX 1 and AUX 2 terminals. This connects the auxiliary heat.
3. Connect the Y and Y2 wires to the Y and Y2 terminals. This connects the compressor.
4. Connect the R wire to RH terminal. This connects the power.
5. Connect the G wire to the G terminal. This connects the fan.
6. If available, connect the C wire to the C terminal.
Accessory Wiring

Zoned Hot Water Heat

For Solenoid or Motor valves, connect the wires based on the diagrams to the correct terminal on the CT200. When controlling a hydronic heating system, configure the thermostat as HVAC Type = Normal with Heat Type = Gas.

- USE ONLY IN HEAT MODE.
- The CT200 must be powered by 24v ac.

The third wire on your valve may be called 6, Y, or G (see the Wire Reference Table on page 23.)
## Wire Reference Table

<table>
<thead>
<tr>
<th>Possible Wires</th>
<th>What They Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>R or V or VR</td>
<td>RH and RC Single power for HEAT and COOL</td>
</tr>
<tr>
<td>RH or 4</td>
<td>RH Power for HEAT (RH not connected to RC jumper clip removed)</td>
</tr>
<tr>
<td>RC</td>
<td>RC Power for COOL (RH not connected to RC jumper clip removed)</td>
</tr>
<tr>
<td>W</td>
<td>W 1st stage HEAT or 1st stage auxiliary heat</td>
</tr>
<tr>
<td>W2</td>
<td>W2 2nd stage HEAT or 2nd stage auxiliary heat</td>
</tr>
<tr>
<td>W3</td>
<td>W3 3rd stage HEAT or 2nd stage of 2 stage auxiliary heat</td>
</tr>
<tr>
<td>Y</td>
<td>Y COOL control or 1st stage compression for heat pump</td>
</tr>
<tr>
<td>Y2</td>
<td>Y2 2nd stage COOL control or 2nd stage compression for a heat pump</td>
</tr>
<tr>
<td>G or F</td>
<td>G FAN control</td>
</tr>
<tr>
<td>C or X</td>
<td>C 24VAC power (to power thermostat) NOTE: TRANE uses B for this connection</td>
</tr>
<tr>
<td>H</td>
<td>H External Humidifier</td>
</tr>
<tr>
<td>DH</td>
<td>DH External De-Humidifier</td>
</tr>
<tr>
<td>EX</td>
<td>EX external fresh air baffle</td>
</tr>
<tr>
<td>B</td>
<td>B Heat pump changeover (cool to heat, powered in heat)</td>
</tr>
<tr>
<td>O</td>
<td>O Heat pump changeover (heat to cool, powered in cool)</td>
</tr>
<tr>
<td>B and O</td>
<td>IMPORTANT: If there are both B and O wires (Trane pump products) DO NOT CONNECT B to B terminal. Instead, connect B to C terminal. If not a Trane product, tape off B.</td>
</tr>
<tr>
<td>E</td>
<td>n/a Emergency heat (do not connect, tape off)</td>
</tr>
<tr>
<td>L</td>
<td>n/a System monitor (do not connect, tape off)</td>
</tr>
<tr>
<td>T</td>
<td>n/a Outdoor sensor (do not connect, tape off)</td>
</tr>
</tbody>
</table>
### Lennox Heat Pump

<table>
<thead>
<tr>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>V or VR or R</td>
<td>RH Power for HEAT</td>
</tr>
<tr>
<td>M or Y</td>
<td>Y COOL control</td>
</tr>
<tr>
<td>Y or W or W2</td>
<td>W2 2nd stage HEAT</td>
</tr>
<tr>
<td>F or G</td>
<td>G Fan control</td>
</tr>
<tr>
<td>R or O</td>
<td>O</td>
</tr>
<tr>
<td>X or X2 or C</td>
<td>C</td>
</tr>
</tbody>
</table>

### Trane Products [American Standard]

<table>
<thead>
<tr>
<th>Wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C 24VAC power (to power thermostat)</td>
</tr>
<tr>
<td>X2</td>
<td>Emergency heat. Do not connect, tape off.</td>
</tr>
</tbody>
</table>

### Zoned Hot Water

2 wire
- R: RH
- W: W

### Motor Driven Valves

3 Wire
- R or 5: RH (power)
- W or 4: W (heat ON)
- Y or G or 6 (the 3rd wire): A (heat OFF)

### Solenoid Valves

3 Wire
- R: RH (power)
- W: A (heat ON)
- Y or G (the 3rd wire): W (heat OFF)
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Product Overview
Home Screen

This is the default screen on the Thermostat. Anytime the unit wakes from sleep (or senses you approaching, if the sensor is enabled), the screen lights up and displays the system's mode (top), the target temperature (center), and the current room temperature (bottom).

When in Heat mode, the light bar at the bottom of the unit glows red. When in Cool mode, it glows blue. When the unit is off, the light bar does not glow. When the system is actively heating or cooling, the colored glow flickers.

**Adjusting Temperature**

- To temporarily change the target temperature, press up/down. The system will meet the target temperature until the next program period starts or you change the system mode.
- Press the side button once to change modes.

**Navigating the Vivint Element screens**

- Use the UP and DOWN buttons to move the cursor on the screen.
- Use the SIDE button to make a selection or scroll through options.
- To go back to a previous screen, highlight the ← arrow at the top of the screen and press the SIDE button.
- Wait 10 seconds for the device to sleep, then press any button to wake it again.
Outside Temp Screen
This screen displays the outside temperature and inside humidity (in %).

To see this screen, press the SIDE button twice.

Fan Timer Screen
This screen enables you to change fan operation (auto/on/15 min/30 min/1 hr).

To see this screen, press the SIDE button twice.

Settings Screen
This screen enables you to adjust the Thermostat’s settings, such as display units (°F or °C), target humidity levels, how the display activates, see information about the Thermostat, and adjust installation settings.

To see this screen, from the Home screen, press and hold the SIDE button for three (3) seconds.
Z-Wave and Thermostat Programs

The Thermostat must be included on a Z-Wave network in order to operate. Use your Z-Wave application to adjust the heating and cooling programs that the Thermostat uses to run your system. You can temporarily override target temperatures and change system modes from the thermostat, but you must use the Z-Wave application to make permanent changes to programs.

Compressor Protection

The Thermostat has a minimum cycle time of four (4) minutes to protect your compressor from excessive wear from responding to thermostat changes. The Home screen shows an hour glass and the message “Please Wait”. The compressor will not come on until the four-minute delay is over.
Customization
The Settings screen provides access to many features and settings of the Thermostat. Features you can control on the Settings screen are °F / °C display, humidity targets, display behavior, information about the Thermostat, and installer settings. The following pages provide detailed information about each of these settings.

Units

The Thermostat can display either Fahrenheit or Celsius temperature units. The Thermostat can display room temperatures in a range from 28°F to 99°F (-2°C to 37°C) with increments of 0.5° (F or C).

1. From the Home screen, press and hold the SIDE button for three (3) seconds.
2. Press DOWN to highlight User, then press the SIDE button.
3. Using the UP or DOWN buttons, select an option, then press the SIDE button to confirm.

Humidity

This screen is only available if your system includes humidity controlling equipment.

1. From the Home screen, press and hold the SIDE button for three (3) seconds.
2. Press DOWN to highlight Humidity, then press the SIDE button. The current Humidity Target Level percentage displays.
3. Press UP or DOWN to set a new target humidity percentage, then press the SIDE button to confirm.

Display

The Thermostat display can operate in one of two modes: Approach or Button Tap. Approach means that the device’s display will automatically turn on when it senses you approach within 4 (four) feet of the unit. Button Tap means that you will have to press one of the buttons on the unit to wake the display.

1. From the Home screen, press and hold the SIDE button for three (3) seconds.
2. Press DOWN to highlight Display, then press the SIDE button. The current Display On behavior has a check mark next to it.
3. Press UP or DOWN to select a behavior, then press the SIDE button to confirm.
**Info**

Information about the Thermostat device includes:

**Power:** The power supply the unit is currently using (batteries, C-wire, and/or transformer).

**Battery:** How much battery power is currently left, if batteries are installed in the unit.

**Heating:** The heating setting the system is currently using.

**Active Relays:** The wires currently being used by the system.

**Network:** Whether or not the unit is currently connected to a Z-Wave network.

**Software:** The current software and firmware versions the unit is using.

1. From the Home screen, press and hold the SIDE button for three (3) seconds.
2. Press DOWN to highlight Info, then press the SIDE button. Information about the Thermostat displays.
3. Press UP or DOWN to scroll through the available information.

**Installer**

Installer settings control the following Thermostat functions:

**EQUIPMENT:** heating, cooling, humidity control, and fan behavior

**COMFORT:** swing, differential, and other settings

**NETWORK:** the Thermostat’s connection to a Z-Wave Network

**TESTING:** the Thermostat’s connection to your equipment

**RESET:** resetting the Thermostat’s software to factory default

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⚠️ **WARNING**

Be sure to turn the thermostat operating mode to OFF before changing HVAC setup.
COMFORT

Comfort settings enable you to control:

**Calibration:** Offsets the unit’s temperature display

**Cycling:** This feature enables you to set the acceptable variance in temperature between the Thermostat’s setting and the current room temperature before the heating or cooling system will turn on. The Cycling range can be from 0.5 to 4.0°F (.25 to 2°C). For example, if Cycling is set to 2.0°F and the Thermostat is set to 70°F target temperature, the heat cycle will start when the room temperature drops to 68°F. Similarly, the cooling system will start when the room temperature increases to 72°F. The HVAC runs until the room reaches the target temperature, and then shuts off.

**Staging:** Used for multiple stage systems only. Staging is the number of degrees between the room temperature and the target temperature at which the next stage in multi-stage systems will engage to bring the room temperature back to the target. The default is 2°F. The programmable range is 2°F to 6°F (1°- 3°C).

**Calibration**

1. From the Home screen, press and hold the SIDE button for three (3) seconds.
2. Press DOWN to highlight Installer, then press the SIDE button.
3. Press DOWN to highlight Comfort, then press the SIDE button.
4. Press DOWN to highlight Calibration, then press the SIDE button. The current temperature offset displays.
5. Press UP or DOWN to change the value, then press the SIDE button to confirm.

**Cycling**

1. From the Home screen, press and hold the SIDE button for three (3) seconds.
2. Press DOWN to highlight Installer, then press the SIDE button.
3. Press DOWN to highlight Comfort, then press the SIDE button.
4. Press DOWN to highlight Cycling, then press the SIDE button. The current cycling value displays.
5. Press UP or DOWN to change the value, then press the SIDE button to confirm.
Staging
1. From the Home screen, press and hold the SIDE button for three (3) seconds.
2. Press DOWN to highlight Installer, then press the SIDE button.
3. Press DOWN to highlight Comfort, then press the SIDE button.
4. Press DOWN to highlight Staging, then press the SIDE button. The current staging value displays.
5. Press UP or DOWN to change the value, then press the SIDE button to confirm.

Network
Network settings enable you to add and remove the Thermostat to a Z-Wave Network, and to reset the network connection.
Before starting this procedure, go to your Vivint panel and prepare it for new devices. Once it is ready, add the Thermostat to the network.
1. From the Home screen, press and hold the SIDE button for three (3) seconds.
2. Press DOWN to highlight Installer, then press the SIDE button.
3. Press DOWN to highlight Network, then press the SIDE button.
4. Press DOWN to highlight "Connect", then press the SIDE button. The current networking status displays.
Selecting HVAC & Heat Types

1. From the Thermostat’s Home screen, press and hold the SIDE button for 3 seconds. The Settings menu opens.
2. Highlight Installer, then press the SIDE button. The Install Settings menu opens.
3. Highlight Equipment, then press the SIDE button. The Equipment menu opens.
4. Highlight Heating, then press the SIDE button. The Heating menu opens.
5. Under Heating Type, press the SIDE button until your heating type is displayed: Forced Air, Heat Pump, Hydronic, or Radiator.
6. Under Fuel, press the SIDE button until your heating fuel is displayed: Natural Gas, Propane, Fuel Oil, or Geothermal and Electric. For Heat Pump systems, this field is labeled Aux. Fuel.
7. Under Stages, press the SIDE button until your system’s heating stage type is displayed: 1 (single), 2 (dual), 1 + Auxiliary, or 2 + Auxiliary. For Heat Pump systems, this field is labeled Aux. Stages.

Note: Auxiliary stages are only available if you select Heat Pump as the heating type.

Selecting Heat Pump Settings

1. From the Thermostat’s Home screen, press and hold the SIDE button for 3 seconds. The Setting menu opens.
2. Highlight Installer, then press the SIDE button. The Install Settings menu opens.
3. Highlight Equipment, then press the SIDE button. The Equipment menu opens.
5. Highlight Wire, then select the letter corresponding to the terminal the Heat Pump is connected to: O or B.
6. Under Stages, press the SIDE button until your system’s heating stage type is displayed: 1 (single), or 2 (dual).
Selecting Cooling Type

1. From the Thermostat’s Home screen, press and hold the SIDE button for 3 seconds. The Settings menu opens.
2. Highlight Installer, then press the SIDE button. The Install Settings menu opens.
3. Highlight Equipment, then press the SIDE button. The Equipment menu opens.
4. Highlight Cooling, then press the SIDE button. The Cooling menu opens.
5. Under Type, press the SIDE button until your Cooling type is displayed: Air Conditioning, Heat Pump, or Evaporate.
6. Under Stages, press the SIDE button until the number of stages your system uses is displayed: 1 (single) or 2 (dual).

Selecting Humidity Settings

1. From the Thermostat’s Home screen, press and hold the SIDE button for 3 seconds. The Settings menu opens.
2. Highlight Installer, then press the SIDE button. The Install Settings menu opens.
3. Highlight Equipment, then press the SIDE button. The Equipment menu opens.
4. Highlight Humidity, then press the SIDE button. The Humidity menu opens.
5. Under Type, press the SIDE button until the type of humidity system you have is displayed: None, Humidifier, Dehumidifier, or Air Conditioner.
6. Under Activation, press the SIDE button until the method your humidity system uses is displayed: W ith Heating, W ith Cooling, or Independent.
7. Under Fan, press the SIDE button until the fan option your humidity system uses is displayed: Active or Inactive.
Test Installation

If you have a heat pump, leave the Thermostat in Off mode for 4 (four) minutes before checking Cool.

Do not operate AC if the outside temp is below 65°F.

To Check Heat

The heating and cooling tests run for up to 30 minutes. You can stop a test at any time by selecting the ← arrow and pressing the SIDE button.

1. From the Thermostat’s Home screen, press and hold the SIDE button for 3 seconds. The Settings menu opens.
2. Highlight Installer, then press the SIDE button. The Install Settings menu opens.
3. Highlight Testing, then press the SIDE button. The Testing menu opens.
4. Highlight Heating, then press the SIDE button. The Heat Test menu opens.
5. Highlight START, then press the SIDE button. The Thermostat screen displays the following:

   - **HEAT TIME**: how long the test has been running in minutes and seconds
   - **ACTIVE**: the wires the system is using to communicate with the heating system (example: W, G)
   - **CHANGE**: the amount of temperature change caused during the test (example: +3.4°)

6. Wait for the test to end, or highlight the back arrow ← and press the SIDE button.

A test of a successfully functioning heating system will show a rise in the temperature, as well as the proper wires indicated as being active. If the temperature appears to drop, or the wrong wires are indicated as being active, the test indicates a problem with the Thermostat installation. Check the wire connections and run the heating test again.
To Check Cool

1. From the Thermostat’s Home screen, press and hold the SIDE button for 3 seconds. The Settings menu opens.

2. Highlight Installer, then press the SIDE button. The Install Settings menu opens.

3. Highlight Testing, then press the SIDE button. The Testing menu opens.

4. Highlight Cooling, then press the SIDE button. The Cool Test menu opens.

5. Highlight START, then press the SIDE button. The Thermostat screen displays the following:
   - COOL TIME: how long the test has been running in minutes and seconds
   - ACTIVE: the wires the system is using to communicate with the cooling system (example: Y, G)
   - CHANGE: the amount of temperature change caused during the test (example: -2.6°)

6. Wait for the test to end, or highlight the back arrow and press the SIDE button.

A test of a successfully functioning cooling system will show a drop in the temperature, as well as the proper wires indicated as being active. If the temperature appears to rise, or the wrong wires are indicated as being active, the test indicates a problem with the Thermostat installation. Check the wire connections and run the cooling test again.
Other Device Information

**Low Battery Warning**
The Thermostat displays this screen when the batteries are running low on charge and should be replaced. This screen will only display once per day the first time the screen wakes.
1. Press the SIDE button to dismiss this warning.
2. Turn the thermostat mode to OFF (from heat or cool).
3. Replace the batteries.
4. Turn the thermostat mode back on to HEAT or COOL.
Your settings will be retained and the thermostat will automatically reconnect to the Z-Wave Network.

**Network Disconnected**
The Thermostat displays this screen when it has lost its connection to the Z-Wave Network. This screen will only display once per day the first time the screen wakes.
1. Press the SIDE button to dismiss this warning.
2. Go to the Home > Installer > Network menu, and follow the procedure to include the Thermostat to the Z-Wave Network.

**Firmware Updating**
The Thermostat displays this screen when it is updating its firmware.
Wait until the firmware update is complete (about 15 minutes) and this screen is no longer displayed before attempting to use the Thermostat.
Factory Reset

Use this procedure only in the event that the network primary controller is missing or otherwise inoperable.

1. From the Home screen, press and hold the SIDE button for three (3) seconds.
2. Press DOWN to highlight Installer, then press the SIDE button.
3. Press DOWN to highlight Reset, then press the SIDE button.
4. Press DOWN to highlight Reset, then press the SIDE button.
5. To confirm that you want to reset the device to factory defaults, press DOWN to highlight Reset, then press the SIDE button.

The device resets itself and reboots. You will need to connect the device to your Z-Wave Network and specify your system’s equipment and settings. See the Installation Guide Setup section.
Z-WAVE® REFERENCE
Z-Wave® Reference

The Thermostat can work in the same network with any other certified Z-Wave device, regardless of manufacturer/vendor. See your specific Z-Wave® controller’s User Manual for detailed instructions on operating your thermostat through the network.

Behavior Note: When power is first applied to this device it will broadcast a Hail message followed by a Node Information frame. This behavior is to maintain backwards compatibility with older controllers that work with this line of devices.

Z-Wave Lifeline

The following commands can be sent to lifeline:
- Command Class Sensor Multilevel - Sensor Multilevel Report
- Command Class Basic - Basic Report
- Command Class Thermostat Mode - Thermostat Mode Report
- Command Class Thermostat Operating State - Thermostat Operating State Report
- Command Class Thermostat Fan Mode - Thermostat Fan Mode Report
- Command Class Thermostat Fan State - Thermostat Fan State Report
- Command Class Thermostat Setpoint - Thermostat Setpoint Report
- Command Class Multichannel - Multi Channel Command Encapsulate

These can be accessed via an Association Group Info Command List Get for group 1 (lifeline)
Advanced Z-Wave® Information

The Thermostat supports compliant mapping of the Z-Wave® BASIC_COMMAND_CLASS to the CT thermostat “Energy Saving” and “Comfort Mode” as follows:

- Basic Set (Value = 0x00) = Set Energy Saving Mode
- Basic Set (Value = 0x01-0x63 & 0xFF) = Set Comfort Mode

Energy Savings applies a 4° F setback to the existing set point temperature to comply with EPA recommendations for energy savings.

Anti-theft

The Anti-Theft Command Class disables a subset of supported/controlled command classes in the thermostat if the thermostat is being excluded from and included to a Z-Wave network. (This thermostat supports version 2 of the Anti-Theft Command Class.) This command class is typically used when installing a thermostat in a public location, such as a hotel room or conference center. The command class allows the user to lock the thermostat to the actual Z-Wave network and to render it useless if it is removed from the local network without being unlocked. Another application would be to protect service-provider-owned products from leaving the service providers network before they are paid for.

Disabled Commands With Engaged Anti-Theft protection

<table>
<thead>
<tr>
<th>Basic Command</th>
<th>Clock Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator Command</td>
<td>Manufacturer Specific Command</td>
</tr>
<tr>
<td>Multilevel Sensor Command</td>
<td>Thermostat Mode Command</td>
</tr>
<tr>
<td>Thermostat Operating State Command</td>
<td>Thermostat Fan Mode Command</td>
</tr>
<tr>
<td>Thermostat Fan State Command</td>
<td>Thermostat Setpoint Command</td>
</tr>
<tr>
<td>Version Command</td>
<td>Configuration Command</td>
</tr>
<tr>
<td>Battery Command</td>
<td>Association Command</td>
</tr>
<tr>
<td>Anti-theft Command</td>
<td>Multi Channel Command</td>
</tr>
<tr>
<td></td>
<td>(Only supported if a humidity sensor is present.)</td>
</tr>
</tbody>
</table>
# Configuration Parameters

This device supports the following Configuration Parameters:

<table>
<thead>
<tr>
<th>Name</th>
<th>Set/Get</th>
<th>Default</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp Reporting Threshold</td>
<td>Set/Get</td>
<td>2</td>
<td>0 to 4</td>
</tr>
<tr>
<td>HVAC Settings</td>
<td>Get Only</td>
<td>N/A</td>
<td>see below</td>
</tr>
<tr>
<td>Utility Lock Enable/Disable</td>
<td>Set Only</td>
<td>0</td>
<td>0 to 127</td>
</tr>
<tr>
<td>C- Wire/Battery Status</td>
<td>Get Only</td>
<td>N/A</td>
<td>0 or 1</td>
</tr>
<tr>
<td>Humidity Reporting Threshold</td>
<td>Set/Get</td>
<td>2</td>
<td>0 to 3</td>
</tr>
<tr>
<td>Auxiliary/Emergency</td>
<td>Set/Get</td>
<td>0</td>
<td>0 or 1</td>
</tr>
<tr>
<td>Thermostat Swing Temp</td>
<td>Set/Get</td>
<td>2</td>
<td>1 to 8</td>
</tr>
<tr>
<td>Thermostat Diff Temp</td>
<td>Set/Get</td>
<td>4</td>
<td>4 to 12</td>
</tr>
<tr>
<td>Thermostat Recovery Mode</td>
<td>Set/Get</td>
<td>2</td>
<td>1 or 2</td>
</tr>
<tr>
<td>Temp Reporting Filter</td>
<td>Set/Get</td>
<td></td>
<td>see below</td>
</tr>
<tr>
<td>Simple UI Mode Enable/Disable</td>
<td>Set/Get</td>
<td>1</td>
<td>0 or 1</td>
</tr>
<tr>
<td>Multicast Enable/Disable</td>
<td>Set/Get</td>
<td>0</td>
<td>0 or 1</td>
</tr>
<tr>
<td>Main Display Selection</td>
<td>Set/Get</td>
<td>1</td>
<td>1 or 2</td>
</tr>
<tr>
<td>Save Energy Mode Type</td>
<td>Set/Get</td>
<td>2</td>
<td>1 to 255</td>
</tr>
<tr>
<td>Fan Timer</td>
<td>Set/Get</td>
<td>0</td>
<td>0 to 60</td>
</tr>
<tr>
<td>Humidity Control Activation</td>
<td>Set/Get</td>
<td>1</td>
<td>0 or 0</td>
</tr>
<tr>
<td>Temperature Calibration</td>
<td>Set/Get</td>
<td>0</td>
<td>-6 to 6</td>
</tr>
<tr>
<td>Display Units</td>
<td>Set/Get</td>
<td>0</td>
<td>0 or 1</td>
</tr>
</tbody>
</table>
1. Temperature Reporting Threshold (8-bit)

This value determines the reporting threshold when association reporting is enabled. Unsupported values are ignored.

<table>
<thead>
<tr>
<th>Value</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treshold</td>
<td>Disabled</td>
<td>Disabled</td>
<td>0.5°F</td>
<td>1.0°F</td>
<td>1.5°F</td>
</tr>
</tbody>
</table>

2. HVAC Settings (32-bit)

Byte 1 = HVAC Setup: Normal (0x01) or Heat Pump (0x02)
Byte 2 = Aux Setup (Gas (0x01) or Electric (0x02)) & Number of Auxiliary Stages (Heat Pump)/Number of Heat Stages (Normal)
Byte 3 = Number of Heat Pump Stages
Byte 4 = Number of Cool Stages

3. Utility Lock (8-bit)

If set to 0, the utility lock is disabled. All other values (1-255) enable the utility lock.

4. C-Wire/Battery Status (8-bit)

If 0x01, the thermostat is powered by a C-wire. If 0x02, the thermostat is powered by batteries.

5. Humidity Reporting Threshold (8-bit)

This value determines the reporting threshold when association reporting is enabled. Unsupported values are ignored.

6. Auxiliary/Emergency (8-bit)

If set to 0, auxiliary / emergency heat is disabled. All other values (1-255) enable auxiliary / emergency heat. This can only be enabled when the thermostat is set to Heat Pump mode.

7. Thermostat Swing Temp

The thermostat swing temperature is in units of 0.5 degrees Fahrenheit. A value of 0x01 is 0.5F and 0x02 is 1.0F. The supported values may vary from thermostat to thermostat but typically the allowed values are 0.5F (0x01) to 4.0F (0x08).
8. Thermostat Diff Temp

The thermostat differential temperature is in units of 0.5 degrees Fahrenheit. A value of 0x04 is 2.0F and 0x06 is 3.0F. The differential temperature must be an integer value. Non-integer values, such as 1.5F (0x03), should not be used. The supported values may vary from thermostat to thermostat but typically, the allowed values are 2.0F (0x04) to 6.0F (0x0C).

9. Thermostat Recovery Mode

The Thermostat Recovery Mode can be either fast (0x01) or economy (0x02).

10. Temp Reporting Filter (16-bit)

Set Command Definition

<table>
<thead>
<tr>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Class = COMMAND_CLASS_CONFIGURATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Command = CONFIGURATION_SET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter = 0x0A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td>RESERVED</td>
<td>Size = 0x04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precision (0x00)</td>
<td>Scale</td>
<td>Bound Size (0x01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Filter Lower Bound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precision (0x00)</td>
<td>Scale</td>
<td>Bound Size (0x01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Filter Upper Bound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Parameter (8-bit)**
  The parameter is set to 10 (0x0A) for the temperature reporting filter.

- **Default (1-bit)**
  If the default bit is set, the upper bound is zero (0) and the lower bound is 124. This disables the filter.

- **Size (3-bit)**
  The Size field must be set to 4 (100b).

- **Precision (3-bits)**
  The precision field describes the precision of the temperature filter value. The filter must be zero (0x00).
• **Scale (2-bits)**  
The scale field indicates the temperature scale used: 0 indicates Celsius and 1 indicates Fahrenheit.

• **Bound Size (3-bits)**  
The size field indicates the number of bytes used for the temperature filter value. This field must be one (0x01).

• **Temperature Filter Lower Bound (8-bit)**  
The thermostat will report ambient temperature changes for temperature values less than the lower bound. This field must be between 0F and 124F. By default, this value is 124F (report all temperature changes).

• **Temperature Filter Upper Bound (8-bit)**  
The thermostat will report ambient temperature changes for temperature values greater than the upper bound. This field must be between 0F and 124F. By default, this value is 0F (report all temperature changes).

---

**Thermostat Reporting Filter Report Command Definition**

<table>
<thead>
<tr>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Class = COMMAND_CLASS_CONFIGURATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Command = CONFIGURATION_SET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter = 0x0A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precision (0x00)</td>
<td>Scale</td>
<td>Bound Size (0x01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Filter Lower Bound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Filter Upper Bound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• **Parameter (8-bit)**  
The parameter is set to 10 (0x0A) for the temperature reporting filter.

• **Temperature Filter Lower Bound (8-bit)**  
The thermostat will report ambient temperature changes for temperature values less than the lower bound. This field must be between 0F and 124F. By default, this value is 124F (report all temperature changes).

• **Temperature Filter Upper Bound (8-bit)**
The thermostat will report ambient temperature changes for temperature values greater than the upper bound. This field must be between 0F and 124F. By default, this value is 0F (report all temperature changes).

11. **Simple UI Mode Enable / Disable**
   If set to 0, Simple UI mode is disabled. If set to 1, Simple UI mode is enabled.

12. **Multicast Enable/Disable (8-bit)**
   If set to 0, Multicast is disabled. If set to 1, Multicast is enabled.

13. **Main Display Selection**
   This configuration Param on the CT110 sets what information is displayed in the main thermostat display area (the largest central numbers on the display). The default values is to display the Temperature (0x01) on the main numbers.

14. **Save Energy Mode Type**
   This configuration value is used to read/write what behavior Save Energy Mode causes in the thermostat when the thermostat enters Save Energy Mode.

15. **Fan Timer**
   This configuration is used to activate the fan with an automatic shut-off timer.

16. **Humidity Activation**
   This parameter is a pass-through. All the logic is handled by the thermostat based on the A terminal assignment.

17. **Temperature Calibration**
   This configuration is used to set the temperature offset of the thermostat. The valid values are from -6 to 6. Note: although the thermostat UI can set calibrations in intervals of 0.5°F, this parameter can only accept whole numbers.

18. **Display Units**
   This configuration is used to set units used by the device to display temperature.
FCC Warning

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (which can be determined by turning the equipment off and on), try to correct the interference by following these suggestions:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
Statement Of Use

100% Compatible with all popular residential HVAC systems: 24VAC single stage and two stage conventional heating systems (gas, oil, electric), heat pumps with up to two stages of heat and up to two stages of auxiliary heat (electric or fossil), zoned forced air and zoned hot water (2 or 3 wire), millivolt systems (with a 12-24V AC or DC source), one or two stage cooling, and hybrid systems. Do not use this thermostat with line voltage heating systems.

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