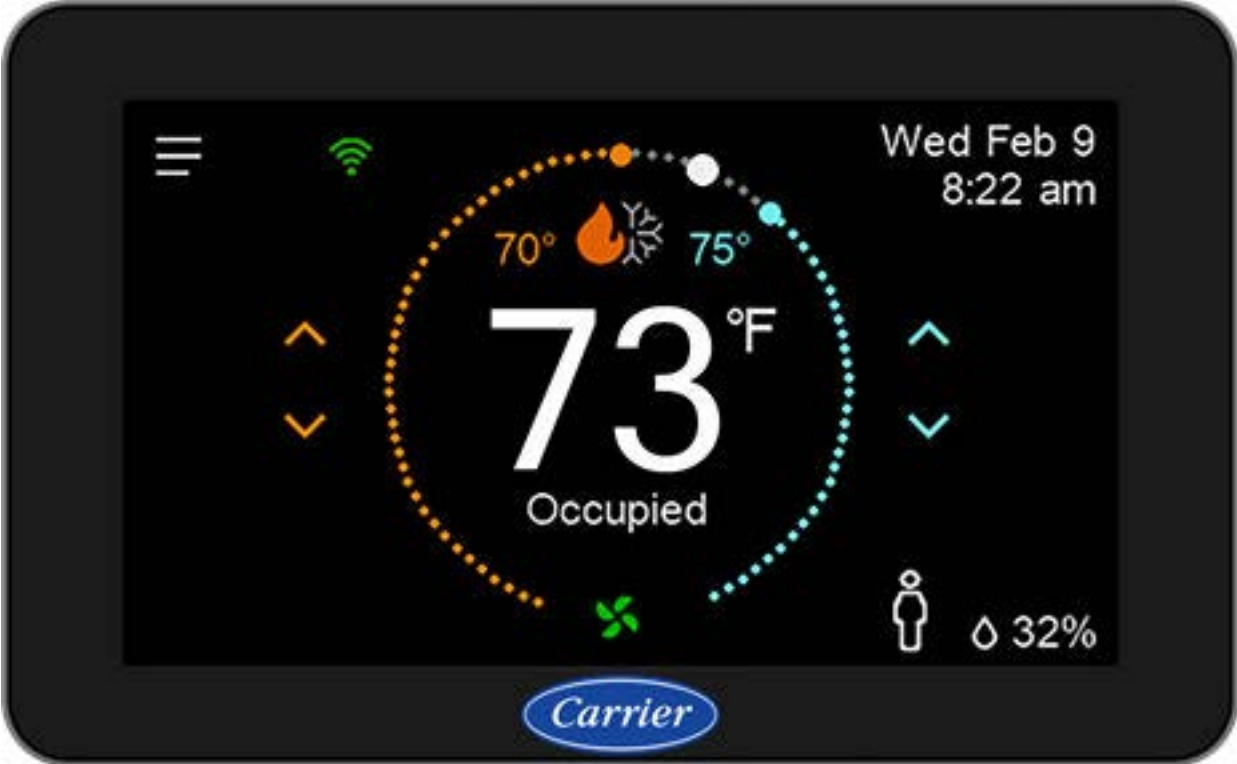


Carrier® Connect™ Wi-Fi Thermostat 33TCSPF-4 / 33TWSPF-4





Verify that you have the most current version of this document from www.hvacpartners.com, the **Carrier Partner Community** website, or your local Carrier office.

Important changes are listed in **Document revision history** at the end of this document.

Specifications subject to change without notice.

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What is the Carrier® Connect™ 33TCSPF-4 / 33TWSPF-4 Thermostat?

This thermostat contains space and outdoor temperature sensing, space humidity sensing, presence detection, NFC functionality, Wi-Fi connectivity and BACnet communications over MS/TP or Wi-Fi.

Part numbers

- 33TCSPF-4: Carrier branded
- 33TWSPF-4: No branding

System Features

The 33TCSPF-4 provides the following features:

- Control of heating, cooling, and fan solid state outputs as a 24VAC standard thermostat.
- Space temperature sensing (> 0.5 °F accuracy from 60 °F to 90 °F)
- Outdoor temperature sensing using a 10K @ 25 °C J Curve thermistor connected between terminals T and C or Wi-Fi outdoor temperature available by GPS location services determined when the thermostat is installed.
- Humidity sensing and control.
- Presence Detection (used to “wake-up” display when being observed by user)
- NFC functionality (used for passive/active limited data transfer)
- Wi-Fi connectivity (supports 802.11 b/g/n standards and utilizes a Broadcom chipset)
- Cloud Connectivity (through Ayla, plans are set up to allow for free end-user connectivity)
- IOS and Android APP for end-user Smart Phone or Tablet control.
- Optimized Installation (“finger friendly” spring loaded connectors that accept from 16-22 AWG wire) (NO screwdriver required for wire insertion and removal)
- Optimized Boot Time (3 seconds total boot time until temperature displayed and thermostat fully operational)
- 4.3” TFT 480x272 QVGA Color display with enhanced 80° viewing angle in all directions.
- Fully integrated Capacitive Touch display functionality
- Custom Second Surface Multi-Color Logo area available on front surface for branding
- OTA functionality (can re-program application via Wi-Fi or BACnet)
- BACnet communications via MS/TP or IP over Wi-Fi

Specifications

Power requirements	24 Vac 50/60 Hz @ 6VA
Network Requirements	Wi-Fi connectivity supports Wi-Fi: 802.11 a/b/g/n standards on 2.4 GHz networks
Environmental operating range	32° to 104 °F (0° to 40 °C), 10 to 95% relative humidity, non-condensing
Inputs	Remote Temperature Sensor 10K Type II. Software selectable for: <ul style="list-style-type: none">• Remote Temperature (33ZCT55SPT)• Outside Air Temperature (33ZCSENOAT)• Duct Temperature (33ZCSENSAT)• Dry Contact Input= Occupancy or Filter status or Door Contact or Economizer Fault

What is the Carrier® Connect™ 33TCSPF-4 / 33TWSPF-4 Thermostat?

Outputs	Minimum Load = 1000 ohms Maximum Load = 1.25 A, 50% power factor
Communications	Wired BACnet MS/TP, Wireless BACnet over Wi-Fi
Mounting	Wall mount on a horizontal standard 4" x 2-1.2 x 2" electrical box
Overall dimensions	Dimensions: (H x W x D): 3.23 in. (82mm) x 5.13 in. (130mm) x .94 in. (24mm) Weight: approximately .75 lb (340g)
Compliance	FCC Part 15, Subpart J Title 24, 2022 Part 6 (OpenADR 2.0b) IECC 2015

Inputs

Power supply

Class II Transformer secondary voltage supplied to the thermostat (from the Packaged Unit or Fan Coil transformer) is 18.0 to 30.0 VAC, 50/60 Hz. Voltage is applied between “R” connector **P104** and “C” connector **P104**.

“T” Terminal

This temperature input is designed to accept a NTC “J” curve 10K @ 25 C thermistor, or an open/closed switch, connected between terminals T and C. The resistance to temperature conversion has an accuracy of $\pm 0.20^{\circ}\text{C}$ from $+15.6^{\circ}\text{C}$ to $+32.2^{\circ}\text{C}$ (approximately 0.5°F accuracy from 60°F to 90°F).

Onboard Temperature Sensor

The thermostat has an onboard NTC “J” curve 10K @ 25°C thermistor used to sense space temperature. The resistance to temperature conversion has an accuracy of $\pm 0.20^{\circ}\text{C}$ from $+15.6^{\circ}\text{C}$ to $+32.2^{\circ}\text{C}$ (approximately 0.5°F accuracy from 60°F to 90°F).

Onboard Humidity Sensor

The humidity is read via synchronous communications from a Sensirion SHT21 Humidity and Temperature Sensor populated on the board. No external sensor is required. The Sensirion humidity is accurate to $\pm 2\%$ relative humidity between 20 and 80 % relative humidity.

Outputs

Connections are made via a compact and robust single pole, “finger friendly” spring type terminal block. The terminal block is labeled per the table in Section 2.1.2.

Terminals 1 through 7

Dry Contact, Max rating is 1.25 Amp @ 24 VAC with a peak off state voltage of 80V.

Analog Output (AO)

Single channel 0-10 VDC output with ± 0.2 vdc resolution. Max rating shall be 300 microamps at 10 vdc. Minimum loading is 33 kohms. Loading less than 33 kohms must not damage the output but will limit the maximum voltage that can be driven.

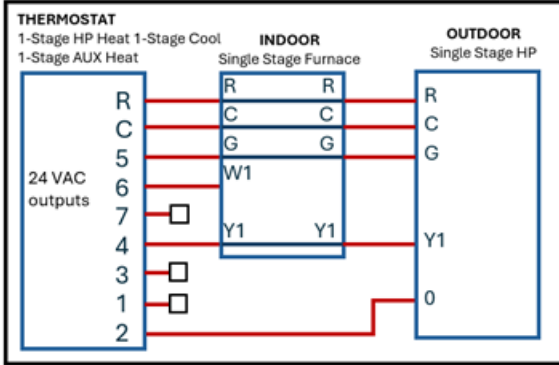
Connections

Connectors P104 and P105. 2 banks of “finger friendly” spring type terminal block.

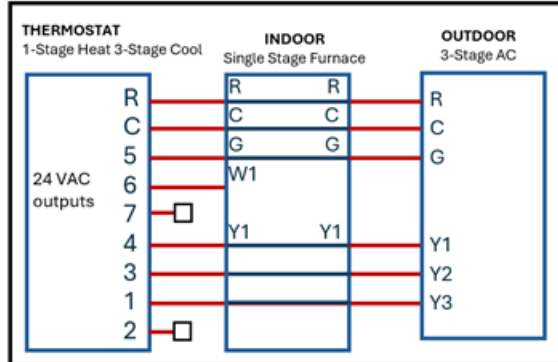
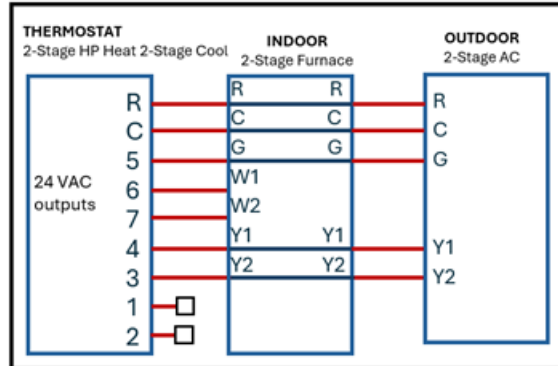
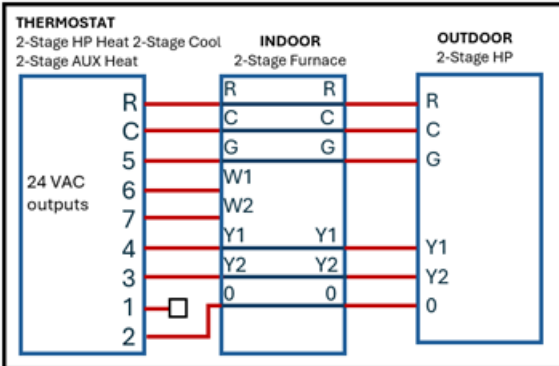
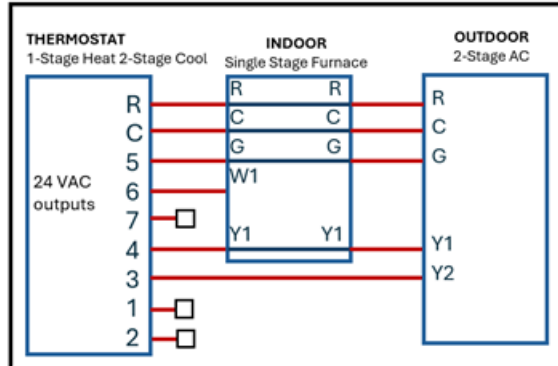
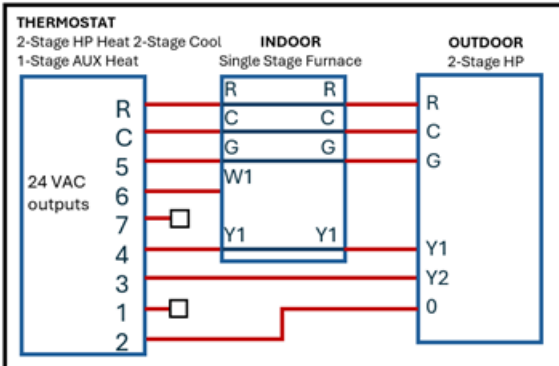
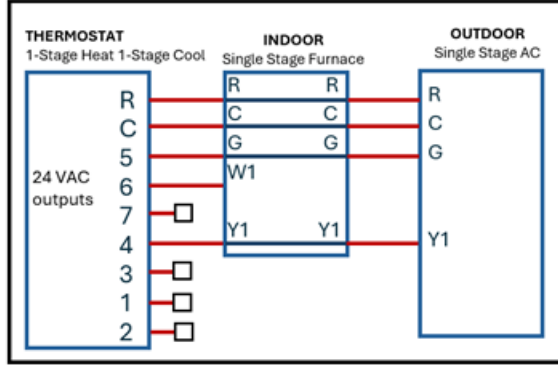
Connector Position	Contact Type	Terminal Designation	Legacy Functionality
P105 (top)	24 vac outputs from internal triac	1	Y3
P105	24 vac outputs from internal triac	2	O/B
P105	24 vac outputs from internal triac	3	Y2
P105	24 vac outputs from internal triac	4	Y1
P105	24 vac outputs from internal triac	5	G
P105	24 vac outputs from internal triac	6	W1
P105 (bottom)	24 vac outputs from internal triac	7	W2
P104 (top)	Communications	A+	A+
P104	Communications	B-	B-
P104	24vac inputs for operating and output loads	C	C
P104	24vac inputs for operating and output loads	R	R
P104	10vdc for modulating out	AO	AO
P104 (bottom)	Remote thermistor in or dry contact in depending on configuration	T	T

Wiring Diagrams

DUAL FUEL SYSTEMS (Furnace and Heat Pump)

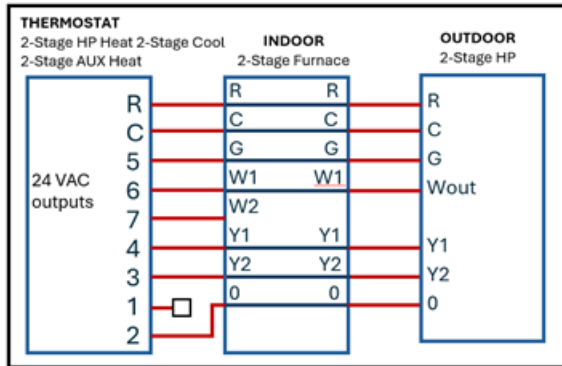
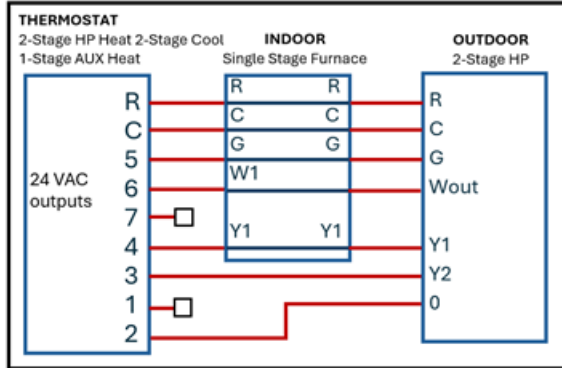
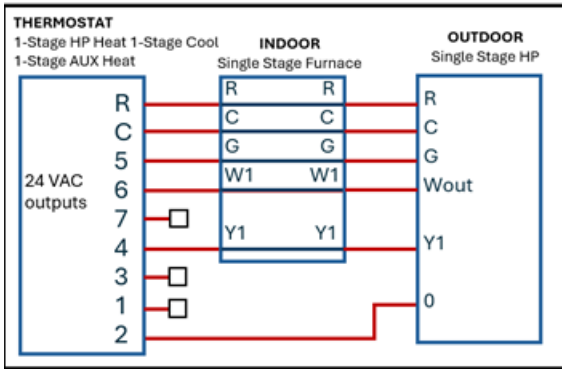


FURNACE / AC SYSTEMS

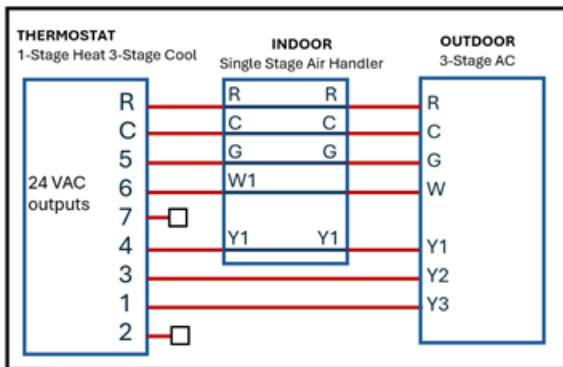
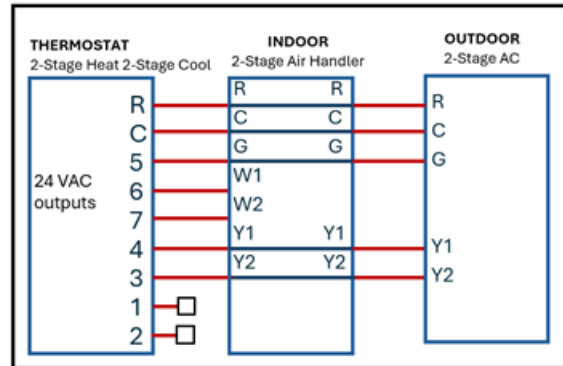
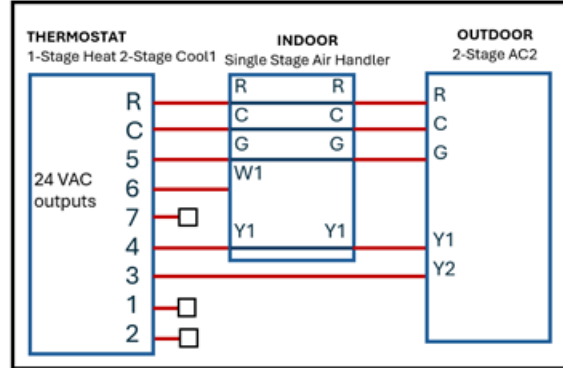
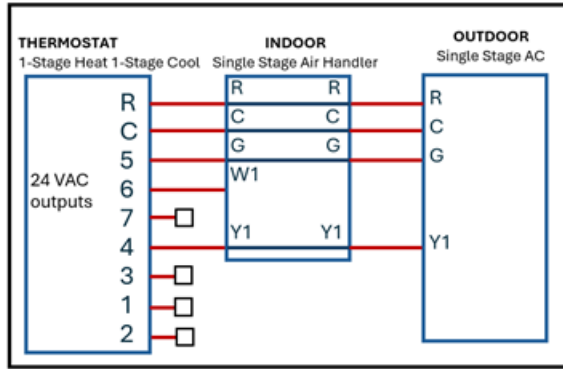


Wiring Diagrams

AIR HANDLER / HEATPUMP SYSTEMS

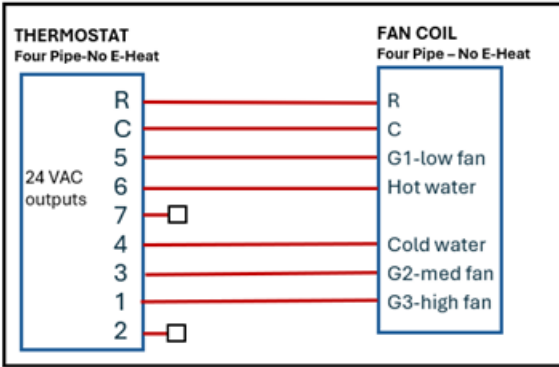


FURNACE / AC SYSTEMS

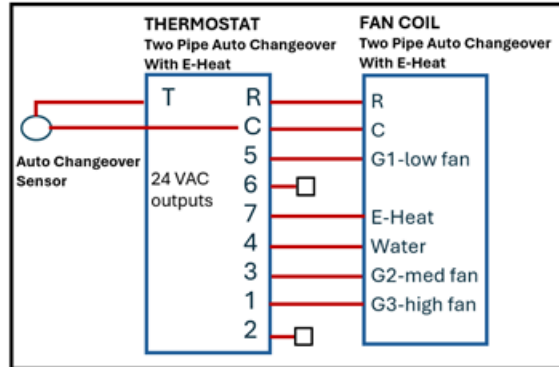
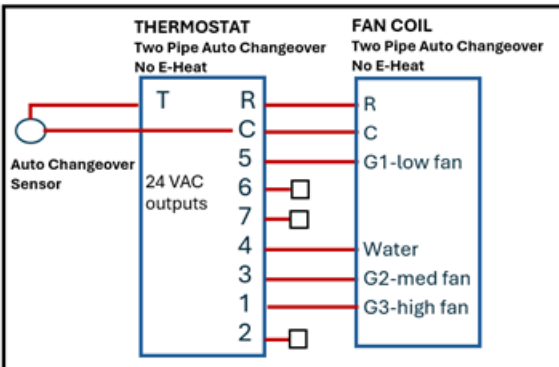
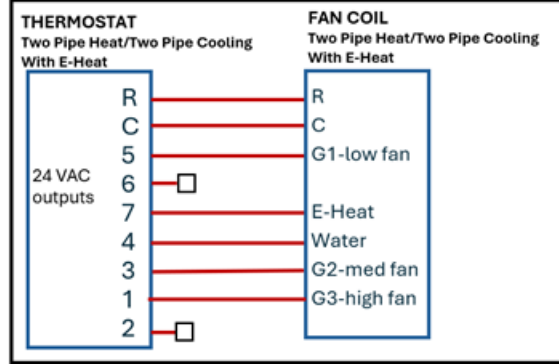
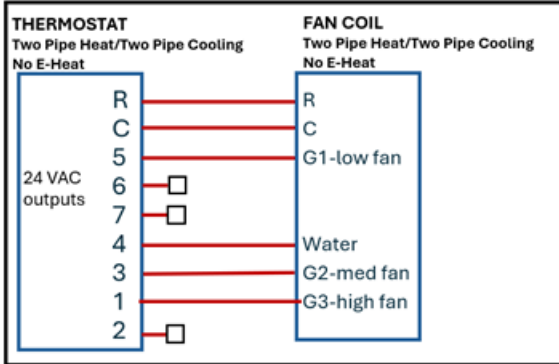
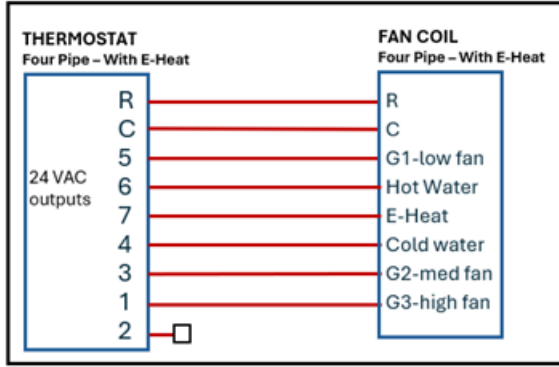


Wiring Diagrams

HYDRONIC FAN COIL SYSTEMS



HYDRONIC FAN COIL SYSTEMS



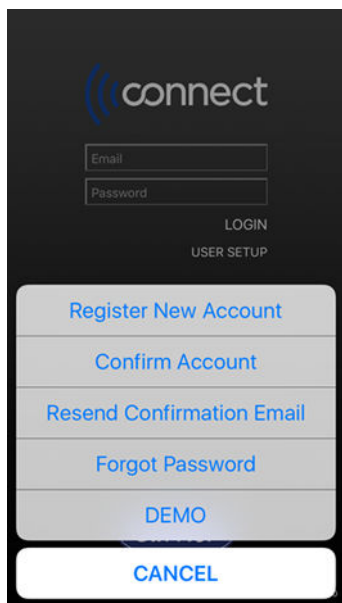
Registering and setting up a mobile device for enhanced access

Downloading the Connect™ App provides enhanced access to your device. The Connect™ App is available for Apple iOS® at App Store® or at Google Play® for Android devices. Search for **Carrier® Connect™ Thermostat**.

NOTE Device compatibility: Apple iOS® 16 or later or Android 9 or later

1. After downloading Connect™ App, select **USER SETUP** and **Register New Account**.

NOTE You can also register new accounts using the website connectstat.carrier.com.



2. Enter an email address that you can access on your mobile device and receive the confirmation email to complete the registration process.
3. Select **SETUP NEW THERMOSTAT** and follow the Connect™ App instructions.
4. After registering the thermostat, enter the service contractor's name and phone number on the **SERVICE INFO** screen.
5. On the **THERMOSTATS** screen, select the thermostat from list and the mobile app's **HOME** screen appears.




Using the Connect website or app

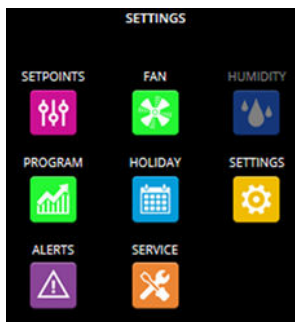
After you register for an account, you can access the thermostat by using the app directly or through the Web at connectstat.carrier.com.

You can:

- Monitor the thermostat operation
- Set up occupied and unoccupied (holiday) schedules
- Adjust setpoints
- Share thermostat access with other users
- Create groups of thermostats that you have registered
- Create groups of thermostats that other owners have shared with you
- Get online product information
- Find local dealer support

To navigate

- On a touchscreen device, use any of the following:
 - Swipe the screen
 - Tap the arrow on the side
 - Tap a dot on the bottom of the screen on either side of the **Home** button
 - On a non-touchscreen device, click on the gray arrow  on either side of the screen.
 - You can press or click  to access the following drop-down list:
 - **My Systems**
 - **My Account**
 - **Shared Systems**
 - **Product Information**
 - **Find and Expert**
 - **Logout**
1. After logging in, a list appears of thermostats that you have registered and that have been shared with you.
 2. Click .
 3. Swipe or click to navigate to the **SETTINGS** screen.



NOTES

- Navigate by clicking or pressing the buttons such as **SETPOINTS**, **FAN**, **PROGRAM**, etc.
- Grayed out function buttons indicate that feature is not being used on the thermostat.

Screens	Use to...
SETPOINTS	Adjust the occupied and unoccupied setpoints by selecting each temperature.
FAN	View and modify fan settings. <ul style="list-style-type: none"> • The default setting for fan operation is AUTO for both Occupied and Unoccupied periods. When operating in AUTO MODE, the fan only runs when there is an active heating or cooling demand. • When you select ON, the fan runs continuously, except during the Blower On Delay when a heat cycle is starting. There is a 30-second minimum on/off timer when changing the FAN MODE.
Non-Programmable Operation	
The following selections are not available if the thermostat has been configured for non-programmable operation.	
HUMIDITY	Adjust the thermostat's humidify and dehumidify setpoints.

Screens	Use to...
PROGRAM	<p>You can:</p> <ul style="list-style-type: none"> • Set Occupied and Unoccupied start times, depending on the configured number of periods and the user's security level. • Select the time at the bottom of the screen to adjust the start or stop time of each period in 15-minute increments. • Select Copy to apply that schedule to other days of the week. • Adjust the setpoints for each period.
HOLIDAY	<p>Set HOLIDAY (same as unoccupied) periods with the following options:</p> <ul style="list-style-type: none"> • Length of time from 1 to 365 days • Same day of each week of the month • Specific day of specific week(s) of the month <p>NOTE Advanced security level is required to edit these settings.</p> <ul style="list-style-type: none"> • Select +ADD HOLIDAY to add start month, day, and number of days. • Select ADVANCED to configure the same day of each week(s) of that month. • To delete a holiday on the: <ul style="list-style-type: none"> • Mobile app - Swipe the selected holiday to the left and select Delete. • Web app - Select x on the right side of the holiday.
SETTINGS	<p>Enter the name and location of the thermostat for the user's reference. The user can enter an email address for alerts and a mobile phone number to receive text alert messages.</p> <p>NOTE Requires advanced security level to edit these settings.</p>
ALERTS	<p>Displays a list of alerts that have been flagged in the thermostat.</p>
SERVICE	<p>Displays the name and phone number of the service company or individual who is responsible for servicing the system.</p> <p>NOTE Requires advanced security level to edit these settings.</p>
CO2	<p>Displays the graph for up to 30 days of CO2 history. Presents the high and average for today as well as the last 30 days.</p>

Getting to know the user interface

Dormant screen

The **Dormant Screen** appears when you are not interacting with the thermostat. It has a minimal amount of information displayed for a clean and uncluttered look.



This screen automatically dims to a dormant state based on the **Backlight** (page 32) settings and brightens when a person is detected in front of the thermostat.

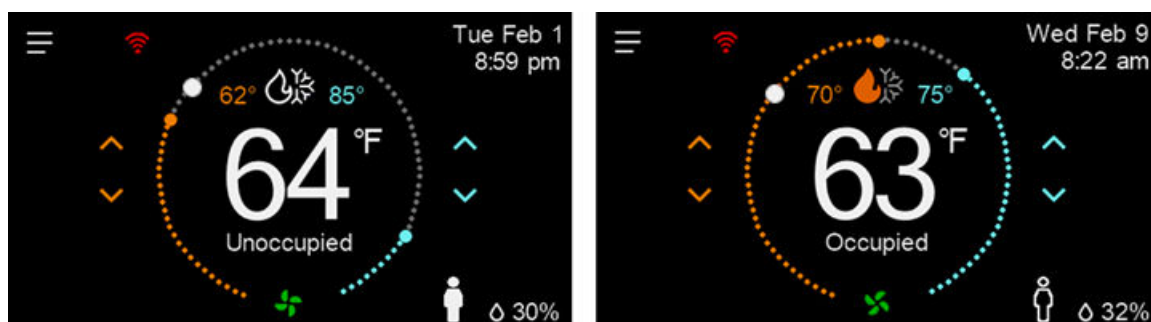
When you touch the **Dormant** screen, the display transitions to the **Home** Screen, if the thermostat **Lockout** (page 33) is disabled. If the thermostat **Lockout** is enabled, you are prompted to enter a PIN to access the thermostat settings.

Home screen

The **Home** screen allows the user to adjust the most used thermostat settings.

The user can adjust the heat and cool setpoints by pressing the orange or blue up and down arrows or by touching the orange or blue dot and dragging it around the semi-circle. As the setpoint changes, the space temperature is replaced by the changing setpoint. Once the setpoint is changed, the space temperature appears.

The white dot on the semi-circle represents the space temperature.



You can change the mode by pressing the mode icon above the space temperature.

Fan

The fan icon at the bottom center of the semi-circle rotates when the fan is energized. The fan state of Auto (run only with the equipment) or On (run continuously) is determined by the occupancy state but can be overridden by touching the fan icon and selecting the desired state.

Time

The user can adjust the time by touching the date and time in the upper right corner. However, if the time is being synchronized with a Wi-Fi server, the user adjustment is canceled the next time the thermostat time synchronizes to the server time.

Humidity

The space humidity appears in the lower right corner.

- If the system is configured for humidification or dehumidification control, touching the displayed humidity allows the user to adjust the humidify or dehumidify control settings.
- If the system is not configured for humidity control, the space humidity level appears for informational purposes only, and touching the value on the screen has no effect.

Outdoor air temperature

If the outdoor air temperature and supply air temperature are available and configured to be displayed (page 34), the humidity, outdoor air temperature and supply air temperature must alternate being displayed with each sensor being displayed for five seconds.

The outdoor temperature can be read from the remote sensor terminals (terminals T and C) or from the Wi-Fi server. If there is no outdoor temperature available from either source, N/A appears.

Occupancy

The one button occupancy state icon (looks like a person) is a one button press to temporarily change the occupancy state.

- If the current state is **Occupied**, the state after the button press is **Unoccupied**.
- If the current state is **Standby**, the state after the button press is **Occupied**.
- If the current state is **Unoccupied**, the state after the button press is **Occupied**.

The occupancy state must change for the amount of time specified by the Maximum **Temporary Hold Time**.

NOTE If the Maximum Temporary Hold Time is set to zero, the program schedule overrides are not allowed and this icon does not appear.

User Menu

The **User Menu** icon in the upper left corner provides access to the less commonly changed thermostat settings.

Temperature

The center portion of the screen displays the current space temperature. The temperature appears in whole degrees Fahrenheit and half degrees Celsius. The default temperature scale is degrees Fahrenheit but can be changed to degrees Celsius in your settings (page 36).

Wi-Fi

An icon on the top left side of the screen displays the current Wi-Fi signal strength. Touch the Wi-Fi icon to view details of the current connection, or if not connected, initiate the Wi-Fi setup process. If the Wi-Fi Enabled in the **Advanced Settings screen is turned off**, touching the Wi-Fi icon on the home screen must transition to the **Advanced Settings** screen.

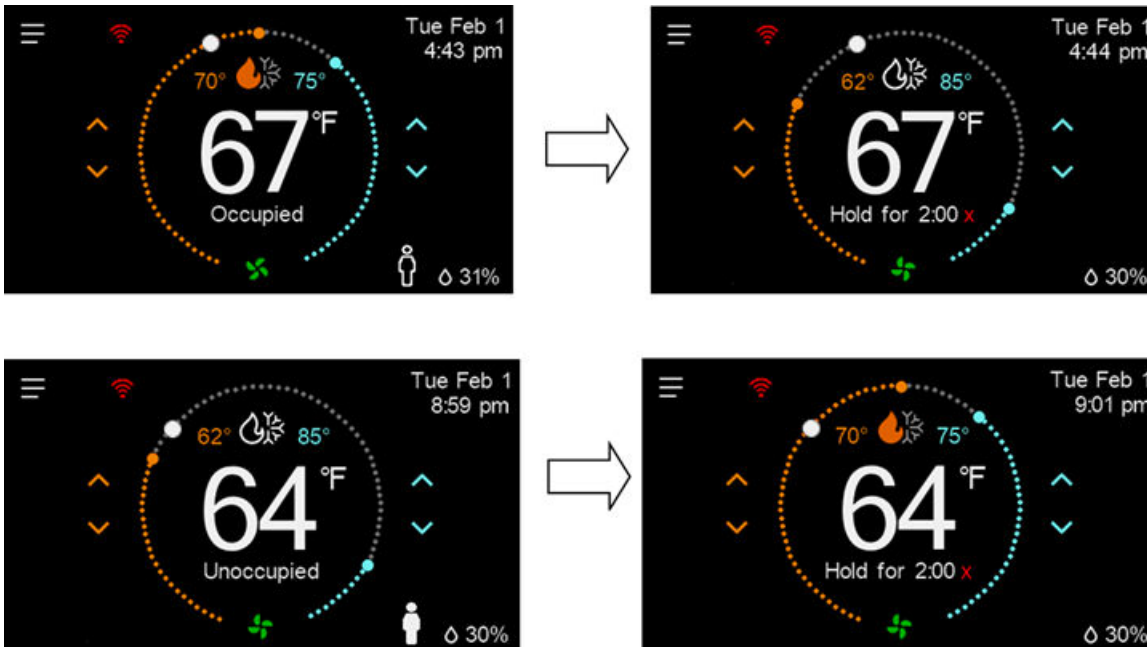
Adjust the Setpoints

The heat and cool setpoints can be changed from the **Home** screen using the up and down buttons or by dragging the blue (for cooling) or orange (for heating) around the semi-circle.

- If the mode is set to **OFF**, the setpoints, up and down buttons and the semi-circle do not appear.
- If the mode is **HEAT** or **EHEAT**, only the heat setpoint appears.
- If the mode is **COOL**, only the cool setpoint appears.
- If the mode is **AUTO**, both setpoints appear.
- Setpoints in Fahrenheit appear in whole degrees.

Getting to know the user interface

- Setpoints in Celsius appear in half degree resolution.
- The setpoints enforce a two-degree dead band in F and a one-and-a-half-degree dead band in C.
- If a setpoint is changed to a value that violates the dead band, the opposite setpoint changes to maintain the dead band separation.



The person icon on the bottom right of the display allows the user to change the setpoints to either the program schedule occupied settings or the program schedule unoccupied settings with a single button press. Pressing this button must modify both the setpoint values and the fan setting.

A setpoint change that overrides the program schedule settings is treated the same whether the user manually changes the setpoints or touches the person icon. When an override is active, the Occupied or Unoccupied beneath the space temperature changes to the words Hold For and the amount of time remaining in the override.

The settings return to the program schedule values at the next programmed time, when the max hold timer expires or if you press the red **x** to the right of the **Hold For** time.

Interdependencies

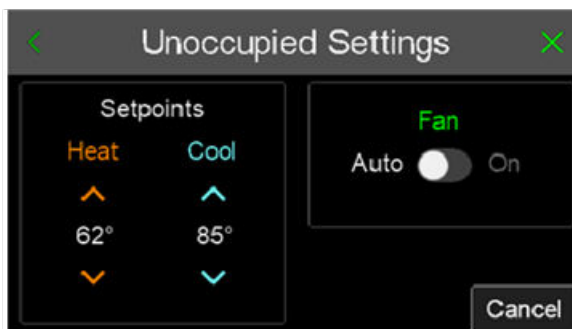
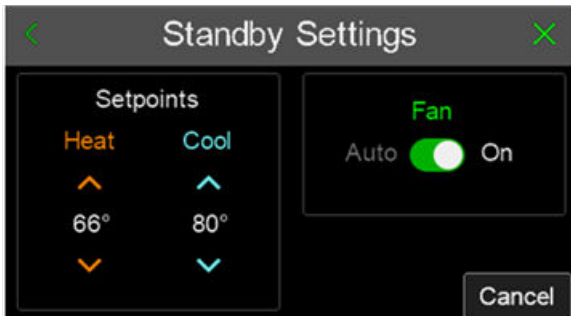
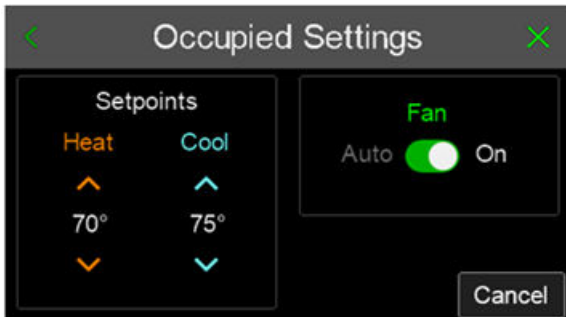
- If the thermostat is configured for **Non-Programmable** operation or the **Max Hold Time** setting is set to “OFF”, then the person icon does not appear.
- Setpoints are limited by the **Max Heat Setpoint** and the **Min Cool Setpoint** values which are set by you.

Change the Fan Setting

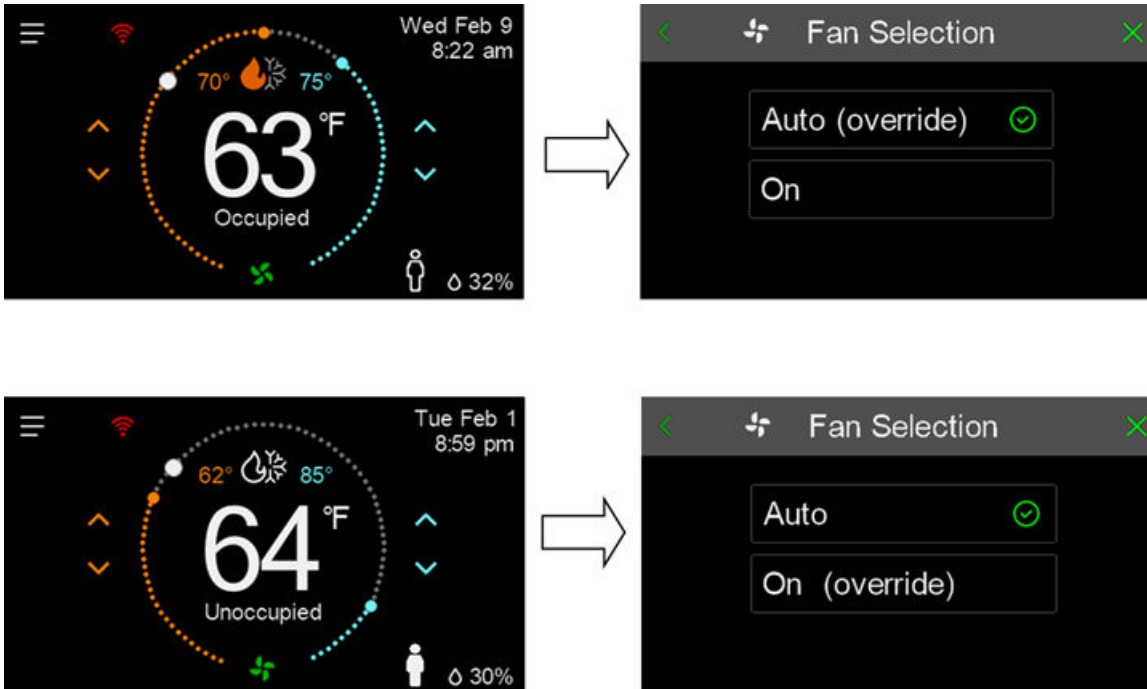
Fan Setting for Gas or Electric Heating Equipment

When the **Heating Equipment Type** (page 36) is Gas or Electric, the fan selections are **Auto** and **On**.

The fan setting of **Auto** (run when the equipment is energized) or **On** (run continuously) is specified in the **Occupied**, **Standby** and **Unoccupied** settings accessed from the **Menu** (see [Occupied Settings](#) (page 27)).



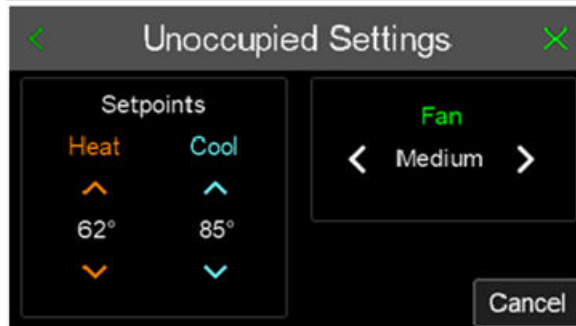
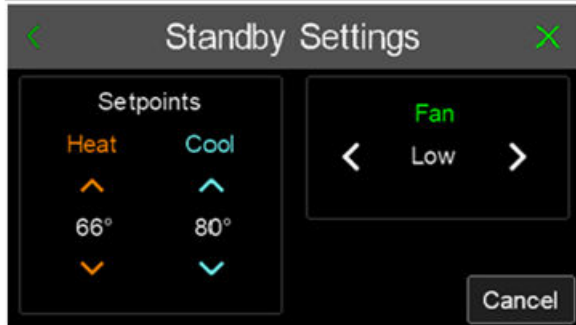
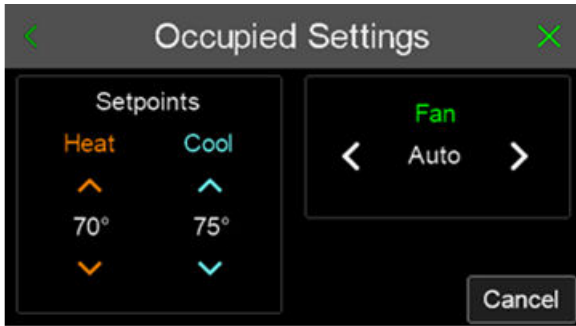
The fan state can be overridden by pressing the fan icon below the space temperature to transition to the Fan Selection screen.



To change the fan setting, select the desired setting. The green checkmark moves to that setting. When the desired state is selected, pressing either the green X in the upper right corner or the green < in the upper left-hand corner returns to the **Home** screen.

Fan Setting for Hydronic Fan Coil Heating Equipment

When the **Heating Equipment Type** (page 36) is **Hydronic Fan Coil**, the fan selections are Low, Medium, High, and Auto. The fan setting of **Auto** (run when the equipment is energized) or Low, Medium and High (run continuously) is specified in the **Occupied**, **Standby** and **Unoccupied** settings accessed from the **Menu** (see Occupied Settings (page 27)).



The fan state can be overridden by pressing the fan icon below the space temperature on the **Home** screen to transition to the **Fan Selection** screen.



When the fan is set to **Auto**, the low, medium, and high speeds are shown in the following table.

Auto Fan Table	
Multiple of the Differential Setting (Section)	Fan Speed Transitions
= 0	Fan Off
>= Differential	Off to Low

Getting to know the user interface

$\geq 2 \times \text{Differential}$	Low to Med
$\geq 3 \times \text{Differential}$	Med to High
$\leq 1.9 \times \text{Differential}$	High to Med
$\leq 0.9 \times \text{Differential}$	Med to Low

If the **Hydronic Fan Coil E-Heat** is energized, the fan speed runs at high speed regardless of the user setting or the **Auto Fan** speed setting.

For all **Heating Equipment Types**, when the fan setting differs from the program schedule, the selected fan setting remains active for the remainder of the current program schedule period.

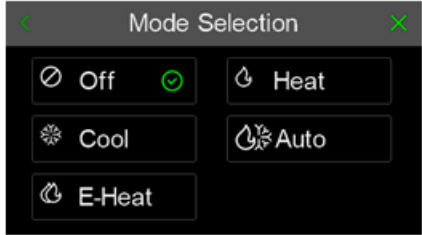
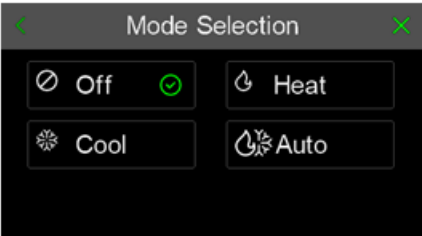

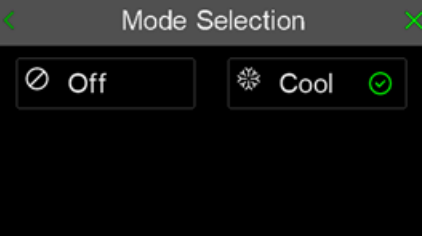
If the screen times out without the user pressing **<** or **X** buttons, any changes made are not saved.

Select the Mode

The mode can be changed by the user from the **Home** screen by pressing the mode icon above the space temperature.

- Changing from one mode to another mode does not affect the operation of the equipment until mode selection has remained constant for at least 5 seconds.
- Changing from one mode to another (e.g. Heat mode to Cool mode) requires that the thermostat first satisfies any **Minimum ON Timer** requirements and then will restart the **Minimum OFF Timer** that are required to expire before equipment is turned on in the new mode.
- Going from any Heating or Cooling Mode to Off Mode immediately shuts off any equipment that is active (after the 5 second mode button requirement is satisfied). Additional descriptions of the **Minimum OFF Timer** and the **Minimum ON Timer** can be found in [Operating your system](#) (page 68).

Mode Selections for Gas or Electric Heating Equipment

Equipment Type	Mode Selections
HP/Electric Heat Systems	
AC Heat/Cool Systems	
Heat Only Systems	
Cool Only Systems	

Mode Selections for Hydronic Fan Coil Heating Equipment

Pipe Configuration	Emergency Heat Available = No	Emergency Heat Available = Yes
Four Pipe		
Two Pipe Cooling		
Two Pipe Heating		
Two Pipe Auto Changeover		

Interdependencies

Some modes may not be available based on the **Indoor Equipment Type** (page 36) or the **Compressor Type** selections.

NOTE Either the **Back** (<) or the **Close** (X) button can be used to return to the home screen. They are both populated for consistency with the other screens.

Set the Date and Time

The **Date & Time** screen allows you to change or view date and time on the thermostat.



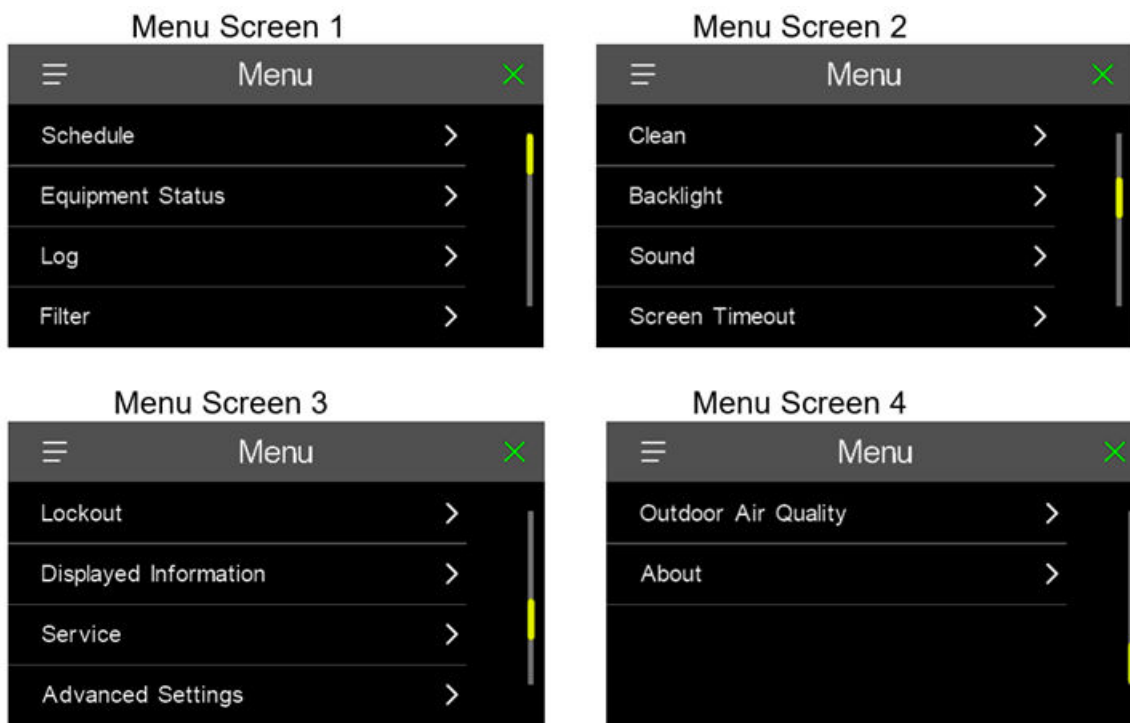
Any change made to this screen is saved when the change is made.

When the thermostat is first registered and connected to a Wi-Fi router, both the date and time are synced with the server (based on the geolocation of the phone/tablet used to connect the thermostat to a router or based on the ISP location if a PC is used to connect the thermostat to a router).

The time and date are updated at the top of each hour automatically unless **Sync Time To Server** in **Menu->Advanced settings** (page 34) is turned off.

Menu

The **Menu** gives the user access to less commonly used settings.



Many of the screens accessed from the **Menu** have a green **Back** button in the top left, a **Close** button in the top right and a **Cancel** button in the bottom right.

Those buttons function as follows:

- **Back Button** - The user changes are saved, and the user is returned to the previous screen.
- **Close Button** - The user changes are saved, and the user is returned to the **Home** screen.
- **Cancel Button** - The user changes are not saved, and the user is returned to the previous screen.

Getting to know the user interface

If the screen the user is viewing has a **Cancel** button and the screen times out (page 33), your changes are not saved and you are returned to the **Home** screen.

If the screen you are viewing does not have a **Cancel** button then changes are saved as they are made.

Interdependencies

Some of the **Menu** items have dependencies on **Settings**.

- If there is no occupancy source configured in the thermostat, ((**Prog** (page 36) or **Non-Prog** is set to Non-Prog), **Remote Sensor** is not set to Occupancy and **BACnet BMS Occupancy** is set to No)) the **Schedule** line is not listed in the **Menu**.
- If the **Remote Sensor** (page 36) is set to Filter, then the Filter line is not listed in the **Menu**.
- If both **Humidifier** (page 36) and **Dehumidifier** are both set to No, then the Humidify line is not listed in the **Menu**.

Schedule

The schedule allows a user to specify the settings the thermostat should use to control the space for the occupied, standby, or unoccupied fan and setpoint values.

Interdependencies

If you have configured the thermostat for Non-Programmable operation (page 36), the following menu items are not shown.

- Program

Exception

If the remote occupancy via the **Remote Sensor** (page 36) or **BACnet BMS Occupancy** is enabled, the **Program** menu item is available to access the Occupied, Standby and Unoccupied settings .

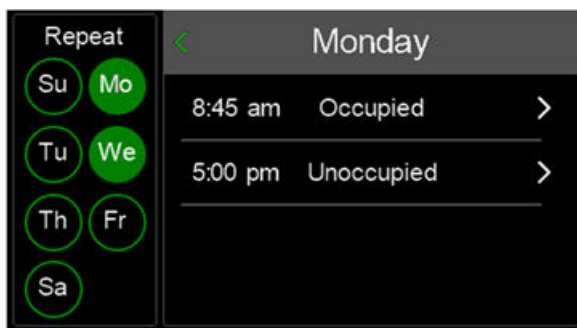
- Holidays
- Number of Program Day Parts

Program Schedule

When the user selects **Program**, the screen transitions to allow the user to select the day of the week to program.

When a day of the week is selected, the thermostat displays the start times and occupancy setting for either 2 or 4 periods for that day as well as any other days of the week that share the same settings.

To copy the displayed day's settings to additional days, press the circles with the days of the week that should have the same settings.



NOTE Copying to new days that were not shown as green when this screen was entered, can be canceled in this screen, but days that are green when this screen is entered can't be "uncopied". Changing the settings for these screens needs to be done by pressing the back button, selecting that day and changing the time or occupancy settings.

- If you select one of the periods, the start time and occupancy selection can be adjusted.
- Pressing the back arrow saves the new settings and returns to the previous screen.

Holidays

The **Holiday** screen is used to display all Holidays for the current year.

Getting to know the user interface

When the current date in the thermostat is the same as a day in the **Holiday List**, the **Unoccupied** setpoints and fan are used for the entire day unless the user overrides them.

When more holidays exist than can be displayed on one screen at a time, the yellow scrollbar indicates that scrolling up and down through additional rows is available.

Basic Holidays

Holidays that are celebrated on a specific date are considered **Basic holidays**. In the United States, examples of Basic holidays are New Year's Day, Independence Day and Christmas.

Basic holidays are added or edited using the Basic holiday template.

Advanced Holidays

Holidays that are celebrated on a day of the week occurrence of a specific month are **Advanced holidays**. In the United States, examples of Advanced holidays are Memorial Day, Labor Day and Thanksgiving.

Advanced holidays are added or edited using the Advanced holiday template. You can switch templates using the middle button at the bottom of the screen.

Interdependencies

If the thermostat has been configured for non-programmable operation, **Remote Occupancy** is active or **BACnet BMS Occupancy** is set to Yes, holiday functionality is not available, and the **Holiday** menu item is not shown in the **Schedule** menu.

Occupied Settings

This screen allows you to specify the heat setpoint, cool setpoint and fan setting that is used when the program schedule is in an occupied period.

Occupied Settings for Gas or Electric Heating Equipment

Ranges:

Heat Setpoint: 50-88 F° (10.0 – 30.5° C)

Cool Setpoint: 52-90 F° (11.5 – 32.0° C)

Fan: Auto or On

Defaults:

Heat Setpoint = 70° F

Cool Setpoint = 75° F

Fan = Auto

Occupied Settings for Hydronic Fan Coil Equipment

Ranges:

Heat Setpoint: 50-88° F (10.0 – 30.5° C)

Cool Setpoint: 52-90° F (11.5 – 32.0° C)

Fan: Auto, Low, Medium and High

Defaults:

Heat Setpoint = 70° F

Cool Setpoint = 75° F

Fan = Auto

NOTE The ability to set the fan to auto during an occupied period is a violation of ASHRAE 90.1 and Title 24 but is a feature of the thermostat for building owners that mandate auto fan operation during occupied periods for energy conservation purposes.

Interdependencies

- The maximum heat setpoint that can be set is limited by the cool setpoint (heat setpoint can't be greater than the cool setpoint) and you setting for **Max Heat Setpoint** (page 36).

Getting to know the user interface

- The minimum cool setpoint that can be set is limited by the heat setpoint (cool setpoint can't be less than the heat setpoint) and you setting for **Min Cool Setpoint** (page 36).
- If you have configured the thermostat for non-programmable operation (page 36), remote occupancy is disabled, and **BACnet BMS Occupancy** is set to No, then this setting is not available.

Standby Settings

This screen allows you to specify the heat setpoint, cool setpoint and fan setting that is used when the program schedule is in a Standby period.

Standby Settings for Gas or Electric Heating Equipment

Ranges:

Heat Setpoint: 50-88° F (10.0 – 30.5° C)

Cool Setpoint: 52-90° F (11.5 – 32.0° C)

Fan: Auto or On

Defaults:

Heat Setpoint = 66° F

Cool Setpoint = 80° F

Fan = Auto

Standby Settings for Hydronic Fan Coil Equipment

Ranges:

Heat Setpoint: 50-88° F (10.0 – 30.5° C)

Cool Setpoint: 52-90° F (11.5 – 32.0° C)

Fan: Auto or On

Defaults:

Heat Setpoint = 66° F

Cool Setpoint = 80° F

Fan = Auto

Interdependencies

- The maximum heat setpoint that can be set is limited by the cool setpoint (heat setpoint can't be greater than the cool setpoint) and you setting for **Max Heat Setpoint** (page 36).
- The minimum cool setpoint that can be set is limited by the heat setpoint (cool setpoint can't be less than the heat setpoint) and you setting for **Min Cool Setpoint** (page 36).
- If you have configured the thermostat for non-programmable operation , remote occupancy is disabled, and **BACnet BMS Occupancy** (page 36) is set to No, then this setting is not available.

Unoccupied Settings

This screen allows you to specify the heat setpoint, cool setpoint and fan setting that is used when the program schedule is in an unoccupied period.

Unoccupied Settings for Gas or Electric Heating Equipment

Ranges:

Heat Setpoint: 50-88° F (10.0 – 30.5° C)

Cool Setpoint: 52-90° F (11.5 – 32.0° C)

Fan: Auto or On

Defaults:

Heat Setpoint = 62° F

Getting to know the user interface

Cool Setpoint = 85° F

Fan = Auto

Unoccupied Settings for Hydronic Fan Coil Equipment

Ranges:

Heat Setpoint: 50-88° F (10.0 – 30.5° C)

Cool Setpoint: 52-90° F (11.5 – 32.0° C)

Fan: Auto, Low, Medium and High

Defaults:

Heat Setpoint = 62° F

Cool Setpoint = 85° F

Fan = Auto

Interdependencies

- The maximum heat setpoint that can be set is limited by the cool setpoint (heat setpoint can't be greater than the cool setpoint) and you setting for **Max Heat Setpoint** (page 36).
- The minimum cool setpoint that can be set is limited by the heat setpoint (cool setpoint can't be less than the heat setpoint) and you setting for **Min Cool Setpoint** (page 36).
- If you have configured the thermostat for non-programmable operation, remote occupancy is disabled, and **BACnet BMS Occupancy** (page 36) is set to No, then this setting is not available.

Number of Program Day Parts

This setting is used to adjust the number of programmable periods in a single day. The setting is adjustable as either 2 (default) or 4 periods in a day. Typically, commercial or light commercial products use a setting of 2.

The setting is changed using a toggle button on the last page of the **Program Schedule** menu.

Date and Time

See Set the Date and Time (page 24).

Humidity Setpoints

This screen allows you to view and modify the Humidify and Dehumidify setpoints. It can be accessed from the **Menu** or from the **Home** screen, if humidification (page 36) or dehumidification has been enabled by you.

Humidify Setpoint

When the heating equipment is energized and the humidity level is more than 2% below the humidify setpoint, the humidifier must turn on.

When the heating equipment turns off or the humidity level is more than 2% above the humidify setpoint, the humidifier must turn off.

Range: 15 – 50 %rh

Default: 15 %rh

Interdependencies

If you selection for **Humidifier** (page 36) is set to Off or the **Hum Output** has not been assigned to one of the three configurable outputs, the **Humidify Setpoint** is greyed out and humidification functionality is disabled.

Dehumidify Setpoint

When the humidity level is greater than the dehumidify setpoint, dehumidification must operate according to your configuration for the dehumidifier (page 36).

Range: 35 – 65 %rh

Default: 65 %rh

Interdependencies

If **Compressor Type** (page 36) is None or the **Dehumidifier** is set to No then the dehumidify setpoints are greyed out and dehumidification functionality is disabled.

Equipment Status

Equipment Status provides details about the current state of the thermostat outputs, timers, equipment stages and lockouts.

This screen has more information than can be displayed on one screen so the vertical scrollbar is used to show you that scrolling up and down through additional screens is available. Navigation is achieved by an “up swipe” and a “down swipe” action.

Outputs

The **Outputs** screen shows the heating or cooling demand and status of the equipment.

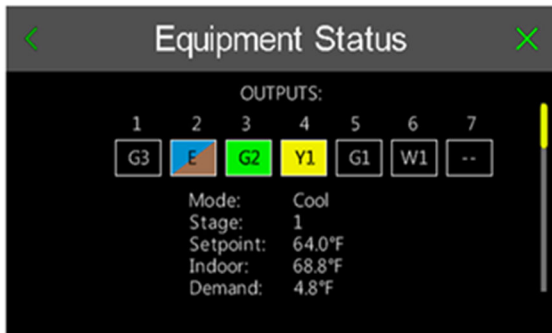
The numbers indicate the thermostat connections, the boxes indicate the functionality of that terminal, and the box color indicates the on/off status.

Unused terminals will be shown as --.

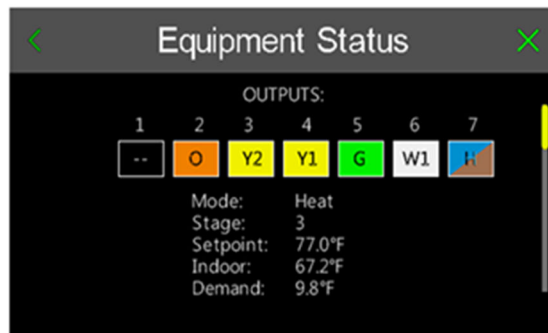
Programmable terminals will be shown with a blue and black box and letter indicating functionality.

- **H** = Humidifier
- **D** = Humidimizer for dehumidification
- **E** = Economizer energized when the unit is occupied.

Hydronic Fan Coil in Medium Speed Cooling with and Occupancy (Economizer)



Two Speed Heat Pump with Electric Heat and a Humidifier



Timers

Current timer status appears on the **Timers** screen.

Pressing and holding the **TIMERS** text for 5 seconds clears timer countdown values for the **On, Off, Cycle** and **Stage Delay** timers.

Active lockouts appear on the **Lockout** screen.

Pressing and holding the **LOCKOUT TIMERS** text for 5 seconds clears the lockout timer values for the **Cool timer, Aux Heat timer** and **HP Heat timer**.

Humidity

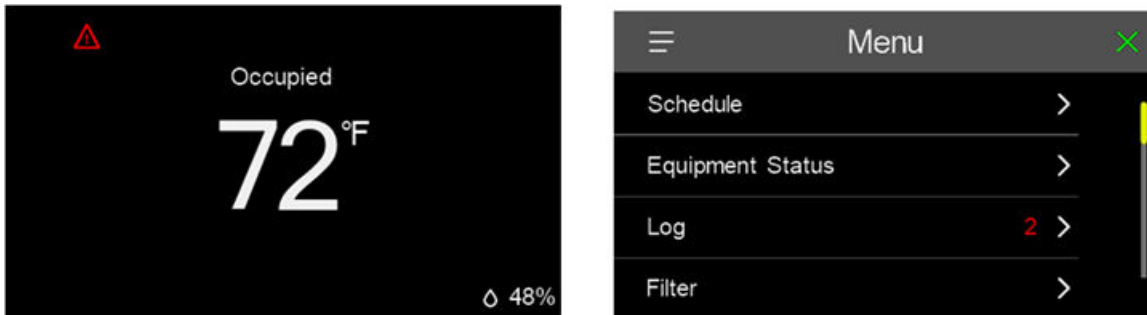
Humidity information appears on the **HUMIDITY** status screen.

The humidity demand is calculated when the HUM timer expires, which is every 60 seconds. Pressing and holding the **HUMIDITY** text for five seconds will clear this timer and force an immediate calculation of the humidity demand.

Log

The **Log** screen allows you to view both active and previous Faults and System Events.

The alert icon appears on the dormant and home screens.



The log screen can be entered by pressing the **Alert** icon on the home screen or through **Log** item in the **User Menu**.

A maximum of five faults and events are stored in the Log.

When the log contains active or previous faults and events, the last line in the list is RESET LOG, which allows you to clear the Log.

When there are no faults or system events in the Log a message states the log is empty.

Mobile App Interactions

Only the highest priority fault is sent to Ayla cloud to be shown on the mobile app. The following is the order of priority for the faults, from highest to lowest.

1. ID TEMP SENSOR HIGH
2. ID TEMP SENSOR LOW
3. REMOTE SENSOR HIGH
4. REMOTE SENSOR LOW
5. HUM TEMP SENSOR HIGH
6. HUM TEMP SENSOR LOW
7. ID TEMP RANGE HIGH
8. ID TEMP RANGE LOW
9. HUM SENSOR FAILURE
10. HUMIDITY RANGE HIGH
11. HUMIDITY RANGE LOW
12. OUTDOOR SENSOR FAILURE
13. NOT CONNECTED TO SERVER
14. NOT CONNECTED TO ROUTER
15. WIFI HARDWARE FAULT
16. PROXIMITY HARDWARE FAULT
17. NFC COMMUNICATIONS FAULT (FUTURE)
18. ECONOMIZER FAULT

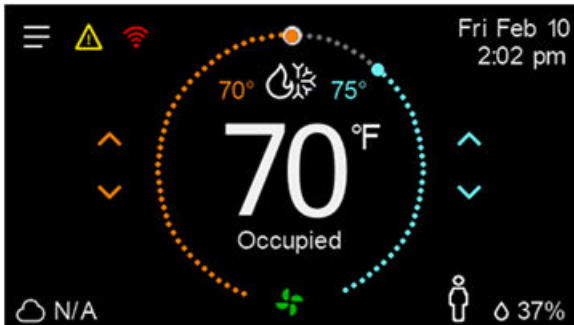
The app never displays the server, router or Wi-Fi hardware faults since the thermostat does not access the Ayla cloud when those faults are active.

Filter

The **Filter** screen allows you to see the number of hours remaining before the filter reminder becomes active. You can reset the filter hours remaining to your specified value (page 36) if the filter is changed prior to the timer decrementing to zero.

You can always access the **Filter Reminder** time remaining from the **Menu**. If the filter reminder decrements to zero, an alert icon is shown on the **Home** and **Dormant** screens.

Pressing the alert icon on the **Home** screen takes you to the **Log** screen which displays the reason for the alert. When the alert is due to an expired **Filter Reminder** timer, you can press > to access the **Filter** screen and reset the hours.



Interdependencies

- Decrements to the Filter Reminder timer happen each hour of total equipment runtime. The accumulated run time hours are stored to non-volatile memory, but the minutes are not, so a power cycle will not retain partial hour runtime.
- If the **Remote Sensor** (page 36) is set to FILTER, then the Filter line does not appear in the **Menu**.

Clean

This screen allows you to completely disable capacitive touch functionality for 10 seconds so the screen can be cleaned with a dry nonabrasive cloth. During this time, a 10 second countdown value appears. After 10 seconds, normal touch screen interactions resume.

Backlight

The Backlight allows you to change or view the backlight intensity in **Active** and **Dormant** backlight modes.

From the dormant state, the active state is activated by either presence detection or by touch activity.

The dormant state is entered after 15 seconds (default value) of inactivity and presence. The 15 second timeout is the **Screen Timeout** (page 33). The **Presence** detection can be disabled in the **Menu** -> **Advanced Settings** (page 34) by setting the **Proximity Enabled** to “No”.

Backlight Active

The **Active** backlight can be set to values of 10% to 100% of the full backlight capability.

Range: 10% - 100% in 5% increments

Default: 75%

Interdependencies

None.

Backlight Dormant

The **Dormant** backlight can be set to values of 0% to 25% of the full backlight capability. The sleep backlight level is used when the **Dormant** screen appears.

Range: 0% to 25% in 5% increments

Default: 25%

Interdependencies

None.

Sound

This setting allows you to select the sound feedback when a button is pressed.

Range: Off, Click (CLCK) or Beep

Default: Click

Interdependencies

None.

Screen Timeout

This setting allows you to set the number of seconds that a screen appears with no interactions from a user. When the specified time has elapsed with no user interactions the screen “times out”.

- If Lockout is **disabled**
 - When the **Home** screen times out, the thermostat transitions to the **Dormant** screen.
 - When all other screens time out, the thermostat transitions to the **Home** screen.
- If Lockout is **enabled**
 - All screen timeouts transition to the **Dormant** screen.

Range: 5 – 30 in 5 second increments

Default: 15 seconds

Interdependencies

None

Lockout

This function is used to lockout unauthorized changes via the touch screen interface. All touch interaction is locked out until the proper unlock code is entered.

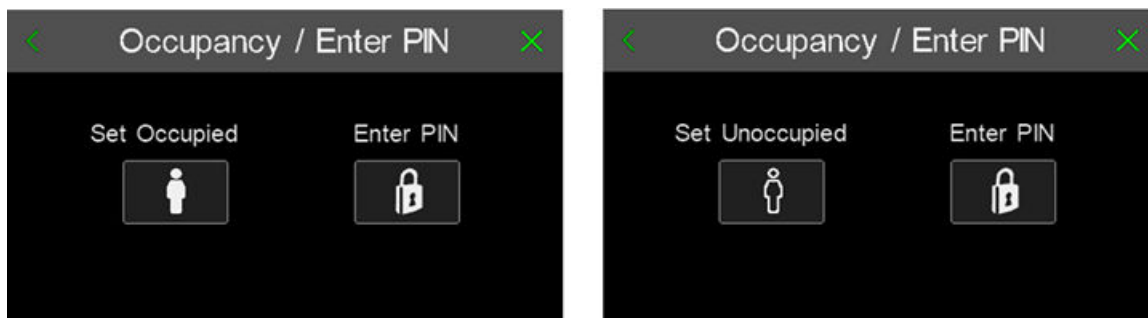
Lockout Disabled

- If the lockout feature is disabled, the first screen shown when **Lockout** is selected is **Enable/Disable**.
- If the lockout functionality is changed from disabled to enabled, you are prompted to set up a three-digit PIN that is used to temporarily unlock the thermostat.
- The **Save** and **Cancel** buttons do not appear until you have changed one of the digits of the PIN.

Lockout Enabled

- When the Lockout is enabled, the dormant screen shows the **Lock** icon.
- When you touch the dormant screen while lockout is active and the thermostat schedule is running, the **Occupancy/Enter PIN** screen appears.

NOTE : the thermostat schedule is not running when the mode is set to OFF.



- This allows a regular employee to temporarily change the occupancy state without the unlock PIN. All other changes to the thermostat require entry of the correct PIN number.

When **Enter PIN** is selected, you are prompted to adjust the three digits to the correct PIN and then press **Enter**.

- **Correct PIN entered:** Once the correct PIN is entered, the home screen appears, and you can modify the thermostat settings. If you do not interact with the display for the time specified by the **Screen Timeout** (page 33) setting, the thermostat must transition to the dormant screen and enter the locked state.

Getting to know the user interface

- **Wrong PIN entered:** When the wrong PIN is entered, you remain on the PIN entry screen to re-enter the PIN. After 5 failed attempts at unlocking the thermostat, a notification (fault) is sent to the registered “owner” of the thermostat through the Wi-Fi and a 15-minute timer starts to disallow additional unlock attempts for the 15-minute period.

Range: 000 - 999

Default: N/A. There is no default PIN.

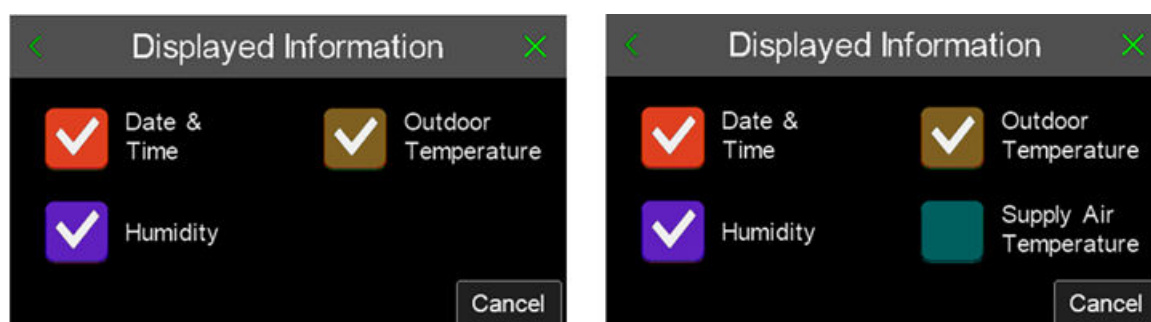
Interdependencies

000 is not a valid PIN

Displayed Information

The **Displayed Information** screen allows you to customize the information that appears on the **Home** screen.

The humidity level, outdoor temperature, date and time and supply air temperature (if the remote sensor is set to SAT) can be removed from the home screen display.



The default is for the date and time, humidity and outdoor air temperature to be shown on the home screen.

Service

The **Service** screen displays Dealer/Installer Service contact information.

Advanced Settings

Advanced Settings allow a more experienced user to further customize the operation of the thermostat.

Synch Time To Server

When the thermostat is first registered and connected to a Wi-Fi router, both the date and time are synced with the server (based on the geolocation of the phone/tablet used to connect the thermostat to a router or based on the ISP location if a PC is used to connect the thermostat to a router).

The time and date are updated/synced at the top of each hour automatically, unless **Sync Time To Server** is set to “NO”.

Wi-Fi-Enabled

This setting is used to enable (default) or disable the Wi-Fi functionality for the thermostat. If this function is disabled, then the Wi-Fi radio in this product is turned off and all functionality that uses the Wi-Fi functionality will not be available (Sync Time To Server, Outdoor Temperature via Wi-Fi Geolocation, Server & Wi-Fi Errors and Remote Access Services via APP or WEB).

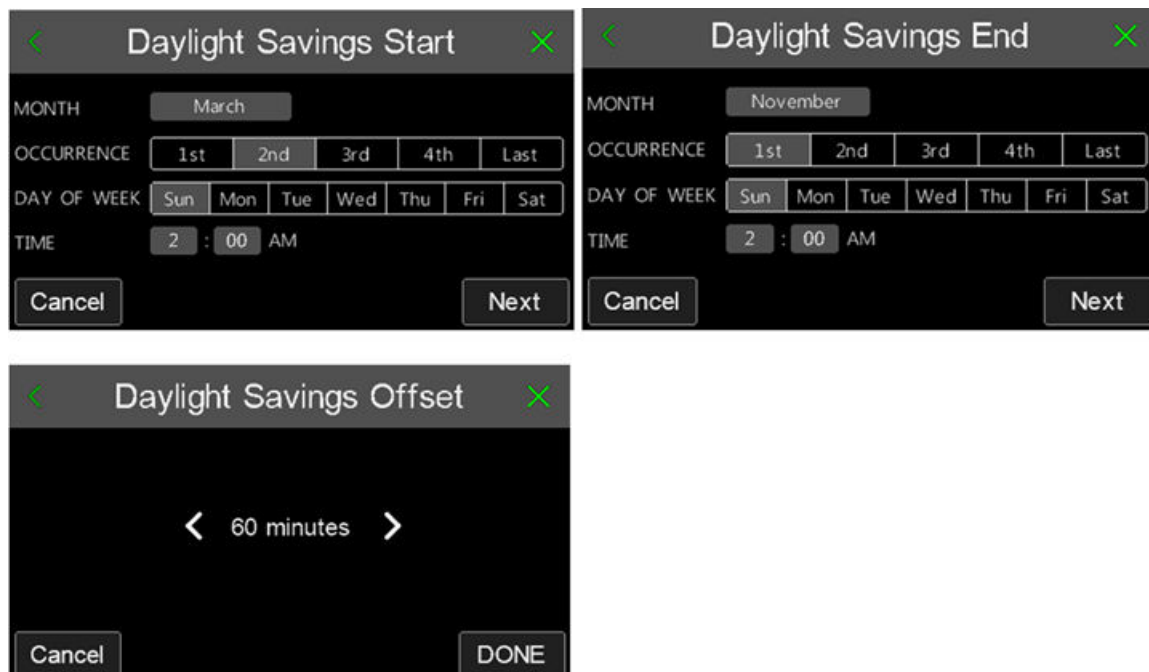
DST Enabled

This setting is used to enable (default) or disable **Daylight Savings Time** functionality for the time function in the thermostat.

- If this function is enabled, then the time will be adjusted automatically for Daylight Savings Time events.
- The starting date/time default for Daylight Savings Time is the second Sunday in March at 2:00 AM and the ending date/time default for Daylight Savings Time is the first Sunday in November at 2:00 AM but these settings are fully configurable.

Getting to know the user interface

- To modify the Daylight Savings Time Start, End and Time Offset, press the > icon next to the DST Enabled toggle button and modify the settings on the following screens.



If any of the daylight savings time configurations are modified, the location's standard time (UTC time + time zone offset) is re-evaluated. If the standard time is between the Daylight Savings Start and Daylight Savings End times, the Daylight Savings Offset is applied to the standard time to advance the clock to the local daylight savings time.

Proximity Enabled

This setting is used to enable proximity sensing that is used to change the screen backlighting from Dormant to Active when a person is sensed as being present in front of the thermostat.

Proximity Sensitivity

When Proximity is enabled, you can specify the sensitivity of the proximity sensing feature.

Increasing the sensitivity increases the range at which the sensor can detect presence but also increases the possibility of a false presence event being triggered.

Outdoor Air Quality

When the thermostat has a Wi-Fi connection, outdoor air quality information can be read from the Ayla server. If the thermostat is not connected to a Wi-Fi network, or the air quality value is zero, the outdoor air quality value(s) must show N/A.

About

The **About** screen is for informational purposes. The screen must display the bootloader software version, application software version, wireless radio software version and thermostat serial number.

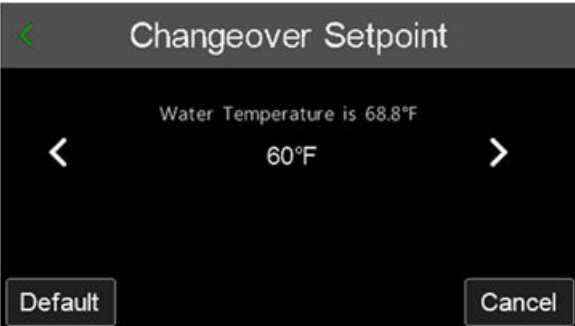
Using installer settings

To open **Installer Setup** set the **Mode** to **OFF**, and then press and hold the fan blade icon on the **Home** screen for five seconds.

NOTE The screen time out is 15 minutes for **Installer Settings**.

Installer Setting	Default/Range
<p>Heating Equipment Type</p> <p>This setting allows the installer to set the of the type of indoor heating equipment being used.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • If HP is chosen for the Compressor Type setting (Section 6.3) the heading of this screen will be “E-Heat Equipment” instead “Heat Equipment”. • If Hydronic Fan Coil is selected, the default control for the three fan speeds are the following outputs. <ul style="list-style-type: none"> • 5 (Low) • 3 (Medium) • 1 (High) <p>Terminal 1 is considered programmable for use as a humidifier output, occupancy output or dehumidification HumidiMizer output. If terminal 1 is required for one of these features, the Analog Output can be configured to control the three fan speeds.</p>	<p>D: Gas</p> <p>R: Gas Electric Hydronic Fan Coil</p> <p>NOTE Electric Heat should be selected for either a fan coil with Electric Heaters or an air handler.</p>
<p>Heating Equipment Stages</p> <p>This setting allows you to specify the numbers of stages of gas or electric heat that are present in the equipment.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • If HP is chosen for the Compressor Equipment Type, the heading of this screen will be “E-Heat Stages” instead “Heating Equip Stages”. • The selection of “0” is only available if the Heating Equipment setting is Electric. • If set to 2, the W2 relay output is not available for optional functions such as Humidifier, Dehumidification and Occupancy Output. • A setting of 2 when the Heating Equipment Type (Section 6.1) is set to Electric, means there are two banks of electric heaters in the equipment. One bank is connected to W1 and the other bank is connected to W2. The software must control these two banks as three stages of electric heat such that first stage is W1, second stage is W2 and third stage is both W1 and W2. • This configuration is not available if the Heating Equipment Type is Hydronic Fan Coil 	<p>D: 1</p> <p>R: 0-2 for AC and HP Heating Equipment Type</p>

Installer Setting	Default/Range
<p>Compressor Type</p> <p>This setting allows you to select the type of compressor being used.</p> <p><u>Interdependencies</u></p> <p>If None is chosen for the Compressor Type, then Cool mode is disabled.</p> <ul style="list-style-type: none"> • If None is chosen for the Compressor Type, then the Dehumidify setting (Section 6.29) is not available. • If None is chosen for the Compressor Type, then the Compressor Stages setting (Section 6.4) is not available. • If None is chosen for the Compressor Type, then the Auto Allowed setting (Section 6.10) is not available. • If HP is the selected setting, then the O output is not available for optional functions such as Humidifier, Dehumidification and Occupancy Output • If the Heating Equipment is Furnace and the Compressor Type is HP, then the defined Dual Fuel thermostat operation will be used for heating. • This setting is not available if the Heating Equipment Type is set to Hydronic Fan Coil. 	<p>D: AC</p> <p>R: None AC HP</p>
<p>Compressor Stages</p> <p>This setting allows you to select the number of compressor stages.</p> <p>The number of stages chosen defines the number of HP or AC cooling stages that are present in the Compressor equipment. The numbers of stages chosen also defines the number of HP heating stages that are present in the Compressor equipment if the Compressor selection is HP.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • This setting is not available to you if the Compressor setting is None. • The maximum number of stages if HP is selected is 2. • The maximum number of stages if AC is selected is 3. • If Compressor Stages is set to 3, the Y3 relay output is used for the third-stage compressor cooling and is not available for optional functions such as Humidifier, Dehumidification and Occupancy Output • This setting is not available if the Heating Equipment Type is set to Hydronic Fan Coil. 	<p>D: 1</p> <p>R: 1-3</p>
<p>Hydronic Fan Coil Pipe Configuration</p> <p>This setting allows you to set the pipe configuration of hydronic fan coil.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • This configuration is only available if the Heating Equipment Type is Hydronic Fan Coil. • If a 2 Pipe Auto Changeover system is selected, a Water Change Over Temperature Sensor is wired between the RT and C Terminals. The electrical characteristics of the sensor are a J-curve 25C thermistor. 	<p>D: 4 Pipe</p> <p>R: 4 Pipe 2 Pipe Heating 2 Pipe Cooling 2 Pipe Auto Changeover</p>

Installer Setting	Default/Range
<p>Hydronic Fan Coil Auto Changeover Setpoint</p> <p>This setting allows you to specify a setpoint for a two-pipe auto changeover system to determine if the water is acceptable for heating or cooling operation.</p> <p>There is a five-degree hysteresis around the configured setpoint.</p> <p>The water is considered acceptable for heating when the temperature of the Water Change Over Temperature Sensor is five degrees above the setpoint and remains valid for heating until the water temperature drops below the setpoint.</p> <p>The water is considered acceptable for cooling when the temperature of the Water Change Over Temperature Sensor is five degrees below the setpoint and remains valid for cooling until the water temperature rises above the setpoint.</p> <p>For reference, the Water Temperature is shown on the display above the Changeover Setpoint value.</p>  <p><u>Interdependencies</u></p> <p>This setting must only be available if the Heating Equipment Type is set to Hydronic Fan Coil.</p>	<p>D: 70°F</p> <p>R: 60-85°F</p>
<p>Hydronic Fan Coil Emergency Heat Available</p> <p>This setting allows you to specify that the system has a heat source that is not hot water. This can be in addition to hot water heating, or if hot water is not available, the primary source of heating.</p> <p>When the E-heat is a secondary heat source to the hot water, the E-Heat turns on when the heat demand is greater than 5°F for 30 minutes and must turn off when the heat demand is less than 2°F.</p> <p>The purpose of E-Heat is not to control the setpoint. It is to provide heating to the space when the hot water is not functioning correctly or cannot provide enough heat to reach the heat setpoint temperature.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • This setting must only be available if the Heating Equipment Type is set to Hydronic Fan Coil. • This heat source is controlled by the W2 output. • When the Hydronic Fan Coil is 2-pipe Cooling, the heading of this screen is “Electric Heat” instead of “Emergency Heat”. 	<p>D: Yes</p> <p>R: Yes No</p>

Installer Setting	Default/Range
<p>Hydronic Fan Coil Hot Water Valve Lockout</p> <p>This setting specifies the outdoor temperature above which the hot water valve is fully closed. Meaning, hot water is not available to provide heating.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • This setting is only available when the Heating Equipment Type is set to Hydronic Fan Coil • This setting is not available when the Pipe Configuration is set to Two Pipe Cooling. • If an outdoor air temperature is not available, the hot water valve lockout is ignored. <p><u>BACnet Objects</u></p> <p>There are two BACnet objects associated with the Heat Valve Lockout.</p> <ul style="list-style-type: none"> • BV517 is the Heat Valve Lockout feature enable/disable. • When BV517 is Enabled, AV524 can be written to set the Heat Valve Lockout Temperature setting. 	<p>D: OFF</p> <p>R: OFF 40-90F in 5° F increments</p>
<p>Auto Allowed</p> <p>This setting allows you to enable or disable the selection of Auto mode when the mode button is pressed. Auto mode allows the thermostat to automatically switch from heating mode to cooling mode to maintain the conditioned temperature between the heating and cooling setpoints.</p> <p><u>Interdependencies</u></p> <p>Auto Allowed is only available if both a heating source and a cooling source are available.</p>	<p>D: Yes</p> <p>R: Yes – Auto mode is available No – Auto mode is not available</p>
<p>Auto Changeover</p> <p>This setting allows you to set an auto changeover number of minutes, which defines the minimum number of minutes of equipment off time before switching from heat-to-cool or from cool-to-heat when operating in Auto Mode.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • Auto Changeover is only available if Auto Allowed is set to Yes. • If the setpoint is changed or the mode is changed, the auto changeover time is ignored to provide a timely response to the user’s request. The auto changeover time becomes active the next time the system is operating in heat and there is a cool demand, or the system is operating in cooling and there is a heating demand. 	<p>D: 30 minutes</p> <p>R: 5 to 30 minutes</p>

Installer Setting	Default/Range																								
<p>Programmable or Non-Programmable</p> <p>This setting allows you to set the thermostat to operate as a non-programmable (simplified) thermostat or a programmable thermostat.</p> <p>Operating the thermostat in a programmable mode allows the user to set up heating and cooling setpoints for 2 or 4 periods for each day of the seven days of the week.</p> <p>The thermostat has default heating and cooling setpoints outlined in the "Default Setpoint Times and Temperature Settings" table below.</p> <p>The program heating and cooling setpoints and transition times for the 2 or 4 periods can be viewed/modified in the Menu – Schedule on the thermostat.</p> <p>Choosing the non-programmable mode for the thermostat allows the thermostat to run in a simplified mode that will maintain the current heat/cool setpoints until they are adjusted by the user at the thermostat, the mobile app or BACnet communications.</p> <table border="1" data-bbox="115 695 870 1024"> <thead> <tr> <th colspan="4">Default Setpoint Times and Temperature Settings</th> </tr> <tr> <th>Setting</th> <th>Start Time</th> <th>Heat Setpoint</th> <th>Cool Setpoint</th> </tr> </thead> <tbody> <tr> <td>1st Period</td> <td>7 am.</td> <td>70°F</td> <td>75°F</td> </tr> <tr> <td>2nd Period</td> <td>5 pm.</td> <td>62°F</td> <td>85°F</td> </tr> <tr> <td>3rd Period</td> <td>10 pm.</td> <td>70°F</td> <td>75°F</td> </tr> <tr> <td>4th Period</td> <td>11 pm.</td> <td>62°F</td> <td>85°F</td> </tr> </tbody> </table> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> When the thermostat is set to Non-Programmable operation, the Occ/Unocc button is not displayed on the home screen. When the thermostat is set to Non-Programmable operation, the Occupied and Unoccupied verbiage is not displayed on the home and dormant screens. When the thermostat is set to Non-Programmable operation, the program schedule cannot be viewed. When the Remote Sensor setting is set to Occupancy (OCC) or BACnet BMS Occupancy is set to Yes, this setting is forced to NP and does not appear. 	Default Setpoint Times and Temperature Settings				Setting	Start Time	Heat Setpoint	Cool Setpoint	1st Period	7 am.	70°F	75°F	2nd Period	5 pm.	62°F	85°F	3rd Period	10 pm.	70°F	75°F	4th Period	11 pm.	62°F	85°F	<p>D: Programmable</p> <p>R: Programmable Non-Programmable</p>
Default Setpoint Times and Temperature Settings																									
Setting	Start Time	Heat Setpoint	Cool Setpoint																						
1st Period	7 am.	70°F	75°F																						
2nd Period	5 pm.	62°F	85°F																						
3rd Period	10 pm.	70°F	75°F																						
4th Period	11 pm.	62°F	85°F																						
<p>Max Hold Time</p> <p>This setting allows you to set the amount of time, in hours, that a setpoint change must override the program schedule.</p> <p><u>Interdependencies</u></p> <p>This selection is not available if the thermostat has been configured for non-programmable operation.</p>	<p>D: 2 hours</p> <p>R: OFF: When set to OFF, the setpoints cannot be changed from their program schedule values.</p> <p>1 – 6: A user setpoint change remains active for this number of hours, after which the setpoint returns to the program schedule setpoints.</p>																								

Installer Setting	Default/Range
<p>Fahrenheit or Celsius</p> <p>This setting allows you to set the temperature units to either Fahrenheit or Celsius.</p> <p><u>Interdependencies</u></p> <p>None</p>	<p>D: °F</p> <p>R: °F °C</p>
<p>Smart Recovery</p> <p>The Smart Recovery feature transitions the conditioned space from one programmable period to the next (when the heat setpoint increases or the cool setpoint decreases in the next programmable period). It uses 1°F increments of the heating setpoint or 1°F decrements of the cooling setpoint such that by the time the next period starts, the setpoints are at the desired settings.</p> <p>The purpose of this gradual transition is to prevent staging up (because of a higher demand) to higher stages to use less energy. The transitions occur in a linear fashion over the smart recovery time.</p> <p>If you start a temporary hold in the middle of a smart recovery, the setpoints of the temporary hold will be used.</p> <p>If a temporary hold is already active during the time that smart recovery would have been started, a smart recovery does not start. If the temporary hold ends in the middle of what would have been a smart recovery, the smart recovery starts where it would have been in the linear progression at that same time had the temporary hold not been active.</p> <p><u>Interdependencies</u></p> <p>The Smart Recovery setting is only available if the thermostat is configured as a programmable thermostat.</p>	<p>D: 30</p> <p>R: No: Smart Recovery Disabled 30 60 90</p> <p>The number of minutes before the next program schedule time to start the smart recovery algorithm.</p>
<p>Fan On with W</p> <p>This setting allows you to set the fan to turn on with any W output when the fan is set to Auto. The G output is (Yes) or is not (No) turned on by the thermostat when the W1 or W2 outputs are energized depending on the setting.</p> <p><u>Interdependencies</u></p> <p>This setting is not available if the Heating Equipment Type is set to Hydronic Fan Coil.</p>	<p>D: Yes</p> <p>R: Yes No</p>
<p>Reversing Valve</p> <p>This setting allows you to set the reversing valve output (O/B) to be activated for a heat pump heating or a heat pump cooling demand.</p> <p>When the reversing valve is energized during cooling, the signal is typically referred to as an “O” demand. When the reversing valve is energized during Heating, the signal is typically referred to as a “B” demand.</p> <p>The reversing valve is energized during heat pump heating or heap pump cooling, depending on the setting.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> This setting is only available if heat pump (HP) is chosen as the Compressor Type. If the reversing valve is energized during a heating or cooling cycle, it must remain energized at the end of the heating or cooling cycle if the mode is not changed. This setting is not available if the Heating Equipment Type is set to Hydronic Fan Coil 	<p>D: Cool</p> <p>R: Heat Cool:</p>

Installer Setting	Default/Range
<p>Remote Sensor</p> <p>This setting allows you to set the functionality of the remote sensor input that is connected to the T and C terminals.</p> <p>None - Any input on the remote sensor is ignored by the thermostat.</p> <p>Space - The remote sensor input is used for the space temperature. If a short is detected for 2 to 5 seconds, the thermostat must operate to the setpoints specified by the Occupancy Input for the time specified by the Maximum Hold Hours. This accommodates space temperature sensors that have an occupancy override button.</p> <p>Outdoor - The remote sensor input is used for the outdoor air temperature.</p> <p>Average - The space temperature is calculated as the average of the local thermistor and the remote thermistor. If a short is detected for 2 to 5 seconds, the thermostat must operate to the setpoints specified by the Occupancy Input for the time specified by the Maximum Hold Hours. This accommodates space temperature sensors that have an occupancy override button.</p> <p>Occupancy - An external source is used to determine if the setpoints are Occupied or Unoccupied. When Normally Open contacts close, the Occupied setpoints are used.</p> <p>SAT - The remote sensor input measures the Supply Air Temperature.</p> <p>Fault Input - The remote sensor input detects an Economizer fault. When the input is shorted, the home screen banner indicates an alarm is detected by displaying the words "ECONOMIZER FAULT". This fault is logged in the fault history.</p> <p>Filter - The remote input can be configured to detect a dirty filter. When the input is shorted, the alert icon appears on the home and dormant screens. This selection disables the timed air filter reminder functionality.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • The outdoor temperature is not available if the thermostat is not connected to Wi-Fi and the ODT option is not selected for the Remote Sensor. • If OCC is the selected setting, the non-programmable (NP) setting is set automatically and is not displayed in you Settings until this setting is changed. • This setting is not available if the Heating Equipment Type is set to Hydronic Fan Coil with the Pipe Configuration set to a 2 Pipe Auto Changeover. In this configuration the remote sensor functionality is mandated to be a thermistor input used to determine if the water in the pipe is intended for heating or cooling. • When the unit is configured for a Hydronic Fan Coil Two Pipe Auto Changeover system, MSV502 is unreliable. In this system configuration, the Remote Sensor is no longer a configurable input. It is forced to function as a Water Temperature Changeover Sensor. 	<p>D: None</p> <p>R: None Space Outdoor Average Occupancy SAT Fault Input Filter</p>
<p>Space Temp Offset</p> <p>This setting allows you to set an offset to the displayed space temperature.</p> <p>This functionality offers the end user the convenience of matching the actual sensed temperature to a different perceived temperature or a different temperature measuring device.</p> <p><u>Interdependencies</u></p> <p>None</p>	<p>D: 0° (C and F)</p> <p>R: -5 to +5 F in 1° F increments -2.5 to + 2.5 C in 0.5° C increments</p>

Installer Setting	Default/Range
<p>Humidity Offset</p> <p>This setting allows you to set an offset to the displayed humidity.</p> <p>This functionality offers the end user the convenience of matching the actual sensed humidity to a different perceived humidity or a different humidity measuring device.</p> <p><u>Interdependencies</u></p> <p>The addition of the humidity offset must not cause or correct a HUMIDITY RANGE HIGH or HUMIDITY RANGE LOW fault condition.</p>	<p>D: 0%rh R: -9 to 9%rh</p>
<p>SAT Temp Offset</p> <p>This setting allows you to set an offset to the Supply Air Temperature.</p> <p>This functionality allows the value read from the SAT_TEMP BACnet object to be calibrated to match other presentations of this measurement.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if the Remote Sensor is set to Supply Air Temperature (SAT).</p>	<p>D: - R: -5 to +5 °F in 1 °F increments</p>
<p>Water Temp Offset</p> <p>This setting allows you to set an offset to water temperature read from the auto changeover sensor.</p> <p>This functionality offers the end user the convenience of matching the actual sensed temperature to a different perceived temperature or a different temperature measuring device.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if the Heating Equipment is Hydronic Fan Coil and the Hydronic Fan Coil Pipe Configuration is set to Two Pipe Auto Changeover.</p>	<p>D: - R: -5 to +5 °F in 1 °F increments -2.5 to +2.5 °C in 0.5 °C increments</p>
<p>Maximum Setpoint Error</p> <p>This setting allows you to select the number of degrees between the space temperature and the heat setpoint, if heating, or the space temperature and cool setpoint, if cooling, that causes an ID TEMP RANGE HIGH or ID TEMP RANGE LOW fault (page 69).</p> <p>In Cool mode, this value is added to the Cool Setpoint to set the temperature limit for determining the "ID TEMP RANGE HIGH" fault condition. If the Indoor temperature is above the temperature limit for longer than ID Temp Fault Inhibit minutes, the "ID TEMP RANGE HIGH" fault becomes active.</p> <p>In Heat mode, this value is subtracted from the Heat Setpoint to set the temperature limit for determining the "ID TEMP RANGE LOW" fault condition. If the Indoor temperature is below the temperature limit for longer than ID Temp Fault Inhibit minutes, the "ID TEMP RANGE LOW" fault becomes active.</p> <p><u>Interdependencies</u></p> <p>None</p>	<p>D: 10°F R: 2 to 30 °F 1.5 °C to 16.5 °C in 0.5 °C increments</p>
<p>Indoor Temperature Fault Inhibit</p> <p>This setting allows you to select the time delay applied to the ID TEMP RANGE HIGH and ID TEMP RANGE LOW faults. The fault condition is present for the selected number of minutes for the fault to become active. This allows for recovery time when transitioning from unoccupied to occupied periods.</p> <p><u>Interdependencies</u></p> <p>None</p>	<p>D: 60 minutes R: 10 to 240 minutes in 10-minute increments</p>

Installer Setting	Default/Range
<p>Time Between Fuel Types</p> <p>When Gas or Electric is the Heating Equipment Type this setting allows you to set a minimum amount of time that the system must run on compressor heat before transitioning to the furnace.</p> <p>When a Hydronic Fan Coil is the Heating Equipment Type, this setting allows you to set a minimum of time that the system must run on hot water before transitioning to the Emergency Heat.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • If the Heating Equipment Type is set to Gas, this selection is only available if the Heating Compressor is set to HP. The minimum number of minutes the compressor must run in heating before staging up to gas heat is the larger of this setting and the Stage Delay setting. • If the Heating Equipment is set to Electric, this selection is not available. • If the Heating Equipment is set to Hydronic Fan Coil, this selection is not available. 	<p>D: 15 minutes</p> <p>R: 10 minutes 15 20 25 30</p>
<p>Cycles per Hour</p> <p>This setting allows you to set a maximum number of equipment cycles per hour. Based on the selection of 2, 4, 6 or 8 maximum number of cycles per hour, this timer is set to 30, 15, 10 or 8 minutes. This time must elapse from the start of one cycle before another cycle can start.</p> <p><u>Interdependencies</u></p> <p>When the equipment is off and the user changes the setpoint to create a heating or cooling demand, the cycles per hour requirement is ignored to provide a timely response to the user's request. The cycles per hour limitation becomes active again when the Y1, Y2, W1 or W2 outputs transition from on to off.</p>	<p>D: 4</p> <p>R: 2 4 6 8</p>
Installer Setting	Default/Range
<p>Stage Delay</p> <p>This setting allows you to set the minimum amount of time the current stage is energized before staging up to the next stage of capacity.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • Multiple heating stages or multiple cooling stages must exist for this feature to be used. • This setting is not available in a Hydronic Fan Coil system. 	<p>D: 10 minutes</p> <p>R: 2-15 minutes in 1-minute increments</p>

Installer Setting	Default/Range
<p>Forced Stage Up</p> <p>This setting allows you to set the maximum number of minutes that the equipment must run at the current stage before forcing the equipment to stage up. The forced stage-up occurs even if the differential demand is not met.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> Multiple heating stages or multiple cooling stages must exist for this feature to be used. This function is not available on Hydronic Fan Coil Systems 	<p>D: 30 minutes</p> <p>R: OFF 10 to 120 Minutes in 10-minute increments</p>
Humidifier Setting	Default/Range
<p>Humidifier</p> <p>This setting allows you to enable humidifier control functionality. When humidifier control is enabled, the humidifier will be energized if there is humidity demand, and any heating equipment is energized.</p> <p>The output (Y3, O/B or W2) is a 24VAC output only (sourced from “R”) and is isolated with a relay at the indoor equipment if 120VAC is needed to interface to a humidifier unit.</p> <p><u>Interdependencies</u></p> <p>This selection is not available if the system does not have a heat source.</p> <ul style="list-style-type: none"> If the Heating Equipment Type is set to Gas or Electric, the Humidifier functionality is not available if the Heat Stages is set to NONE. If the Heating Equipment Type is set to Hydronic Fan Coil, the Humidifier functionality is not available in a two-pipe cooling unit with the Emergency Heat set to No. 	<p>D: No</p> <p>R: Yes No</p>

Humidifier Setting	Default/Range								
<p>Hum Output</p> <p>This setting allows you to choose which output relay to use for the Humidifier.</p> <ul style="list-style-type: none"> The choices must only include outputs that aren't already assigned to another function. The output selected (1, 2 or 7) is used to control the humidifier equipment. <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> The Hum Output option is only available if the Humidifier setting is YES. The Hum Output option is not available if the 1, 2 and 7 relays are already being used for other functions. The 1 output is used for 3-Stages of Cooling, the Humidifier, a Hydronic Fan coil high speed fan, and the Dehumidifier setting of HUMIDIMIZER. The 2 output is used for heat pump equipment, the Humidifier, and the Dehumidifier setting of HUMIDIMIZER. The 7 output is used for 2 Stages of Heating, the Humidifier, the Dehumidifier setting of HUMIDIMIZER and a Hydronic Fan coil E-Heat. Any output that is already being used is not shown in the Hum Output selections. 	<p>D: Off</p> <p>R: OFF ON-1 ON-2 ON-7</p>								
Dehumidifier Setting	Default/Range								
<p>Dehumidifier</p> <p>This setting allows you to enable the dehumidification functionality.</p> <p>No – Dehumidification is disabled</p> <p>Yes – When the humidity is above the dehumidify target, the cooling setpoint is adjusted downward, increasing the cooling demand according to the following equations. The system uses the first stage of cooling to satisfy the dehumidify demand.</p> <table border="1" data-bbox="107 1066 1008 1402"> <thead> <tr> <th>Cooling Setpoint</th> <th>Algorithm</th> </tr> </thead> <tbody> <tr> <td><= 70 °F</td> <td>Use the cooling setpoint only</td> </tr> <tr> <td>70.1 °F – 74.9 °F</td> <td>Cooling setpoint = Cooling Setpoint – (Cooling Setpoint - 70 °F) x (Dehumidify Error / 10) with maximum dehumidify Error of 6% (i.e. use 6% if >6%)</td> </tr> <tr> <td>>= 75 °F</td> <td>Cooling setpoint = Cooling Setpoint – (Dehumidify Error / 2) with maximum dehumidify Error of 6%</td> </tr> </tbody> </table>	Cooling Setpoint	Algorithm	<= 70 °F	Use the cooling setpoint only	70.1 °F – 74.9 °F	Cooling setpoint = Cooling Setpoint – (Cooling Setpoint - 70 °F) x (Dehumidify Error / 10) with maximum dehumidify Error of 6% (i.e. use 6% if >6%)	>= 75 °F	Cooling setpoint = Cooling Setpoint – (Dehumidify Error / 2) with maximum dehumidify Error of 6%	<p>D: No</p> <p>R: No Yes Overcool HumidiMizer</p>
Cooling Setpoint	Algorithm								
<= 70 °F	Use the cooling setpoint only								
70.1 °F – 74.9 °F	Cooling setpoint = Cooling Setpoint – (Cooling Setpoint - 70 °F) x (Dehumidify Error / 10) with maximum dehumidify Error of 6% (i.e. use 6% if >6%)								
>= 75 °F	Cooling setpoint = Cooling Setpoint – (Dehumidify Error / 2) with maximum dehumidify Error of 6%								
<p>Overcool - commands the system to operate the compressor, within limits, when there is a dehumidification demand, even if there is no cooling demand. The system uses the first stage of cooling to overcool up to 2 °F and no more, when satisfying a dehumidification demand.</p> <p>HumidiMizer - When configured as a HUMIDIMIZER output, and the humidity level is above the dehumidify target, 24V is output at the selected terminal. When the humidity level is below the dehumidify target, 0 Vac is output on the selected terminal. There is a +1/-4% hysteresis around the dehumidify target to prevent rapid on/off cycling of the selected output.</p> <p>This output may be connected to compressor outputs on commercial equipment. If the selected output is energized without any compressors being energized, the 5-minute time guard is enforced.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> When the Heating Equipment Type is Gas or Electric and the Compressor Type (Section) is set to None, dehumidification is not available. When the Heating Equipment Type is Hydronic Fan Coil and the Piping Configuration is 2 Pipe Heating, dehumidification is not available. 									

Dehumidifier Setting	Default/Range
<p>Dehum Output</p> <p>This setting allows you to choose which output relay to use for the HumidiMizer function of the Dehumidifier. The choices must only include outputs that aren't already assigned to another function.</p> <p>When Dehumidifier setting is HumidiMizer, and the selected relay must control the HumidiMizer equipment.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • This setting is not available if the Dehumidifier selection is set to anything other than HumidiMizer. • This setting is not available if the configurable outputs (1, 2 and 7) are already assigned to other functions. • Any configurable output that is already assigned to another function is not shown in the Dehum Output selections. 	<p>D: OFF</p> <p>R: OFF ON-1 ON-2 ON-7</p>
Installer Setting	Default/Range
<p>Max Heat Setpoint</p> <p>This setting allows you to set a maximum heating setpoint. This is the maximum heat setpoint value that can be used in the program schedule or set on the home screen.</p> <p><u>Interdependencies</u></p> <p>This setting is not available if the system is configured for no heating equipment (Heat Equipment = Electric and Heat Stages = 0)</p>	<p>D: 88°F</p> <p>R: 50 – 88° F in 1° F increments 10 – 30.5° C in 0.5° C increments</p>
<p>Min Cool Setpoint</p> <p>This setting allows you to set a minimum cooling setpoint. This is the minimum cooling setpoint value that can be used in the program schedule or when the user adjusts the setpoint to temporarily override the program schedule.</p> <p><u>Interdependencies</u></p> <p>This setting is not available if the Compressor is set to NONE.</p>	<p>D: 52°F</p> <p>R: 52 – 90 °F in 1°F increments 11.5 – 32 °C in 0.5 °C increments</p>

Installer Setting	Default/Range
<p>Aux Heat Lockout</p> <p>For a HP system, this setting allows you to set an outdoor temperature above which the Aux Heat (W1 and W2) outputs are not energized in HEAT mode.</p> <p>For a Hydronic Fan Coil system, this setting allows you to set an outdoor temperature above which the Aux Heat (W2) output is not energized in HEAT mode.</p> <p>If the selected mode is emergency heat the auxiliary heat is allowed to turn on.</p> <p>The auxiliary heat lockout is checked when there is sufficient demand to energize the Auxiliary Heat but the output has not been turned on. Once the output is energized, it remains energized until the demand algorithm no longer requires the capacity of the auxiliary heat regardless of the value of the outdoor air temperature.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> When the Heating Equipment Type is set to Gas or Electric, the Aux Heat Lockout functionality is not available (and is set to the OFF setting) if the Compressor Type is None or AC, because the aux heat lockout functionality is specific to a HP system. When the Heating Equipment Type is set to Gas or Electric, the auxiliary heat lockout temperature cannot be set to a value less than the heat pump lock out temperature. This prevents a condition where the range of outdoor air temperatures between the auxiliary heat lockout and the heat pump lock out temperature result in no equipment operation. Below the heat pump lockout temperature, the air source attempts to turn on, but the auxiliary heat lockout temperature prevents it from doing so. If the auxiliary heat lockout temperature is changed such that it is less than the heat pump lockout temperature, the heat pump lockout temperature is set equal to auxiliary heat lockout temperature value. This change to the heat pump lockout temperature is not visible to the user while the auxiliary heat lockout temperature is being changed. On a Hydronic Fan Coil system, this setting is only available if the Emergency Heat Available is set to Yes. <p><u>BACnet Objects</u></p> <p>There are two BACnet objects associated with the Aux Heat Lockout.</p> <ul style="list-style-type: none"> BV513 is the Aux Heat Lockout feature enable/disable. When BV513 is Enabled, AV511 can be written to set the Aux Heat Lockout Temperature setting. 	<p>D: OFF</p> <p>R: OFF</p> <p>5 – 55° F in 5° F increments</p> <p>OFF, -15.0 – 12.5° C in 2.5° C increments</p>

Installer Setting	Default/Range
<p>HP Lockout</p> <p>This setting allows you to set an outdoor temperature below which the heat pump does not operate. If the setting is Off, the heating equipment cycle always starts with the heat pump regardless of the outdoor air temperature. If a lockout temperature is selected and the outdoor air temperature is less than the selected temperature, the heating cycle is started with the AUX Heat source. If the outdoor air temperature is equal to or greater than the selected temperature, the heating cycle is started with the heat pump. If the outdoor temperature is not available, all heating cycles start with compressor heat.</p> <p>When the heat pump is not energized but there is demand sufficient to request heat pump heating, the heat pump lockout temperature is checked against the outdoor air temperature and if the outdoor air temperature is greater than the heat pump lockout temperature the heat pump is energized. Once the heat pump is energized, it remains energized until the heating demand no longer requires heat pump heating, regardless of the outdoor air temperature.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • If the Heating Equipment Type is Gas or Electric, the HP Lockout functionality is not available if the Compressor Type is set to None or AC because the HP lockout functionality is only applicable to heat pump systems. • If the Heating Equipment Type is Hydronic Fan Coil, the HP Lockout functionality is not available. • The heat pump lockout temperature cannot be set to a value greater than the auxiliary heat lockout temperature unless the auxiliary heat lockout temperature setting is Off. This prevents a condition where the range of outdoor air temperatures between the auxiliary heat lockout and the heat pump lock out temperature result in no equipment operation. Below the heat pump lock out temperature the AUX heat source attempts to turn on, but the auxiliary heat lockout temperature prevents it from doing so. If the heat pump lockout temperature is changed such that it is greater than the auxiliary heat lockout temperature, the heat pump lockout temperature is set to the auxiliary heat lockout temperature when you exit the HP Lockout screen. <p><u>BACnet Objects</u></p> <p>There are two BACnet objects associated with the Heat Pump Lockout.</p> <ul style="list-style-type: none"> • BV514 is the Heat Pump Lockout feature enable/disable. • When BV514 is Enabled, AV512 can be written to set the Heat Pump Lockout Temperature setting. 	<p>D: OFF</p> <p>R: OFF</p> <p>5 – 55° F in 5° F increments</p> <p>OFF</p> <p>-15.0 – 12.5° C in 2.5° C increments</p>

Installer Setting	Default/Range
<p>Cool Lockout</p> <p>This setting allows you to set an outdoor air temperature below which the cooling equipment will be held off.</p> <ul style="list-style-type: none"> • If the cooling equipment is energized and the outdoor air temperature falls below the cool lockout setting, the cooling equipment turns off. • If cooling is being inhibited by this lockout and the outdoor air temperature rises above the cool lockout setting, the cooling equipment energizes. • The comparison between the outdoor air temperature and the cool lockout setting is performed every five minutes to prevent rapid equipment cycling when the outdoor air temperature is close to the lockout setting. <p><u>Interdependencies</u></p> <p>If there is not a valid outdoor temperature in the system, the cooling is not inhibited.</p> <p><u>BACnet Objects</u></p> <p>There are two BACnet objects associated with the Cool Lockout.</p> <ul style="list-style-type: none"> • BV512 is the Cool Lockout feature enable/disable. • When BV512 is Enabled, AV504 can be written to set the Cool Lockout Temperature setting. 	<p>D: OFF</p> <p>R: OFF 5 to 80° F in 5° F increments OFF -15.0 to 25.0 in 2.5° C increments</p>
<p>Low Cool Lockout</p> <p>This setting allows you to set an outdoor air temperature above which low speed cooling is locked out. Above the specified temperature, all cooling demands are satisfied with high-speed cooling.</p> <p>Off - Functionality Disabled. Cooling always starts with first-stage compressor (Y1) and stages up to second-stage (Y1 and Y/Y2) when the demand is sufficient and staging and cycle timer constraints are satisfied.</p> <p>Outdoor temperature above which both the first and second stages of the compressor are energized to satisfy all cooling demands. This check is performed when the first stage of the compressor is energized. If at the time the compressor is energized the outdoor air temperature is greater than or equal to the high cool latch temperature, then the second stage of the compressor is energized also. When a cycle starts under a high cool latch, it finishes the cooling cycle on high Stage. If the cooling equipment is energized to satisfy a dehumidify demand only (no cooling demand), the latch is not applied.</p> <p>On - The Y1 and Y/Y2 outputs are simultaneously energized to satisfy all cooling demands.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • If there is not a valid outdoor temperature and the Low Cool Lockout is set to a temperature (not OFF or ON), the outdoor temperature shows N/A, and the Low Cool Lockout setting is ignored (acts as if the setting is OFF). • If the System does not have a 2 stage Heat Pump, this selection is not available. <p><u>BACnet Objects</u></p> <p>There are two BACnet objects associated with the Low Cool Lockout.</p> <ul style="list-style-type: none"> • BV515 is the Low Cool Lockout feature enable/disable. • When BV515 is Enabled, AV505 can be written to set the Low Cool Lockout Temperature setting. 	<p>D: OFF</p> <p>R: ON OFF 80 to 110° F in 5° F increments 27.5 to 42.5° C in 2.5° C increments</p>

Installer Setting	Default/Range
<p>Low Heat Lockout</p> <p>This setting allows you to set an outdoor air temperature below which low speed compressor heating is locked out. Below the specified outdoor air temperature, all heating demands that use the compressor uses high speed compressor heating.</p> <p>Off - Functionality Disabled. Compressor heating always starts with first stage compressor (Y1) and stages up to second stage (Y1 and Y/Y2) when the demand is sufficient and staging and cycle timer constraints have been satisfied.</p> <p>Outdoor temperature below which both the first and second stages of the compressor are energized to satisfy all heating demands. This check is performed when the first stage of the compressor is energized. If at the time the compressor is energized the outdoor air temperature is less than or equal to the low heat lockout temperature, then the second stage of the compressor is energized also. When a cycle starts under a low heat lockout condition, it must finish the heating cycle on high speed.</p> <p>On - The Y1 and Y/Y2 outputs are simultaneously energized to satisfy all compressor heating demands, regardless of outdoor air temperature.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • If there is not a valid outdoor temperature and the Low Heat Lockout is set to a temperature (not OFF or ON), the outdoor temperature must show N/A, and the Low Heat Lockout setting is ignored (acts as if the setting is OFF). • If the System does not have a 2 stage Heat Pump, this selection is not available. <p><u>BACnet Objects</u></p> <p>There are two BACnet objects associated with the Low Heat Lockout.</p> <ul style="list-style-type: none"> • BV516 is the Low Heat Lockout feature enable/disable. • When BV516 is Enabled, AV506 can be written to set the Low Heat Lockout Temperature setting. 	<p>D: OFF</p> <p>R: OFF ON</p> <p>20 to 50° F in 5° F increments</p> <p>-5 to 10° C in 2.5° C increments</p>
<p>Differential</p> <p>This setting allows you to set a value that specifies the required difference between the current space temperature and the setpoint that results in the equipment being energized to satisfy the demand. This value is additive for each additional stage of equipment being demanded.</p> <p>For example, a chosen Differential value of 0.5° F requires a 0.5-degree difference between setpoint and space temperature before first stage is turned on. Then a value of 1.0 degree of difference between setpoint and space temperature before second stage is turned on.</p> <p><u>Interdependencies</u></p> <p>None</p>	<p>D: 1.0° F</p> <p>R: 0.3° F to 2.0° F in 0.1° F increments</p> <p>0.20° C to 1.10° C in 0.05° C increments</p>
<p>Air Filter Reminder</p> <p>This setting allows you to set a value that specifies the number of equipment run hours before an alert icon is shown on the Home and Dormant screens. For more information on viewing and resetting the <u>filter reminder</u> (page 31).</p> <p>If the setting is Off, the equipment run hours do not cause alert icon to be displayed.</p> <p>Decrement to the equipment run hours occur after each hour of equipment runtime. Minute counts within each hour are not stored in non-volatile memory, so a power reset clears the minutes within each hour of run time. The equipment run hours are stored in non-volatile memory.</p> <p><u>Interdependencies</u></p> <p>If the Remote Sensor is set to Filter, this setting is set to Off and not available to you.</p>	<p>D: 3000 hours</p> <p>R: OFF</p> <p>500 to 15,000 hours in 100-hour increments</p>

Installer Setting	Default/Range
<p>Occupancy Output</p> <p>This setting allows you to choose an output relay to function as an indicator of the occupancy state. The choices only include outputs that are not already assigned to another function.</p> <p>The output that is selected (1, 2 or 7) is energized when in the Occupied or setpoint override state and de-energized when in the Unoccupied or Standby state.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> The Occupancy Output option is not available if the 1, 2 and 7 relays are already being used for other functions. The 1 output is used for 3-Stages of Cooling, the Humidifier, the Dehumidifier setting of HumidiMizer, and a Hydronic Fan Coil high fan speed. The 2 output is used for heat pump equipment, the Humidifier, and the Dehumidifier setting of HumidiMizer. The 7 output is used for 2 Stages of Heating, the Humidifier, the Dehumidifier setting of HumidiMizer and a Hydronic Fan Coil E-Heat. Any output that is already being used is not shown in the Occupancy Output selections. 	<p>D: OFF</p> <p>R: OFF ON-1 ON-2 ON-7</p>
<p>Occupancy Input</p> <p>This setting changes the current heating and cooling setpoints to the option selected for the duration specified by the Max Hold Time. This occurs when the short is detected on the Remote Space Sensor for the duration of 2 to 5 seconds.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> This setting must only be available if the Remote Sensor is set to Space or Average. This setting is not available if the Heating Equipment Type is set to Hydronic Fan Coil and the Pipe Configuration is Two Pipe Auto Changeover because the Remote Sensor is required for the water auto changeover sensor. 	<p>D: Occupied</p> <p>R: Occupied Unoccupied</p>
<p>Brand Logos</p> <p>This setting allows you to select a brand logo that appears in the lower right corner of the Home and dormant screens.</p> <p><u>Interdependencies</u></p> <p>None</p>	<p>D: None</p> <p>R: Varies</p>
<p>Dealer Name</p> <p>This setting allows the dealer to enter the name that appears on the Menu Service screen.</p> <ul style="list-style-type: none"> An alpha-numeric keypad appears to facilitate entering characters. Pressing Caps toggles between upper and lower case keys, while the 123+ -= and .?[]/ keys change the keys to number or symbols respectively. Pressing Clear removes the entire name and the backspace key deletes characters to the left of the cursor. There are left (<<) and right (>>) keys for navigating the cursor within the characters of the name. Once the selection is made, pressing the Save key saves the selection into non-volatile memory. <p><u>Interdependencies</u></p> <p>None</p>	<p>D: Blank</p> <p>R: Up to 25 printable</p>

Installer Setting	Default/Range
<p>Dealer Phone</p> <p>This setting allows you to enter the phone number that appears on the Menu Service screen.</p> <ul style="list-style-type: none"> • A numeric keypad appears to facilitate entering numbers. • Clear is used to remove the entire number. • Backspace deletes numbers to the left of the cursor. • ABC changes to the alpha-numeric keypad, where there are left and right keys for navigating the cursor within the numeric field. • Once the selection is made, press Save to save the selection into non-volatile memory. <p><u>Interdependencies</u></p> <p>None</p>	<p>D: Blank</p> <p>R: Up to 15 printable characters</p>
<p>Dealer Website</p> <p>This setting allows you to enter the Website that appears on the Menu -> Service screen.</p> <ul style="list-style-type: none"> • An alpha-numeric keypad appears to facilitate entering characters. • Pressing the Caps key toggles between upper and lower case keys, while the 123+ = and ,.?[]/ keys change the keys to number or symbols respectively. • The keypad has a Clear key for removing the entire website and a backspace key for deleting characters to the left of the cursor. There are left (<<) and right (>>) keys for navigating the cursor within the characters of the name. • Once the selection is made, pressing Save saves the selection into non-volatile memory. <p><u>Interdependencies</u></p> <p>None</p>	<p>D: Blank</p> <p>R: Up to 35 printable characters</p>
<p>Dealer Email</p> <p>This setting allows you to enter the email address that appears on the Menu -> Service screen.</p> <ul style="list-style-type: none"> • An alpha-numeric keypad appears to facilitate entering characters. • Pressing the Caps key toggles between upper and lower case keys, while the 123+ = and ,.?[]/ keys change the keys to number or symbols respectively. • The keypad has a Clear key for removing the entire website and a backspace key for deleting characters to the left of the cursor. There are left (<<) and right (>>) keys for navigating the cursor within the characters of the name. • Once the selection is made, pressing Save saves the selection into non-volatile memory. <p><u>Interdependencies</u></p> <p>None</p>	<p>D: None</p> <p>R: Up to 25 printable characters</p>
<p>Door Open Switch State</p> <p>When the Remote Sensor is set to Door Switch this setting allows you to specify the switch state when the door is open.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if the Remote Sensor is set to Door Switch.</p>	<p>D: Open</p> <p>R: Open – when door is open the switch is open Closed – when the door is open the switch is closed.</p>

Installer Setting	Default/Range
<p>Door Open Cool Setpoint</p> <p>When the Remote Sensor is set to Door Switch this setting allows you to specify the cool setpoint used when the door is detected open.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if the Remote Sensor is set to Door Switch.</p>	<p>D: 90 °F (32.0 °C)</p> <p>R: 75 °F to 90 °F (24.0 to 32.0 °C)</p>
<p>Door Open Heat Setpoint</p> <p>When the Remote Sensor is set to Door Switch this setting allows you to specify the heat setpoint used when the door is detected open.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if the Remote Sensor is set to Door Switch.</p>	<p>D: 55 °F (12.5 °C)</p> <p>R: 50 °F to 65 °F (10.0 to 18.0 °C)</p>
BACnet Enable Setting	Default/Range
<p>BACnet Enable</p> <p>This setting allows you to enable BACnet and specify the communication as wired (MS/TP) or wireless (IP over Wi-Fi).</p> <ul style="list-style-type: none"> After a restore factory defaults is executed, the user is prompted to decide whether to enable BACnet. When you exit the configuration settings after making changes to the BACnet settings, the thermostat resets to restart the BACnet functionality with the modified settings. <p><u>Interdependencies</u></p> <p>None.</p>	<p>D: BACnet Disabled</p> <p>R: BACnet Disabled BACnet MSTP BACnet IP (Wi-Fi)</p>
BACnet Enable Setting	Default/Range
<p>BACnet Enable</p> <p>This setting allows you to enable BACnet and specify the communication as wired (MS/TP) or wireless (IP over Wi-Fi).</p> <ul style="list-style-type: none"> After a restore factory defaults is executed, the user is prompted to decide whether to enable BACnet. When you exit the configuration settings after making changes to the BACnet settings, the thermostat resets to restart the BACnet functionality with the modified settings. <p><u>Interdependencies</u></p> <p>None.</p>	<p>D: BACnet Disabled</p> <p>R: BACnet Disabled BACnet MSTP BACnet IP (Wi-Fi)</p>
BACnet IP Setting	Default/Range
<p>UDP Port</p> <p>Allows you to specify the IP UDP port to be used for the BACnet over Wi-Fi communications.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> This setting is only available if the BACnet Enable setting is BACnet IP (Wi-Fi) If a value less than 47808 is entered, the setting is corrected to 47808. 	<p>D: 47808 (0xBAC0)</p> <p>R: 47808 (0xBAC0) to 65535 (0xFFFF)</p>

BACnet IP Setting	Default/Range
<p>DHCP Enable</p> <p>Allows the user to specify whether the BACnet IP address should be assigned by a DHCP server.</p> <p>If this setting is No, additional settings for a static IP, static subnet mask and static gateway will need to be manually configured.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if the BACnet Enable setting is BACnet IP (Wi-Fi)</p>	<p>D: YES</p> <p>R: YES NO</p>
<p>Static IP Address</p> <p>When the DHCP Enable is set to No, you must manually enter the Static IP address for the BACnet IP wireless communications.</p> <p>The static IP address is IPV4 format.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if BACnet Enable is set to BACnet IP (Wi-Fi) and the BACnet IP DHCP Enable is set to No.</p>	<p>D: 192.168.1.100</p> <p>R: Any valid IPV4 address</p>
<p>Static Subnet Mask</p> <p>When the DHCP Enable is set to No, you must manually enter the Static Subnet Mask address for the BACnet IP wireless communications.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if BACnet Enable is set to BACnet IP (Wi-Fi) and the BACnet IP DHCP Enable is set to No.</p>	<p>D: 255.255.255.0</p> <p>R: Any valid IPV4 address</p>
<p>Static Gateway</p> <p>When the DHCP Enable is set to No, you must manually enter the Static Gateway address for the BACnet IP wireless communications.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if BACnet Enable is set to BACnet IP (Wi-Fi) and the BACnet IP DHCP Enable is set to No.</p>	<p>D: 192.168.1.1</p> <p>R: Any valid IPV4 address</p>
<p>DNS Server</p> <p>When the DHCP Enable is set to No, you must manually enter the DNS Server for BACnet IP wireless communications.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if BACnet Enable is set to BACnet IP (Wi-Fi) and the BACnet IP DHCP Enable is set to No.</p>	<p>D: 192.168.1.1</p> <p>R: Any valid IPV4 address</p>
<p>Foreign Dev Enable</p> <p>This setting allows you to specify whether foreign devices (devices with a different subnet mask than this thermostat) are allowed to join the BACnet network.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> This setting is only available if BACnet Enable is set to BACnet IP (Wi-Fi) If this setting is Yes, additional settings of BBMD IP Address and Foreign Dev TTL must also be configured. 	<p>D: NO</p> <p>R: YES NO</p>

BACnet IP Setting	Default/Range
<p>BBMD IP Address</p> <p>When the Foreign Device Enable setting is Yes, you must manually configure the address of the BACnet Broadcast Management Device (BBMD), which is the device responsible for managing BACnet messages across different subnets.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if BACnet Enable is set to BACnet IP (Wi-Fi) and the Foreign Device Enable is set to Yes.</p>	<p>D: 0.0.0.0</p> <p>R: Any</p>
<p>BBMD Host Name</p> <p>When the Foreign Device Enable setting is Host Name you must manually configure the Host Name of the BACnet Broadcast Management Device (BBMD). This is the device responsible for managing BACnet messages across different subnets. The Host Name will be checked for dotted-decimal form (for example 192.168.0.122) before using mDNS for local names then the DNS server to resolve the IP address.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if BACnet Enable is set to BACnet IP (Wi-Fi) and Foreign Device Enable is set to Host Name.</p>	<p>D: None</p> <p>R: Any</p>
<p>Foreign Dev TTL</p> <p>When the Foreign Device Enable setting is Yes, you must manually configure the Foreign Device Time To Live (TTL) parameter. If the foreign device does not re-register with the BBMD within this time period, it will be removed from the BBMD Foreign Device Table.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if BACnet Enable is set to BACnet IP (Wi-Fi), and the Foreign Device Enable is set to Yes.</p>	<p>D: 60 seconds</p> <p>R: 0-65535 seconds</p>
BACnet MSTP Setting	Default/Range
<p>Max Master</p> <p>This setting allows you to set the maximum MAC address for BACnet MS/TP master devices.</p> <p>BACnet MS/TP Mac Addresses for master devices exist in the range from 0 to 127. Each BACnet MS/TP device periodically looks for other devices (sends Poll for Master message) with addresses from its own address plus one to the next known address (wrapping to 0 after 127). Performance gains can be made on a BACnet MS/TP network by not leaving any gaps in MAC address and setting the MS/TP Max Master parameter of the device with the highest MAC address to a value equal to its MAC address. The downside to setting the MS/TP Max Master to a value less than 127 is, if new devices are added to the network with addresses above the Max Master value, they won't be discovered or added to the network.</p> <p>NOTE Changing the MS/TP Max Master requires the thermostat to be restarted. When you exit the configuration settings after making changes to the BACnet settings, there will be a prompt to either cancel those settings or save the new settings which force a thermostat reset.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if the BACnet Enable is BACnet MS/TP.</p>	<p>D: 127</p> <p>R: 1-127</p>

BACnet MSTP Setting	Default/Range
<p>Baud Rate</p> <p>This setting allows you to set the baud rate for the BACnet MS/TP communications to one of the following values: 9600, 19.2K (19200), 38.4K (38400), 76.8K (76800) or 115k (115200). The BACnet MS/TP baud rate is set to match the other devices on the BACnet MS/TP network.</p> <p>NOTE Changing the MS/TP Baud Rate requires the thermostat to be restarted. When you exit the configuration settings after making changes to the BACnet settings, there is a prompt to either cancel those settings or save the new settings which forces a thermostat reset.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if the BACnet Enable selection is BACnet MS/TP.</p>	<p>D: 7608K</p> <p>R: 9600 19.2K (19200) 38.4K (38400) 76.8K (76800) 115k (115200)</p>
<p>MAC</p> <p>This setting allows you to set the BACnet MS/TP Mac Addresses for master devices. Each BACnet MS/TP device on a MS/TP segment, must have a unique Mac address. Performance gains can be made on a BACnet MS/TP network by not leaving any gaps in MAC addresses, eliminating the need for each device to continuously check the addresses above its address and up to the next known device for new devices. Although the BACnet standard doesn't limit the use of Mac Address zero, it is often reserved for a MS/TP router.</p> <p>NOTE Changing the MS/TP Mac Address requires the thermostat to be restarted. When you exit the configuration settings after making changes to the BACnet settings, there is a prompt to either cancel those settings or save the new settings which forces a thermostat reset.</p> <p>This setting is only available if the BACnet Enable selection is BACnet MS/TP.</p>	<p>D: 1</p> <p>R: 0-127</p>
BACnet Enable Setting	Default/Range
<p>BACnet UTC Offset</p> <p>This setting allows you to specify a UTC offset to be set from -13 to +13 hours in increments of 15 minutes.</p> <p>When a BACnet UTC Time synchronization message is received by the thermostat, the value in UTC Offset is subtracted from the UTC Time to determine the local standard time. The daylight saving time logic is then applied to the standard time to get the local time with daylight saving.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> For reception of the UTC Time synchronization service to be enabled (and UTC offset used) on the device, the Synch Time To Server option has to be set to No and DST is set to Enabled. This setting is not available if BACnet Enable is set to BACnet Disabled. 	<p>D: 5:00 (5 hours 0 minutes)</p> <p>R: 13:00 to 13:00 in 15 minute increments</p>

BACnet Enable Setting	Default/Range
<p>BACnet UTC Offset</p> <p>This setting allows you to specify a UTC offset to be set from -13 to +13 hours in increments of 15 minutes.</p> <p>When a BACnet UTC Time synchronization message is received by the thermostat, the value in UTC Offset is subtracted from the UTC Time to determine the local standard time. The daylight saving time logic is then applied to the standard time to get the local time with daylight saving.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> For reception of the UTC Time synchronization service to be enabled (and UTC offset used) on the device, the Synch Time To Server option has to be set to No and DST is set to Enabled. This setting is not available if BACnet Enable is set to BACnet Disabled. 	<p>D: 5:00 (5 hours 0 minutes)</p> <p>R: 13:00 to 13:00 in 15 minute increments</p>
<p>Device ID</p> <p>This setting allows you to specify a Device ID from 0 to 4194302.</p> <p>Device IDs on BACnet devices are unique internetwork wide. Each device broadcasts its Device ID using the I-Am service upon power up and in response to the Who-Is service. Changing the Device ID triggers a new I-Am message to be sent including the new Device ID.</p> <p>Changing the Device ID triggers an I-Am message to be sent over BACnet and increments the Database-revision property in the Device object.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> Changing the Device ID causes the Database Revision property of the device to be incremented. This setting is not displayed if BACnet is disabled. 	<p>D: 16xxxx (last four digits of the thermostat serial number)</p> <p>R: 0 to 4 194 302</p>
<p>Device Object Name</p> <p>This setting allows you to specify a Device Object Name.</p> <p>Device Object Names on BACnet devices are unique internetwork-wide.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> Changing the Device Object Name causes the Database Revision property of the Device to be incremented. This setting is not displayed if BACnet is disabled. 	<p>D: DEVICE 16xxxx where xxx is the last four digits of the serial number</p> <p>R: Up to 16 printable characters</p>
<p>Device Location</p> <p>This setting allows you to specify a Device Location. Device location is an optional property that is used to describe the physical location of the BACnet device.</p> <p><u>Interdependencies</u></p> <p>This setting is not displayed if BACnet is disabled.</p>	<p>D: LOCATION</p> <p>R: Up to 32 printable characters</p>
<p>Device Description</p> <p>This setting allows you to view the Device Description. Description is an optional property that is used to add descriptive information about the BACnet device.</p> <p><u>Interdependencies</u></p> <p>This setting is not displayed if BACnet is disabled.</p>	<p>D: DESCRIPTION</p> <p>R: Up to 32 printable characters</p>

BACnet Enable Setting	Default/Range
<p>BACnet BMS OCC</p> <p>This setting allows the user to enable or disable occupancy scheduling through the BACnet BMS by enabling or disabling the connection between the Present Value of the BACnet Binary Object Value named “BMS_OCC” and the Occupancy state of the controller.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> Occupancy is determined using just one of three methods. BACnet BMS OCC is mutually exclusive with both Programmable Mode and Remote Sensor set to Occupancy. Setting BACnet BMS OCC to Yes forces “Prog or Non-Prog” to Non-Prog and switches “Remote Sensor” to None if set to Occupancy. This setting is not displayed if BACnet is disabled. 	<p>D: No (disabled) R: Yes (enabled) No (disabled)</p>
<p>BACnet Config Write</p> <p>This setting allows the user to choose whether to allow (Yes) or disallow (No) BACnet writes to modify Installer Settings configuration. Many of the configuration items in your Setting menu are exposed as BACnet objects. These BACnet Objects can be read to verify the configuration of the thermostat.</p> <ul style="list-style-type: none"> If BACnet Config Write is set to Yes, these objects can also be written to change the configuration of the thermostat. If BACnet Config Write is set to No, these objects are read-only. <p><u>Interdependencies</u></p> <p>This setting is not displayed if BACnet is disabled.</p>	<p>D: No R: Yes No</p>
<p>Net GP Out Timeout</p> <p>This setting allows the user to set the timeout associated with Network General Purpose Outputs. If this value is set to 2 minutes, 20 minutes or 60 minutes, this number represents the maximum time that can lapse between writes to the Present Value property of the output object before the value returns to the Inactive State.</p> <p><u>Interdependencies</u></p> <p>This setting is not displayed if BACnet is disabled.</p>	<p>D: 2 minutes R: 2 minutes 20 minutes 1 hour Unlimited</p>
<p>Net GP 1 OUTPUT Mode</p> <p>This setting allows you to choose the mode of the Network General Purpose Output 1 for control over the BACnet network.</p> <ul style="list-style-type: none"> Setting the mode to Disabled sets the Present Value of the BACnet object to Inactive and read-only and the corresponding output relay will be in a de-energized state. Setting the mode to Energized Active allows BACnet writes to the Present Value and energizes the output relay when the Present Value is active. Setting the mode to Energized Inactive allows BACnet writes to the Present Value and will energize the output relay when the Present Value is inactive. <p>If a Network General Purpose Output timeout occurs, the Present Value goes to the inactive state and the relay is either energized active or de-energized inactive depending on the mode.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> If Output 1 has a primary function to control the heating or cooling equipment (i.e. third stage cooling or high speed fan), or an optional function (i.e. humidifier, HumidiMizer or occupancy), then this output is not available as a BACnet network-controlled output. This setting is not displayed if BACnet is disabled. 	<p>D: Disabled R: Disabled Energized Active Energized Inactive</p>

BACnet Enable Setting	Default/Range
<p>Net GP 7 Output Mode</p> <p>This setting allows you to choose the mode of the Network General Purpose Output 7 for control over the BACnet network.</p> <ul style="list-style-type: none"> Setting the mode to Disabled sets the Present Value of the BACnet object to Inactive and read-only and the corresponding output relay will be in a de-energized state. Setting the mode to Energized Active allows BACnet writes to the Present Value and energizes the output relay when the Present Value is active. Setting the mode to Energized Inactive allows BACnet writes to the Present Value and energizes the output relay when the Present Value is inactive. <p>If a Network General Purpose Output timeout occurs, the Present Value goes to the inactive state and the relay will be either energized active or de-energized inactive depending on the mode.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> If Output 7 has a primary function to control the heating or cooling equipment (i.e. second stage heating or E-Heat output), or an optional function (i.e. humidifier, HumidiMizer or occupancy), then this output is not available as a BACnet network-controlled output. This setting is not displayed if BACnet is disabled. 	<p>D: Disabled</p> <p>R: Disabled Energized Active Energized Inactive</p>
<p>Net GP 2 Mode</p> <p>This setting allows the user to choose the mode of the Network General Purpose Output 2 for control over the BACnet network.</p> <ul style="list-style-type: none"> Setting the mode to Disabled sets the Present Value of the BACnet object to Inactive and read-only and the corresponding output relay will be in a de-energized state. Setting the mode to Energized Active allows BACnet writes to the Present Value and energizes the output relay when the Present Value is active. Setting the mode to Energized Inactive allows BACnet writes to the Present Value and energizes the output relay when the Present Value is inactive. <p>If a Network General Purpose Output timeout occurs, the Present Value goes to the inactive state and the relay will be either energized active or de-energized inactive depending on the mode.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> If Output 2 has a primary function to control the heating or cooling equipment (i.e. heat pump reversing valve), or an optional function (i.e. humidifier, HumidiMizer or occupancy), then this output is not available as a BACnet network-controlled output. This setting is not displayed if BACnet is disabled. 	<p>D: Disabled</p> <p>R: Disabled Energized Active Energized Inactive</p>

BACnet Enable Setting	Default/Range
<p>Net GP AO Mode</p> <p>This setting allows the user to specify how a BACnet write to the Network General Purpose Output AO (AV201, NET_GP_AO_OUT) is translated to an Analog Output voltage.</p> <p>Disabled - Writes to AV201 will be ignored. BACnet cannot control the Analog Output voltage.</p> <p>Direct LV Default – There is a direct correlation between the 0-100% value written to AV201 and the Analog Output Scaling setting. If a Network General Purpose Output timeout occurs, the analog output voltage is set to the Analog Output Scaling minimum voltage.</p> <p>Direct HV Default – There is a direct correlation between the 0-100% value written to AV201 and the Analog Output Scaling setting. If a Network General Purpose Output timeout occurs, the analog output voltage is set to the Analog Output Scaling maximum voltage.</p> <p>Reverse LV Default – There is a reverse (inverse) correlation between the 0-100% value written to AV201 and the Analog Output Scaling setting. If a Network General Purpose Output timeout occurs, the analog output voltage is set to the Analog Output Scaling minimum voltage.</p> <p>Reverse HV Default – There is a reverse (inverse) correlation between the 0-100% value written to AV201 and the Analog Output Scaling setting. If a Network General Purpose Output timeout occurs, the analog output voltage is set to the Analog Output Scaling maximum voltage.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • This setting is not displayed if the Analog Output is set to something other than None. • This setting is not displayed if BACnet is disabled. 	<p>D: Disabled</p> <p>R: Disabled Direct LV Default Direct HV Default Reverse LV Default Reverse HV Default</p>
Installer Setting	Default/Range
<p>Disconnect Wi-Fi</p> <p>This setting allows you to disconnect from the Wi-Fi network.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> • This setting is not displayed if the thermostat is already disconnected from the Wi-Fi network. • If the user chooses to disconnect the Wi-Fi, the control advances to the next setting since this one can no longer appear. 	<p>D: NO</p> <p>R: YES NO</p>
Analog Output Setting	Default/Range
<p>Analog Output</p> <p>This setting specifies the device being controlled by the Analog Output.</p> <p><u>Interdependencies</u></p> <p>This setting is only available if the Heating Equipment is set to Hydronic Fan Coil.</p>	<p>D: None</p> <p>R: None Water Valve Three Speed Fan</p>
Analog Output - Water Valve Control	Default/Range
<p>This setting allows you to specify the type of electrical signal that is output by the thermostat between the Analog Output terminal (A) and common (C).</p>	

Analog Output Setting	Default/Range
<p>Analog Output Scaling</p> <p>This setting allows you to specify the type of electrical signal that is output by the thermostat between the Analog Output terminal (A) and common (C).</p> <p><u>Interdependencies</u></p> <p>This setting is only available when the Analog Output is set to Water Valve.</p>	<p>D: 2-10</p> <p>R: 0-10 - When the output should be controlled between 0 and 10 volts</p> <p>2-10 - When the output should be controlled between 2 and 10 volts</p>
<p>Analog Output Type</p> <p>This setting specifies whether the device connected to the analog output functions as a Normally Closed or Normally Open device.</p> <p>Normally Open devices are fully open, or at full capacity, at the minimum voltage specified by the Analog Output Scaling and Normally Closed devices are fully open, or at full capacity, at the maximum voltage specified by the Analog Output Scaling.</p> <p><u>Interdependencies</u></p> <p>This setting is only available when the Analog Output is set to Water Valve.</p>	<p>D: Normally Open</p> <p>R: Normally Open Normally Closed</p>
<p>PI Algorithm for Valve Modulation</p> <p>When there is a heating demand and the outdoor air temperature is less than the Hot Water Valve Enable Temp or there is a cooling demand and the outdoor temperature is above the Cold Water Valve Enable Temp, then the analog out must modulate between the values specified by the Analog Output Scaling per the following requirements:</p> <ul style="list-style-type: none"> • If the difference between the space temperature and the setpoint is between -0.9 and 2.0 degrees Fahrenheit then: <ul style="list-style-type: none"> • The analog output voltage is (5P+I) where... <ul style="list-style-type: none"> • P is the error between the setpoint and the space temperature • I is the integral sum calculated once every 30 seconds • $I = I(t-30\text{sec}) + (0.05 * P)$ • Limitations on the I term <ul style="list-style-type: none"> • If 5P+I is greater than 10, the I term remains unchanged from the t-30 value. • The I term is limited to ≥ 0 and ≤ 5. • When the equipment is off the I term is set to 0. • If the difference between the space temperature and the setpoint is ≥ 2 degrees Fahrenheit, then <ul style="list-style-type: none"> • The analog output voltage is the value that fully opens the valve. • The I term is set to 0 • If the difference between the space temperature and the setpoint is < -0.9 degrees Fahrenheit <ul style="list-style-type: none"> • The voltage at the analog output is set to the value that fully closes the valve. • The I term is set to 0 	<p>D:</p> <p>R:</p>
<p>Analog Output – Hydronic Fan Coil Three Speed Fan</p> <p>When the Heating Equipment is set to Hydronic Fan Coil and the Analog Output is set to Three Speed Fan, you must specify the desired voltages for low, medium and high speed.</p> <p>Analog Output - Low Speed Fan Voltage</p> <p>This setting allows you to specify the voltage level for low-speed fan.</p> <p><u>Interdependencies</u></p> <p>This setting is only available when Heating Equipment Type is Hydronic Fan Coil, and Analog Output is set to Three Speed Fan</p>	<p>D: 3 volts</p> <p>R: 1-10 When the output should be controlled between 0 and 10 volts</p>

Analog Output Setting	Default/Range
<p>Analog Output - Medium Speed Fan Voltage This setting allows you to specify the voltage level for medium speed fan.</p> <p><u>Interdependencies</u> This setting is only available when Heating Equipment Type is Hydronic Fan Coil, and Analog Output is set to Three Speed Fan</p>	<p>D: 6 volts R: 1-10 When the output should be controlled between 0 and 10 volts</p>
<p>Analog Output – High Speed Fan Voltage This setting allows you to specify the voltage levels for high-speed fan.</p> <p><u>Interdependencies</u> This setting is only available when Heating Equipment Type is Hydronic Fan Coil, and Analog Output is set to Three Speed Fan</p>	<p>D: 9 volts R: 1-10 When the output should be controlled between 0 and 10 volts</p>
Installer Setting	Default/Range
<p>Installer Test This setting allows you to test the HVAC system without creating a demand for heating or cooling.</p> <ul style="list-style-type: none"> When Heating Equipment Type is Gas or Electric pressing the Change button cycles through Heating, E-Heat, Cooling and Fan. Some modes may not be available based on your configuration settings. When Heating Equipment Type is Hydronic Fan Coil, pressing the Change button cycles through Heating, E-Heat, Cooling, Fan Low, Fan Medium and Fan High. <p>The selected mode operates each equipment stage for three minutes. The center of the display counts down the number of seconds remaining for the current stage of equipment operation.</p> <ul style="list-style-type: none"> When the countdown reaches zero, if another stage exists, the banner text changes to “2ND STAGE” and a new 180 second countdown timer must start. If no other stage exists, the test cycle must end. When the Heating or E-Heat modes are running and a humidifier has been configured, the output configured to control the humidifier is energized. When the cool mode is running, and a dehumidifier has been configured for HumidiMizer operation, the output configured for the dehum output is energized. When the Stop button is pressed, the currently running equipment is turned off. <p>After 20 minutes of inactivity (no button presses by you), installer test is terminated, and the Home screen appears.</p> <p><u>Interdependencies</u></p> <ul style="list-style-type: none"> When the Heating Equipment Type is Gas or Electric, E-Heat must only be a choice when a heat pump is selected in the configuration. When the Heating Equipment Type is Hydronic Fan Coil, E-Heat must only be a choice when the Emergency Heat is set to Yes. Heat is not available in a Cooling only configuration. Cool is not available in a Heating only configuration. 	<p>D: R:</p>

Installer Setting	Default/Range
<p>Restore Defaults</p> <p>This setting allows you to reset all system settings back to factory default values. Pressing and holding the 5 Button counts down to initiate the restore defaults operation. After holding the button down for 5-seconds all system settings are returned to factory default values.</p> <p>Function: RESTORE DEFAULTS – This functionality is used to restore all Installer Settings to their default values.</p> <p><u>Defaults</u></p>	
Heating Equip Type	Gas
Heating Equip Stages	1
Compressor Equip Type	A/C
Compressor Equip Stages	1
Hydronic Fan Coil Pipe Config	Four Pipe
Hydronic Fan Coil Auto Changeover Setpoint	70 °F
Hydronic Fan Coil Emergency Heat Available	No
Hydronic Fan Coil Hot Water Valve Lockout	Off
Auto Allowed	Yes
Auto Changeover	30 Minutes
Remote Sensor	None
Prog or NonProg	Prog
Max Temp Hold Time	2 Hours
Fahrenheit or Celsius	°F
Smart Recovery	30 Minutes
Fan On with W	Yes
Reversing Valve	Cool
Space Temp Offset	0°F
Space Humidity Offset	0%
SAT Temp Offset	0°F
Max Setpoint Error	10°F

Using installer settings

Installer Setting	Default/Range
ID Temp Fault Inhibit	60 minutes
Time Between Fuel Types	15 minutes
Cycles per Hour	4
Stage Delay	10 Minutes
Forced Stage Up	30 Minutes
Humidifier	No
Humidifier Output	Off
Dehumidifier	No
Dehumidifier Output	Off
Max Heat Setpoint	88 °F
Min Cool Setpoint	52 °F
Aux Heat Lockout	Off
HP Lockout	Off
Cool Lockout	Off
Low Cool Lockout Temp	Off
Low Heat Lockout Temp	Off
Differential	1.0 °F
Air Filter Reminder	3000 HRS
Occupancy Output	Off
Occupancy Input	Occupied
Brand Logo	None
Dealer Name	Blank
Dealer Phone	Blank
Dealer Website	Blank
Dealer Email	Blank
Door Open Switch State	Open

Using installer settings

Installer Setting	Default/Range
Door Open Cool Setpoint	90 °F
Door Open Heat Setpoint	55 °F
BACnet Enable	BACnet Disabled
UDP Port	47808
DHCP Enable	Yes
Static IP Address	192.168.1.100
Static Subnet Mask	255.255.255.0
Static Gateway	192.168.1.1
DNS Server	192.168.1.1
Foreign Device Enable	No
BBMD IP Address	0.0.0.0
Foreign Device TTL	60 seconds
MSTP Baud Rate	76.8k
MSTP MAC	1
MSTP Max Master	127
Max Info Frames	1
BACnet UTC Offset	5:00 (5h, 0min (EST))
Device ID	160000 + last 4 of S/N
Device Object Name	DEVICE16 + last 4 of S/N
Device Location	LOCATION
Device Description	DESCRIPTION
BACnet BMS Occupancy	No
BACnet Config Write	No
Network GP OUT Timeout	2 Minutes
Network GP Y3 Mode	Disabled
Network GP W2 Mode	Disabled

Using installer settings

Installer Setting	Default/Range
Network GP OB Mode	Disabled

Operating your system

Occupancy

There are three methods in the thermostat that can be used to specify when occupied, standby and unoccupied control settings are active.

1. **Prog - Prog:** When the Prog or Non-Prog installer setting is set to Prog, the occupied, standby and unoccupied times are controlled by the thermostat's program schedule. This is the lowest priority of the three methods.
2. **Remote Sensor - Occupancy:** When the Remote Sensor is set to Occupancy, the occupied and unoccupied is determined by the voltage input on the remote sensor inputs (RT and C). This is the middle priority of the three methods and when the **Remote Sensor** is first configured for Occupancy, the Prog or Non-Prog is forced to Non-Prog.
3. **BACnet BMS Occupancy - Yes:** When the BACnet BMS Occupancy is set to Yes, then the BACnet network is responsible for determining whether the thermostat is controlling to the occupied, standby or unoccupied settings. This is the highest priority of the three occupancy options. When BACnet BMS Occupancy is set to Yes, the Prog or Non-Prog is set to Non-Prog and if the **Remote Sensor** is set to Occupancy, then the **Remote Sensor** setting is changed to None.

Timers

Minimum Off Timer

Once a heating or cooling demand is satisfied on the thermostat, the **Minimum OFF Timer** is set to a 300-second value (5-minutes) and then begins to count down each second. Heating and cooling outputs are de-energized the entire time that this timer has a value greater than 0.

Minimum On Timer

Once a heating or cooling demand is present the thermostat will finish the heating or cooling demand (regardless of whether the demand is satisfied) for the 5-minute **Minimum ON Timer** period.

Changing the setpoint cancels the **Minimum On timer**.

Non-Volatile Memory

The thermostat can store settings in non-volatile memory to ensure that settings remain the same after a power outage. Items stored in non-volatile memory include:

- Settings
- Homeowner Settings
- Program Schedule
- Date & Time
- Software Information
- Dealer Information
- Fault & System Event Information

Deadband

This feature is for a future release. Initial implementation has a fixed 2°F and 1.5°C deadband. If you change a setpoint that violates the deadband requirement, the opposite mode setpoint is "pushed" to enforce the deadband.

Faults and System Events

When a fault or system event is active, the alert icon appears on the **Home** and **Dormant** screens. The details of the faults and system events appear in the **Log** screen, which is accessible from the **Menu**.

Faults and System events include:

- Startup
- Software Update Events
- Power Cycle Events
- Parameter Out-of-Range Events
- Server Connectivity Events
- Non-Volatile Memory Faults
- Temperature Faults

A history of the Faults and System events can be viewed in the Carrier® Connect™™ for Carrier mobile app under **Alerts**. The history contains the 5 most-recent logged items, with the most recent at the top of the list.

Faults	Description
ID TEMP SENSOR HIGH	Fault becomes active when main thermistor (P102 or RT1) reads > 100F. Fault is cleared when temperature <= 99F. When this fault occurs, the thermostat uses the temperature reading from the temperature/humidity sensor as the space temperature.
ID TEMP SENSOR LOW	Fault becomes active when main thermistor (P102 or RT1) reads < 39F. Fault is cleared when temperature >= 40F. When this fault occurs, the thermostat uses the temperature reading from the temperature/humidity sensor as the space temperature.
REMOTE SENSOR HIGH	If the Remote Sensor is configured for Space or Average and the remote temperature is less than or equal to 0F or the Remote Sensor is configured for SAT and the remote temperature is less than -35F.
REMOTE SENSOR LOW	If the Remote Sensor is configured for Space or Average and the remote temperature is greater than 122F or the Remote Sensor is configured for SAT and the remote temperature is greater than 165F.
ID TEMP RANGE HIGH	If the mode is cooling (Cool or Auto operating in Cool), the space temperature is greater than the cool setpoint plus the Maximum Setpoint Error and this condition exists for the number minutes specified by the Indoor Temp Fault Inhibit time.
ID TEMP RANGE LOW	If the mode is heating (Heat, E-heat or Auto operating in Heat), the space temperature is less than the heat setpoint minus the Maximum Setpoint Error and this condition exists for the number minutes specified by the Indoor Temp Fault Inhibit time.
HUM SENSOR FAILURE	Humidity sensor timed out, Humidity reading is > 99%, or Humidity reading is 0%
HUMIDITY RANGE HIGH	Humidity reading is > 90%
HUMIDITY RANGE LOW	Humidity reading is < 10%

Faults and System Events

Faults	Description
OUTDOOR TEMP FAILURE	OD temp > 127 or < -60
NO WI-FI SERVER	Not connected to Ayla server
NO WI-FI ROUTER	Router signal strength is 0 bars (not connected)
WI-FI HARDWARE FAULT	Communications error occurred with Wi-Fi module (resets after valid message received)
ECONOMIZER FAULT	The Remote Sensor is set to Fault Input and there is a short between terminals T and C.

System Events	Description
FILTER REMINDER	Filter change reminder is active (run hours have expired or remote input shorted.)
LOCKOUT 5 WRONG PINS	An incorrect PIN was entered consecutive times so the screen is locked out (does not respond to any touch) for 15 minutes.

NOTE This is a system event because if it were handled like a fault, the red alert icon would flash during the 15 minutes the screen is locked but you could not press the alert to see the Log and after the 15 minutes expired, the alert would no longer be flashing.

Setting up Wi-Fi

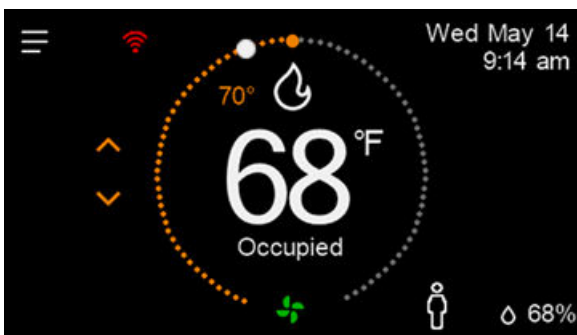
Wi-Fi Settings

Pressing the Wi-Fi icon on the Home screen must initiate the Wi-Fi setup process if the thermostat is not connected to a router or display the Wi-Fi network information if the thermostat is already connected to a router.

The Wi-Fi screens for commissioning and viewing the Wi-Fi status (accessed by pressing the Wi-Fi icon on the home screen) have a timeout of 60 seconds. The **Wi-Fi Disconnect** screen, part of your **Setup** menu, follows the 15-minute timeout that applies to all your settings screens.

Setup Wi-Fi

When the Wi-Fi is not connected to a router, the Wi-Fi icon displayed on the home screen is red.



Pressing the red Wi-Fi icon displays the Setup button and the BLE information required to start the commissioning process.

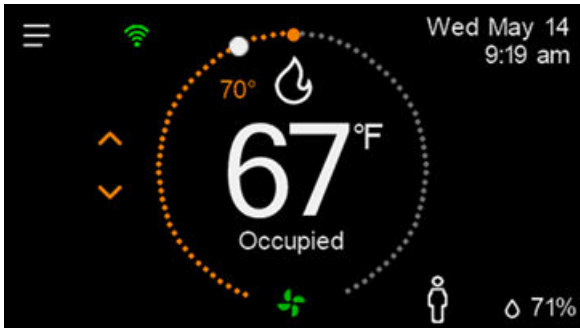


Pressing the Setup button will begin broadcasting the BLE information, so the thermostat is visible to the mobile app. The mobile app displays the BLE identifiers for all thermostats that are broadcasting their information. When the user selects the BLE identifier for the thermostat being connected, the mobile app takes the user through the process of connecting to the Wi-Fi. Once the thermostat connects to the Wi-Fi, the BLE information is replaced with the Wi-Fi SSID and the Reg (Registration status) changes from Not Connected to Yes.

Wi-Fi Connectivity

When the Wi-Fi is successfully connected to a router, the Wi-Fi icon displayed on the **Home** screen is green.

Setting up Wi-Fi



Pressing the green Wi-Fi icon displays the Wi-Fi connection information.



Appendix A: BACnet Objects

Analog Input Objects

Instance	Object Name	Description	Access	Resolution
100	ID_SPACE_TEMP	Indoor Space Temperature	WRITE_WHEN_OOS	0.1
101	ID_SPACE_HUM	Indoor Space Humidity	WRITE_WHEN_OOS	1
102	ID_SPACE_CO2	Indoor Space CO2	WRITE_WHEN_OOS	1

Analog Variable Objects

Instance	Object Name	Description	Access	Resolution
100	REM_SPACE_TEMP	Remote Space Temperature	READ_ONLY	0.1
101	OD_TEMP	Outdoor Temperature	READ_ONLY	1
102	SAT	Supply Air Temperature	READ_ONLY	0.1
103	NET_SP_TEMP	Network Space Temperature	READ_WRITE	0.1
104	SP_TEMP_CTRL	Space Temperature for Control	READ_ONLY	0.1
105	NET_SP_HUM	Network Space Humidity	READ_WRITE	1
106	SP_HUM_CTRL	Space Humidity for Control	READ_ONLY	1
107	OD_HUM	Outdoor Humidity	READ_ONLY	1
108	OD_AQI	Outdoor Air Quality Index	READ_ONLY	1
109	OD_CO	Outdoor Carbon Monoxide	READ_ONLY	1
110	OD_NO2	Outdoor Nitrogen Dioxide	READ_ONLY	1
111	OD_O3	Outdoor Ozone	READ_ONLY	1
112	OD_PM2_5	Outdoor PM2.5	READ_ONLY	1
113	OD_PM10	Outdoor PM10	READ_ONLY	1
114	OD_SO2	Outdoor Sulphur Dioxide	READ_ONLY	1
200	AN_OUT	Analog Output	READ_ONLY	0.1
201	NET_GP_AO_OUT	Network General Purpose Output AO	READ_WRITE	1
300	AIR_FLTR_HRS_LFT	Air Filter Hours Left	READ_ONLY	1
301	OVRD_TIME	Override Time Remaining	READ_ONLY	1
400	OCC_HT_SP	Occupied Heat Setpoint	READ_WRITE	1
401	OCC_CL_SP	Occupied Cool Setpoint	READ_WRITE	1
402	UNOCC_HT_SP	Unoccupied Heat Setpoint	READ_WRITE	1

Appendix A: BACnet Objects

403	UNOCC_CL_SP	Unoccupied Cool Setpoint	READ_WRITE	1
406	DEHUM_SP	Dehumidification Setpoint	READ_WRITE	1
407	HUM_SP	Humidification Setpoint	READ_WRITE	1
408	SCRN_TMT	Screen Timeout	READ_WRITE	5
409	HEAT_SP	Heat Setpoint	READ_WRITE	1
410	COOL_SP	Cool Setpoint	READ_WRITE	1
411	ACTV_BCKLT	Active Backlight	READ_WRITE	5
412	DRMNT_BCKLT	Dormant Backlight	READ_WRITE	5
413	STBY_HT_SP	Standby Heat Setpoint	READ_WRITE	1
414	STBY_CL_SP	Standby Cool Setpoint	READ_WRITE	1
500	ID_STAGES	Indoor Equip Stages	GATED_WRITE	1
501	OD_STAGES	Outdoor Equip Stages	GATED_WRITE	1
502	MAX_HOLD_TIME	Max Temperature Hold Time	GATED_WRITE	1
503	AUTO_XOVR	Auto Changeover Delay	GATED_WRITE	1
504	COOL_LOCKOUT	Cool Lockout Temperature	GATED_WRITE	1
505	LO_CL_LCKOUT	Low Cool Lockout (HP only)	GATED_WRITE	1
506	LO_HT_LCKOUT	Low Heat Lockout (HP only)	GATED_WRITE	1
507	DLY_BW_FUEL	Delay Between Fuel (HP only)	GATED_WRITE	1
508	CYCLES_HR	Cycles Per Hour	GATED_WRITE	1
509	MAX_HT_SP	Max Heat Setpoint	GATED_WRITE	1
510	MIN_CL_SP	Min Cool Setpoint	GATED_WRITE	1
511	AUX_HT_LCKOUT	Aux Heat Lockout (HP only)	GATED_WRITE	1
512	HP_LCKOUT	Heat Pump Lockout	GATED_WRITE	1
513	STG_DELAY	Stage Delay	GATED_WRITE	1
514	FRCD_STG_UP Note: this value is read and written as the actual value divided by 10.	Forced Stage Up Delay	GATED_WRITE	1
515	DIFFERENTIAL	Stage Change Temp Differential	GATED_WRITE	1
516	LINE_FREQ	Line Frequency	Not implemented	1
517	ID_TEMP_OFF	Indoor Temperature Offset	GATED_WRITE	1
518	ID_HUM_OFF	Indoor Humidity Offset	GATED_WRITE	1
519	SAT_OFFSET	SAT Temp Offset	GATED_WRITE	1
520	AIR_FLT_HRS	Air Filter Hours	GATED_WRITE	100

Appendix A: BACnet Objects

521	MAX_SP_ERR	Max Setpoint Error	GATED_WRITE	1
522	ID_TMP_FLT_INHBT	Indoor Temp Fault Inhibit	GATED_WRITE	10
523	CO2_FLT_THRESHL D (currently not used)	CO2 Fault Threshold	GATED_WRITE	100
524	AO_HT_EN_TEMP	Hot Water Valve Enable Temp	GATED_WRITE	1
525	WATER_TEMP_OFF	Water Temperature Offset	GATED_WRITE	1
526	DOOR_OPEN_HT_STPT	Door Open Heat Setpoint	GATED_WRITE	1
527	DOOR_OPEN_CL_STPT	Door Open Cool Setpoint	GATED_WRITE	1

Binary Variable Objects

Instance	Object Name	Description	Access	Inactive/ Active Text
200	Y1_OUT	1st Stage Cooling Out Status	READ_ONLY	OFF/ON
201	Y2_OUT	2nd Stage Cooling Out Status	READ_ONLY	OFF/ON
202	Y3_OUT	3rd Stage Cooling Out Status	READ_ONLY	OFF/ON
203	W1_OUT	1st Stage Heating Out Status	READ_ONLY	OFF/ON
204	W2_OUT	2nd Stage Heating Out Status	READ_ONLY	OFF/ON
205	G_OUT	Fan Out Status	READ_ONLY	OFF/ON
206	OB_OUT	Reversing Valve Out Status	READ_ONLY	OFF/ON
208	OCC_OUT	Occupancy Out Status	READ_ONLY	OFF/ON
209	HUM_OUT	Humidifier Out Status	READ_ONLY	OFF/ON
210	DEHUM_OUT	Dehumidifier Out Status	READ_ONLY	OFF/ON
211	NET_GP_Y3_OUT	Network General Purpose Out Y3	READ_WRITE	OFF/ON
212	NET_GP_W2_OUT	Network General Purpose Out W2	READ_WRITE	OFF/ON
213	NET_GP_OB_OUT	Network General Purpose Out OB	READ_WRITE	OFF/ON
214	FAN_LOW	Hydronic Fan Coil Fan Low	READ_ONLY	OFF/ON
215	FAN_MED	Hydronic Fan Coil Fan Medium	READ_ONLY	OFF/ON
216	FAN_HIGH	Hydronic Fan Coil Fan High	READ_ONLY	OFF/ON
300	DOOR_IS_OPEN	Door Is Open	READ_ONLY	NO/YES
400	WIFI_TIME_SYNC	Wi-Fi Time Synchronization	READ_WRITE	DISABLED/ ENABLED

Appendix A: BACnet Objects

401	PROXIMITY_EN	Proximity Sensor Enable	READ_WRITE	DISABLED/ ENABLED
402	AUTO_DST	Auto DST Time Shift	READ_WRITE	DISABLED/ ENABLED
403	WIFI_ENABLE	Wi-Fi Enable	READ_WRITE	DISABLED/ ENABLED
404	SETPT_OVERRIDE	Setpoint Override	READ_WRITE	DISABLED/ ENABLED
405	BMS_OCC	BACnet BMS Occupancy	READ_WRITE	UNOCCUPIED/ OCCUPIED
406	FLTR_TMR_RST	Filter Timer Reset	READ_WRITE	INACTIVE/ ACTIVE
407	NET_SP_TEMP_EN	Network Space Temperature Enable	READ_WRITE	DISABLED/ ENABLED
408	NET_SP_HUM_EN	Network Space Humidity Enable	READ_WRITE	DISABLED/ ENABLED
500	OCC_IN_POL	Occupancy Input Polarity	GATED_WRITE	OCC
501	ALLOW_AUTO	Auto Mode Allowed	GATED_WRITE	NO
502	ALLOW_PROG	Prog Mode Allowed	GATED_WRITE	NO
503	CELSIUS_DISP	Celsius Display	GATED_WRITE	FAHRENHEIT
504	FAN_WITH_W	Fan On with W	GATED_WRITE	NO
505	RVS_VLV_DIR	Rvs Vlv Energized Ht	GATED_WRITE	ENERGIZED FOR COOL/ ENERGIZED FOR HEAT
506	HUM_INST	Humidifier Installed	GATED_WRITE	NO
507	BMS_OCC_EN	BMS Occupancy Enable	GATED_WRITE	DISABLED/ ENABLED
511	CFG_WR_EN	BACnet Config Write Enable	GATED_WRITE	DISABLED/ ENABLED
512	CL_LO_EN	Cooling Lockout Enable	GATED_WRITE	DISABLED/ ENABLED
513	AUX_HT_LO_EN	Aux Heat Lockout Enable	GATED_WRITE	DISABLED/ ENABLED
514	HP_LO_EN	Heat Pump Lockout Enable	GATED_WRITE	DISABLED/ ENABLED
515	LO_CL_LO_EN	Low Cool Lockout Enable	GATED_WRITE	DISABLED/ ENABLED
516	LO_HT_LO_EN	Low Heat Lockout Enable	GATED_WRITE	DISABLED/ ENABLED

Appendix A: BACnet Objects

517	AO_HT_VLV_LO_EN	Hot Water Valve Lockout Enable	GATED_WRITE	DISABLED/ ENABLED
518	DOOR_OPEN_SW_STATE	Low Heat Lockout Enable	GATED_WRITE	OPEN/ CLOSED
900	ID_TEMP_SENS_HI	ID TEMP SENSOR HIGH	READ_ONLY	INACTIVE/ ACTIVE
901	ID_TEMP_SENS_LO	ID TEMP SENSOR LOW	READ_ONLY	INACTIVE/ ACTIVE
902	REM_TEMP_HI	REMOTE SENSOR HIGH	READ_ONLY	INACTIVE/ ACTIVE
903	REM_TEMP_LO	REMOTE SENSOR LOW	READ_ONLY	INACTIVE/ ACTIVE
904	HUM_TEMP_HI	HUM TEMP SENSOR HIGH	READ_ONLY	INACTIVE/ ACTIVE
905	HUM_TEMP_LO	HUM TEMP SENSOR LOW	READ_ONLY	INACTIVE/ ACTIVE
906	ID_TEMP_RNG_HI	ID TEMP RANGE HIGH	READ_ONLY	INACTIVE/ ACTIVE
907	ID_TEMP_RNG_LO	ID TEMP RANGE LOW	READ_ONLY	INACTIVE/ ACTIVE
908	HUM_SENS_FAIL	HUM SENSOR FAILURE	READ_ONLY	INACTIVE/ ACTIVE
909	HUM_TOO_HI	HUMIDITY RANGE HIGH	READ_ONLY	INACTIVE/ ACTIVE
910	HUM_TOO_LO	HUMIDITY RANGE LOW	READ_ONLY	INACTIVE/ ACTIVE
911	OD_TEMP_FAIL	OUTDOOR SENSOR FAILURE	READ_ONLY	INACTIVE/ ACTIVE
912	SRVR_CONN_FAIL	NOT CONNECTED TO SERVER	READ_ONLY	INACTIVE/ ACTIVE
913	RTR_CONN_FAIL	NOT CONNECTED TO ROUTER	READ_ONLY	INACTIVE/ ACTIVE
914	WIFI_CONF_FAIL	WIFI HARDWARE FAULT	READ_ONLY	INACTIVE/ ACTIVE
915	ECON_FAULT	ECONOMIZER FAULT	READ_ONLY	INACTIVE/ ACTIVE
916	LOCKOUT_FAIL	Removed. Changed from Fault to System Event.		

Multistate Variable Objects

Instance	Object Name	Description	Access	Number of States	State Text
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Appendix A: BACnet Objects

300	CURRENT_MODE	Current Mode Status	READ_ONLY	3	OFF, HEAT, COOL
400	USER_MODE	User Mode	READ_WRITE	5	OFF, HEAT, COOL, AUTO, E-HEAT
401	PROX_SENS	IR Proximity Sensitivity	READ_WRITE	3	HIGH, MEDIUM, LOW
402	SOUND	Sound Effect	READ_WRITE	3	OFF, CLICK, BEEP
403	SCHED_DAY_PARTS	Number of Parts in Schedule Day	READ_WRITE	2	2 PARTS, 4 PARTS
404	OCC_FAN	Occupied Fan Mode	READ_WRITE	2	AUTO, ON
405	UNOCC_FAN	Unoccupied Fan Mode	READ_WRITE	2	AUTO, ON
406	FAN_MODE	Current Fan Mode	READ_WRITE	4	AUTO, ON, OVERRIDE AUTO, OVERRIDE ON
407	STANDBY_FAN	Standby Fan Mode	READ_WRITE	2	AUTO, ON
500	ID_EQUIP_TYPE	Indoor Equipment Type	READ_ONLY	3	NO INDOOR, FURNACE, AIR HANDLER
501	OD_EQUIP_TYPE	Outdoor Equipment Type	GATED_WRITE	3	NO OUTDOOR, A/C, HEAT PUMP
502	REMOTE_SENSOR	Remote Sensor Type	GATED_WRITE	8	NONE, OUTDOOR, SPACE, AVERAGE, OCCUPANCY, FAULT_INPUT, SAT, FILTER
503	DEHUM_TYPE	Dehumidification Type	GATED_WRITE	4	NO, YES, OVRCL (2F), HUMIDIMIZER
504	OCC_OUTPUT	Occupancy Output Terminal	GATED_WRITE	4	OFF, Y3, O/B, W2
505	HUM_OUTPUT	Humidification Output Terminal	GATED_WRITE	4	OFF, Y3, O/B, W2
506	DEHUM_OUTPUT	Dehumidification Output Terminal	GATED_WRITE	4	OFF, Y3, O/B, W2
507	SMART_RECVRY	Smart Recovery	GATED_WRITE	4	NO, 30 min, 60 min, 90 min
508	GP_OUT_TIMEOUT	General Purpose Output Timeout	GATED_WRITE	4	2 min, 20 min, 1 hr UNLIMITED
509	NET_GP_Y3_MODE	Network GP Y3 Mode	GATED_WRITE	3	DISABLED,

Appendix A: BACnet Objects

					ENERGIZED_ACTIVE, ENERGIZED_INACTIVE
510	NET_GP_W2_MODE	Network GP W2 Mode	GATED_WRITE	3	DISABLED, ENERGIZED_ACTIVE, ENERGIZED_INACTIVE
511	NET_GP_OB_MODE	Network GP OB Mode	GATED_WRITE	3	DISABLED, ENERGIZED_ACTIVE, ENERGIZED_INACTIVE
512	ANALOG_INPUT (not used)	Analog Input	GATED_WRITE	3	None, Humidity, CO2
513	ANALOG_IN_SCALE (not used)	Analog Input Scaling	GATED_WRITE	2	2-10V (4-20mAw/ext 500 Ohm), 0-10V
514	ANALOG_OUTPUT	Analog Output Configuration	GATED_WRITE	3	None, Water Valve, Three Speed Fan
515	ANALOG_OUT_SCALE	Analog Output Scaling	GATED_WRITE	2	2-10v, 0-10v
516	ANALOG_OUT_TYPE	Analog Output Type	GATED_WRITE	2	NORMALLY CLOSED NORMALLY OPEN
517	NET_GP_AO_MODE	Network GP AO Mode	GATED_WRITE	5	DISABLED, DIRECT LV DEFAULT, DIRECT HV DEFAULT, REVERSE LV DEFAULT REVERSE HV DEFAULT
518	BMS_OCC_WSTBY	BMS OCC with Standby	GATED_WRITE	3	UNOCCUPIED OCCUPIED STANDBY

Network Port Objects

Instance	Object Name	Description	Network Type	Writable Properties
500	MSTP_PORT	MSTP Network Port	mstp	Max_Info_Frames, Max_Master
501	IP_PORT	IP Network Port	ipv4	FD_BBMD_Address, FD_Subscription_Lifetime

Appendix B: BACnet Functionality

BACnet Communication

BACnet IP (Wi-Fi IPv4)

BACnet MS/TP

Baud Rates: 9600, 19200, 38400, 76800, 115200

BACnet Objects

Device Object

Analog Input Objects

Analog Value Objects

Binary Value Objects

Multistate Value Objects

Network Port Objects

BACnet Interoperability Building Blocks (BIBBs)

Data Sharing BIBBs

Execute Read Property (DS-RP-B)

Execute Read Property Multiple (DS-RPM-B)

Execute Write Property (DS-WP-B)

Execute Write Property Multiple (DS-WPM-B)

Execute Subscribe COV, Initiate ConfirmedCOVNotification and Initiate UnconfirmedCOVNotification (DS-COV-B)

Device Management BIBBs

Execute Who-Is and Initiate I-Am (DM-DDB-B)

Execute Who-Has and Initiate I-Have (DM-DOB-B)

Execute TimeSynchronization (DM-TS-B)

Execute UTCTimeSynchronization (DM-UTC-B)

Execute ReinitializeDevice (DM-RD-B)

Execute DeviceCommunicationControl (DM-DCC-B)

Appendix C: BACnet Constraints

UTC Time Synchronization

- If the device is to support UTCTimeSynchronization, time syncs with Local Time is disabled to avoid ambiguity, Daylight Saving calculations is enabled and the UTC_Offset is set according to the local time zone (Standard Local Time = UTC Time - UTC_Offset).

The following settings are in the **Advanced** menu:

- **SYNCH TIME TO SERVER** - NO
- **DST** - ENABLED

The following setting is in the **Systems Settings** menu:

- **BACNET UTC OFFSET** - Xh Xm (5h 0m – U.S. Eastern Time Zone)

Subscribe COV

- Up to 7 concurrent **COV Subscriptions** are supported.
- **COV Subscriptions** support **Binary Value Objects** and **Multistate Value Objects** only.
- **COV Lifetime** values allowed are between 1 second and 8 hours.

BACnet Reliability Property

In addition to indicating sensor issues, the **BACnet Reliability** property of the **BACnet Objects** is used to convey when the configuration does not support a given point.

Reliability Value	Meaning
No-fault-detected	Configuration matches the object description and value is in range.
Shorted-loop	The Present_Value of this object indicates a shorted sensor.
Open-loop	The Present_Value of this object indicates an open sensor.
Under-range	The Present_Value of this object is below normal.
Over-range	The Present_Value of this object is above normal.
No-output	The output is not used in the current configuration.
Unreliable-other	This object is not relevant with the current configuration.
No-sensor	The sensor is not used in the current configuration.

Appendix D: Network Override of Analog Inputs

Each Analog Input object has two associated Analog Value objects and one Binary Value object. One of the Analog Value objects represents a value written from the network that can override the Analog Input Object. The second Analog Value object has the value that is used by the equipment control logic. The value of the Binary Value object determines whether (Active) to pass the value of the network written Analog Value object to the Analog Value used by the equipment control logic or (Inactive) to pass the value of the Analog Input object to the Analog Value used by the control logic.

Examples:

- NET_SP_TEMP_EN (BV407) – Controls whether AV103 is written to AV104
- NET_SP_TEMP (AV103) – The network space temperature (has to be refreshed < 5 min)
- ID_SPACE_TEMP (AI100) – The space temperature as measured by the device.
- SP_TEMP_CTRL (AV104) – The space temperature value used by the control logic.

- NET_SP_HUM_EN (BV408) – Controls whether AV105 is written to AV106
- NET_SP_HUM (AV105) – The network space humidity (has to be refreshed < 5 min)
- ID_SPACE_HUM (AI101) – The space humidity as measured by the device.
- SP_HUM_CTRL (AV106) – The space humidity value used by the control logic.

Appendix E: Network Port Objects

The following truth table shows that the present value of SP_TEMP_CTRL (AV104) will match the present value of ID_SPACE_TEMP unless NET_SP_TEMP_EN (BV407) is active and NET_SP_TEMP (AV103) has been updated by an external write property request within the previous 5 minutes.

AV103 last update time	BV407	AV104
N/A	F	AI100
>= 5 min	T	AI100
< 5 min	T	AV103

Appendix E: Network Port Objects

There is a Network Port Object for each physical communication port on a device. This device has a mstp type Network Port Object with ID MSTP_PORT and an ipv4 Network Port Object with ID IP_PORT. The Network Port Objects have different properties depending on the network type.

The MSTP_PORT object has the following writable properties that when successfully written causes the CHANGES_PENDING property to become true until a Reinitialized State of Device' of ACTIVATE_CHANGES or WARMSTART is executed:

- **Max_Info_Frames** – The maximum number of information frames the node may send on this port before it must pass the token.
- **Max_Master** – The highest allowable address for master nodes.

The IP_PORT object has the following writable properties that when successfully written cause the CHANGES_PENDING property to become true until a Reinitialized State of Device' of ACTIVATE_CHANGES or WARMSTART is executed:

- **FD_BBMD_Address** – The host name or IP address of the BBMD device to which the Register Foreign Device message is sent.
- **FD_Subscription_Lifetime** – The number of seconds between Register Foreign Device messages before devices are dropped from the Foreign Device Table in the BBMD.

Document revision history

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
		No updates yet	

* For internal use only



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