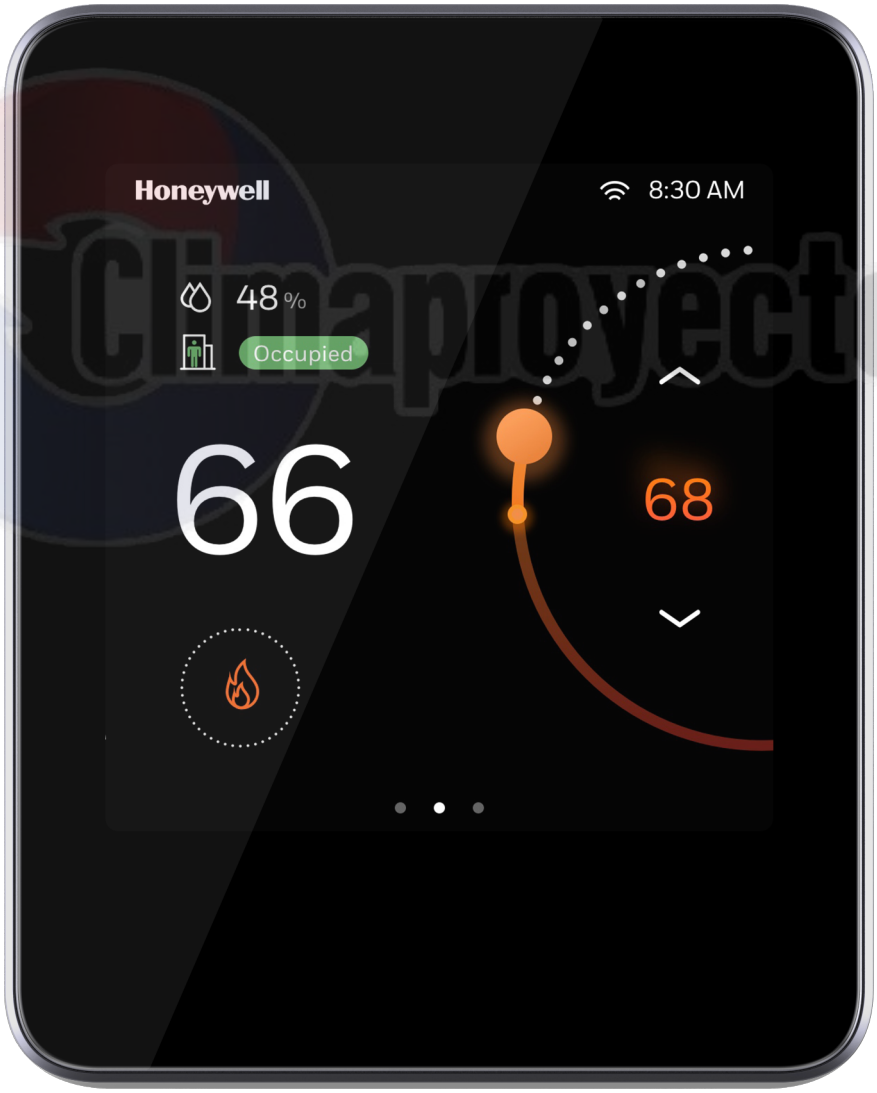
Honeywell | THE FUTURE IS WHAT WE MAKE IT

TC500A Commercial Thermostat

USER GUIDE

OCTOBER 2020



31-00400M-01 | Rev10-20

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Revision History

Document	Date
31-00400M-01	Oct 2020

Notice

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Waste Electrical and Electronic Equipment (WEEE)

WEEE: Waste Electrical and Electronic Equipment Directive	
	• At the end of the product life, dispose of the packaging and product in an appropriate recycling center. • Do not dispose of the device with the usual domestic refuse. • Do not burn the device.

FCC Part 15 compliant

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

Regulation (EC) No 1907/2006

According to Article 33 of Reach Regulation, be informed that the substances listed below may be contained in these products above the threshold level of 0.1% by weight of the listed article.

Product/Part Code	Substance Name	CAS Number
Only TC500A-W / thermostat mainboard CBA, thermostat wall plate board PCBA	Lead	7439-92-1
	Lead oxide	1317-36-8

Important Safety Information and Installation Precautions

Read all instructions

Failure to follow all instructions may result in equipment damage or a hazardous condition. Read all instructions carefully before installing equipment.

When performing any work (installation, mounting, start-up), all manufacturer instructions and in particular the Mounting Instructions (31-00399M-01) are to be observed.

- TC500A Thermostat may be installed and mounted only by authorized and trained personnel.
- It is recommended that devices be kept at room temperature for at least 24 hours before applying power. This is to allow any condensation resulting from low shipping/storage temperatures to evaporate.
- Investigated according to United States Standard UL- 60730-1, and UL60730-2-9.
- Investigated according to Canadian National Standard(s) C22.2, No. 205-M1983 (CNL-listed).
- Do not open TC500A Thermostat, as it contains no user-serviceable parts inside!
- CE declarations according to LVD Directive 2014/35/EU and EMC Directive 2014/30/EU.
- Product standards are EN 60730-1 and EN 60730-2-9.
- TC500A Thermostat is Class B digital apparatus and complies with Canadian ICES-003.

Local codes and practices

Always install equipment in accordance with the National Electric Code and in a manner acceptable to the local authority having jurisdiction.

Electrostatic sensitivity

This product and its components may be susceptible to electrostatic discharge (ESD). Use appropriate ESD grounding techniques while handling the product. When possible, always handle the product by its non-electrical components.

High voltage safety test

Experienced electricians, at first contact, always assume that hazardous voltages may exist in any wiring system. A safety check using a known, reliable voltage measurement or detection device should be made immediately before starting work and when work resumes.

Lightning and high-voltage danger

Most electrical injuries involving low-voltage wiring result from sudden, unexpected high voltages on normally low voltage wiring. Low-voltage wiring can carry hazardous high voltages under unsafe conditions. Never install or connect wiring or equipment during electrical storms. Improperly protected wiring can carry a fatal lightning surge for many miles. All outdoor wiring must be equipped with properly grounded and listed signal circuit protectors, which must be installed in compliance with local, applicable codes. Never install wiring or equipment while standing in water.

Wiring and equipment separations

All wiring and controllers must be installed to minimize the possibility of accidental contact with other potentially hazardous and disruptive power and lighting wiring. Never place 24VAC or communications wiring near other bare power wires, lightning rods, antennas, transformers, or steam or hot water pipes. Never place wire in any conduit, box, channel, duct or other enclosure containing power or lighting circuits of any type. Always provide adequate separation of communications wiring and other electrical wiring according to code. Keep wiring and controllers at least six feet from large inductive loads (power distribution panels, lighting ballasts, motors, etc.). Failure to follow these guidelines can introduce electrical interference and cause the system to operate erratically.

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Safety Information as per EN60730-1

TC500A Thermostat is intended for commercial and residential environments.

TC500A Thermostat is an independently mounted electronic control system with fixed wiring.

TC500A Thermostat is used for the purpose of building HVAC control and is suitable for use only in non-safety controls for installation on or in appliances.

CHAPTER

1 Introduction

About TC500A Thermostat

The TC500A Thermostat is an advanced, configurable, connected device for commercial buildings. It controls and monitors RTU, AHU, Heat Pump equipment, and their configurations. This device communicates over Wi-Fi, Bluetooth, BACnet IP over Wi-Fi, BACnet RS485, Sylk to easily integrates with the building automation system.

The built-in intelligent control algorithms of the device help to achieve the perfect balance between Energy Efficiency and Comfort. The device is packaged with numerous presets suitable for most commercial building requirements that enable the easy and quick initial setup.

The firmware of the device can be upgraded via Wi-Fi network. The device has four universal terminals and a pair of Sylk terminals to connect with sensors or other accessories. It also has a built-in temperature sensor, humidity sensor, and proximity sensor.

Features

- The device can be easily commissioned through the TC500A Connect Mobile application.
- Easily customizable and intuitive UI.
- Supports BACnet system schedule and holiday configuration.
- Multiple, configurable, levels of user privilege access for features such as Reminders, Occupancy set points, Date/Time, Schedules, Calendars of special events, remote and local Manual Override, remote and local Occupancy Override, Choice of language and units, and so on.
- Multiple, configurable, screen lockouts to prevent unauthorized settings changes.
- High level control algorithms such as Auto Changeover, Adaptive Intelligent Recovery, Pre-occupancy Purge, Power up disable time, Freeze protection, and Demand limit controls are supported.
- Settings to switch Fahrenheit to Celsius and vice-versa.
- Auto display sleep to save energy when there is no user action for configured time out.

- A LED indicator to show the operational status of the thermostat when the display goes to sleep mode.
- Real-Time Clock time keeping accuracy with 72 hour retention during power loss.

Intended audience and assumed knowledge

This document provides information about installing and commissioning a TC500A Thermostat. It also shows how to operate the user interface.

It is assumed that the user is trained and familiar with HVAC concepts.

IMPORTANT: Always install equipment in accordance with the National Electric Code and in a manner acceptable to the local authority having jurisdiction (AHJ). No guidelines, instructions, installation practices, or other information presented in this guide may be interpreted to supersede or modify the local codes and practices of the AHJ.

Reference documents

- Commercial Thermostat Datasheet (31-00398M)
- Commercial Thermostat Mounting instructions (31-00399M)
- Commercial Thermostat Quick start guide (31-00401M)

Abbreviation and Nomenclature

Abbreviation	Definition
AHU	Air Handling Unit
RTU	Roof Top Unit
VAC	Volts AC (Alternating Current)
VDC/ DC	Volts DC (Direct Current)
OTW	Over-The-Wire
ETA	Serial Communication protocol
BMS	Building Management System

Conventions

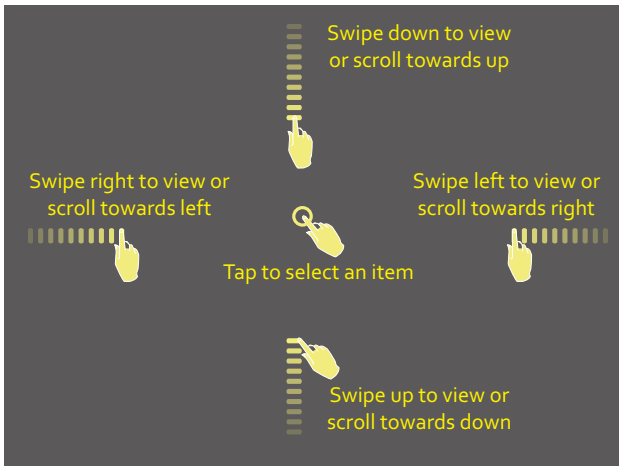
The TC500A Commercial Connected Thermostat uses a 4 inch, 480x480 pixel LCD screen for easy navigation and setup. User can select from various options available on the screen by lightly tapping the option on the screen or scrolling through the list.

The conventions for hand gestures used to navigate through the pages on the TC500A Thermostat display are:

- Tap: Quickly touch and release to select a control or item; equivalent to a mouse-click.

- Swipe: Quickly slide one or more fingers across the screen to reveal controls or to scroll through lists or groups of items; equivalent to scroll.

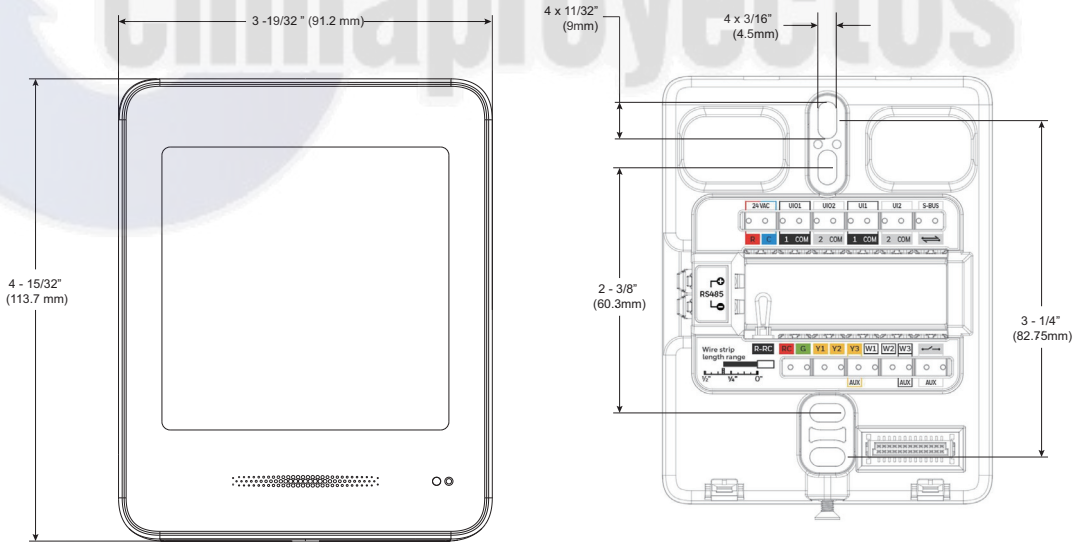
Figure 1 Hand Gestures Convention



- A green tick appears before the valid selection
- If the option selected or the text entered is valid, the option to move to the subsequent screen turns blue. Tapping the option in blue will toggle to next screen.

Dimensions

Figure 2 Dimensions



Technical Specifications

Power Characteristics

Table 1 Power Characteristics

Power Supply	Rated voltage: 24VAC 50/60Hz, Working voltage range: 20-30VAC, UL listed class-2 transformer or IEC 61558 listed transformer.
Power Consumption (Display ON)	Max. 8.5VA @ 24VAC (355mA @ 24VAC)
Min. Load	8VA (all BOs OFF)
Max. Load	96VA (all BOs ON)

Display

Table 2 Display

Display Type	24 BPP TFT display with CTP
Resolutions	480x480 pixel
Active Display Area	4” diagonally
Backlight	LCD (Dimmable)

Operating Environment

Table 3 Operating Environment

Ambient Operating Temperature	32 to 122 °F (0 to +50°C)
Ambient Operating Humidity	10 to 90% relative humidity (non-condensing)
Storage Temperature	-40 to 150 °F(-40 to 65.5°C)
Protection Class	IP20

Compliances

Table 4 Compliances

Certificates	CE, FCC, ICES, UL/cUL, RoHs, REACH, Title 24, BTL, ASHRAE, LEED, and Prop65.
Standards	EN 60730-1, EN 60730-2-9, EN 301489-1, EN 301489-17, EN 300328, EN 301893, EN 62479, UL60730-1, UL60730-2-9, Title 47 part 15 subpart B, Title 47 part 15 subpart C, RSS 210, ICES-003

IO Characteristics

Table 5 IO Characteristics

UIO x 2	Resistive Input For 10K NTC type II, C7021 series For 10K NTC type III,C7023 series For 20K NTC, TR21 and C7041 series. ±0.5°C (±1°F) at 10 – 32°C (50 – 90°F) ±1.1°C (±2°F) at -1.1 – 50°C (30 – 122°F) Voltage Input, SELV 0-10V, ±5% of full scale Digital Input Dry contact closure Open circuit (≥ 100Kohms) Closed circuit (≤100ohms) Voltage Output 0-10V, ±3% of full scale @2K ohms
UI x 2	Resistive Input for 10K NTC type II, C7021 series for 10K NTC type III,C7023 series for 20K NTC, TR21 and C7041 series ±0.5°C (±1°F) at 10 – 32°C (50 – 90°F) ±1.1°C (±2°F) at -1.1 – 50°C (30 – 122°F) Voltage Input, SELV 0-10V, ±5% of full scale Digital Input Dry contact closure Open circuit (≥ 100Kohms) Closed circuit (≤100ohms)
DO (G, Y1,Y2,Y3,W1,W2,W3)	Relay Output 1 Amps Max. at 24VAC
DO (AUX)	Relay Dry Contact 1 Amps Max. at 24VAC/DC

Communication Baud Rates

Table 6 Communication Baud Rates

BACnet IP	Over Wi-Fi
Wi-Fi	802.11 b/g/n
Bluetooth	BLE 4.2 with 1 Mbps Classic Bluetooth with max. 3 Mbps

Electrical Characteristics

Table 7 Electrical Characteristics

Rated Impulse Voltage	500 V
Construction of Control	Independently Mounted Control
Operation Method	Type 1 Action
Pollution Degree	2
Purpose of Control	Operating Control

Supported Sensors and Devices

- Indoor/Outdoor Air Temp Sensor
- Discharge sensor/Supply air sensor
- CO2 sensor
- Mixed air sensor
- Occupancy sensor
- Dirty filter
- Proof of airflow
- Proof of waterflow
- Sylk Sensor Bus devices (TR40 series and C7400S)
- Up to four TR40 series room sensors
- Up to four C7400S duct sensors

Thermostat Part Number

TC500A-N	Thermostat with North American Wi-Fi conformance
TC500A-W	Thermostat with outside of North American Wi-Fi conformance

Security requirement

System Environmental Considerations

A firewall is required to isolate the Thermostat. Unprotected Internet connections can expose and damage the thermostat system and facility components to cyber-attacks from third parties. This may cause the thermostat to malfunction and can also be misused for illegal purposes for which the operator may then be held liable.

Deployments and Maintenance Considerations

- Always keep local server up to date on the latest security patches via regular system update. This applies not only to workstations or servers running on Windows, Linux, Mac or any devices that runs as part of information infrastructure or operations workstation.
- Always keep the thermostat firmware with the latest released firmware to have maximum protection by built-in security features.
- Do not use default passwords for any devices (if exists). This includes, but not limited, to all server workstations, storage servers, firewall devices, routers, and mobile devices.
- Do not use weak passwords for server administrators or operators. Different user role (for example administrator, user, guest, etc.) shall have different password, and user should not share common passwords.
- It is recommended to change password in every 3 months.
- In case of wireless communication, malicious wireless devices can easily scan the wireless channel and inject malicious packets or mass data flow to perform Deny-of-Service attacks. Honeywell has taken steps to prevent TC500A Commercial Thermostat device from being injected, but the mass data flow will result in loss of wireless communication bandwidth within the whole system. Regular check of the communication failure rate or response rate of the thermostat is helpful to discover and isolate devices being attacked and stop the physical attacks in daily operation

Network Communication Notice

- To keep maximum integration compatibility with third — party devices and Fast-pack communications are un-encrypted as open protocol. Improper security protection may lead to data leakage, spoofing and/or tampered by malicious devices and denial-of-service attacks.
- To keep maximum integration compatibility with legacy devices, in-room wired devices are less secure from data confidentiality and authentication thus not-recommended for new design. It is always highly recommended to use deep mesh wireless network communication to gain maximum protection and latest updates.
- In case of Deny-of-Service attacks, all communication channels will inevitably have loss of bandwidth due to malicious data flow.
- The RS 485, S5 bus may contain legacy technology, which is less secure under modern cyber-security attacks. Honeywell strongly recommends to use a secured deep mesh wireless network communication. In case of legacy technology, user needs to be aware of the risk of being tampered or attacked. To reduce the attack surface, user is advised to physically secure the wired communication signals or provide necessary shield on wires, or place necessary access control on accessing such communication wires.

CHAPTER

2 Getting started

This chapter describes TC500A Thermostat display and icon overview. For mounting the TC500A Thermostat, refer TC500A Thermostat Mounting instructions (31-00399M).

TC500A Thermostat at a glance

Thermostat Display Overview

The images below illustrates the typical screen of TC500A Thermostat screens. The 4 inch LCD screen on the thermostat is touch sensitive and shows status of the thermostat.

Presence detection

TC500A Thermostat has a built-in proximity sensor. It detects presence of a user up to 1.5 meters, and “wakes” the screen to prepare for user interaction.

Home Page (Main Screen): Temperature reading and adjustment

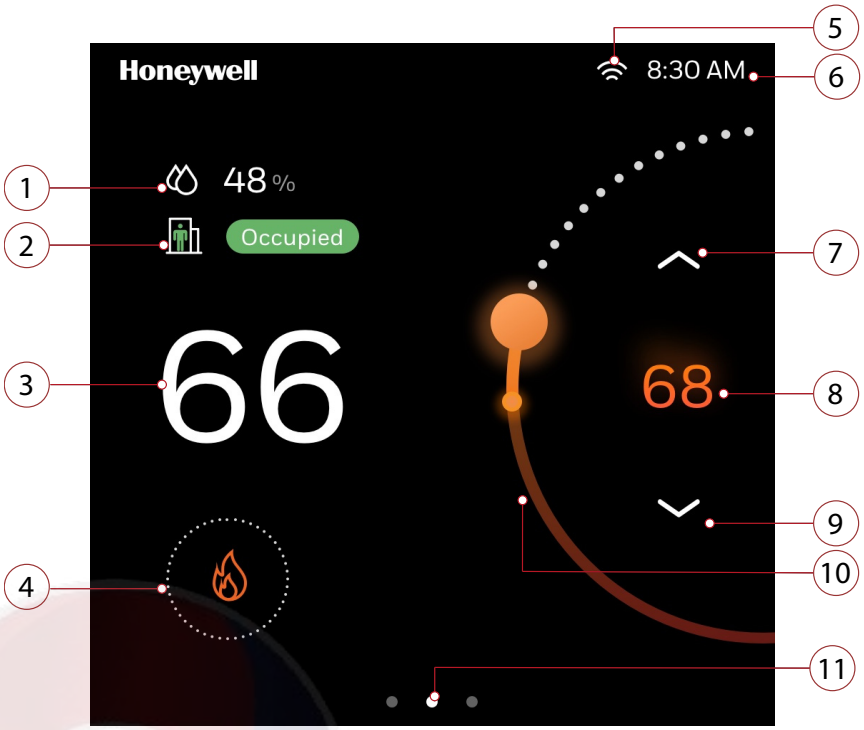


Table 8 Home Page (main screen) overview

Serial Number	Description
1	**Indoor Humidity:** Displays the current indoor humidity
2	**Current Priority:** Tap to toggle between occupied or unoccupied mode
3	**Indoor Temperature:** Displays the current indoor temperature.
4	**Mode Display:** Orange flame for heat mode, blue snowflake for cool mode.
5	Wi-Fi signal strength
6	Time
7	**Adjust temperature:** Touch the up arrow to increase the desired temperature.
8	**Desired temperature:** Displays the desired temperature.
9	**Adjust temperature:** Touch the down arrow to decrease the desired temperature.
10	**Temperature Slider**: Use finger to move the slider to set the desired temperature.
11	**Page Slider:** Use finger to slide to left or right to display more options.

Home Page (Right Screen): Quick access and device management

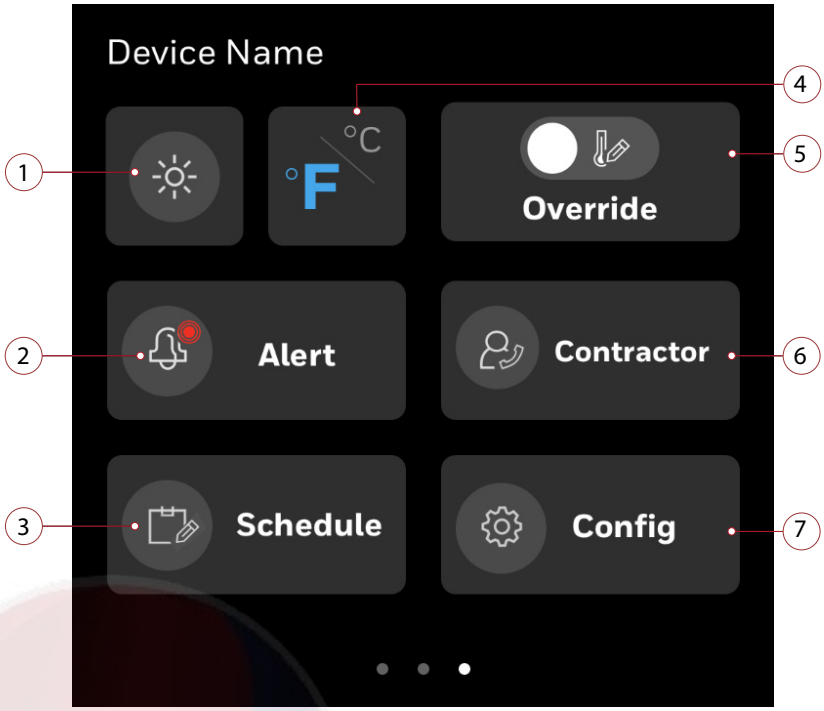
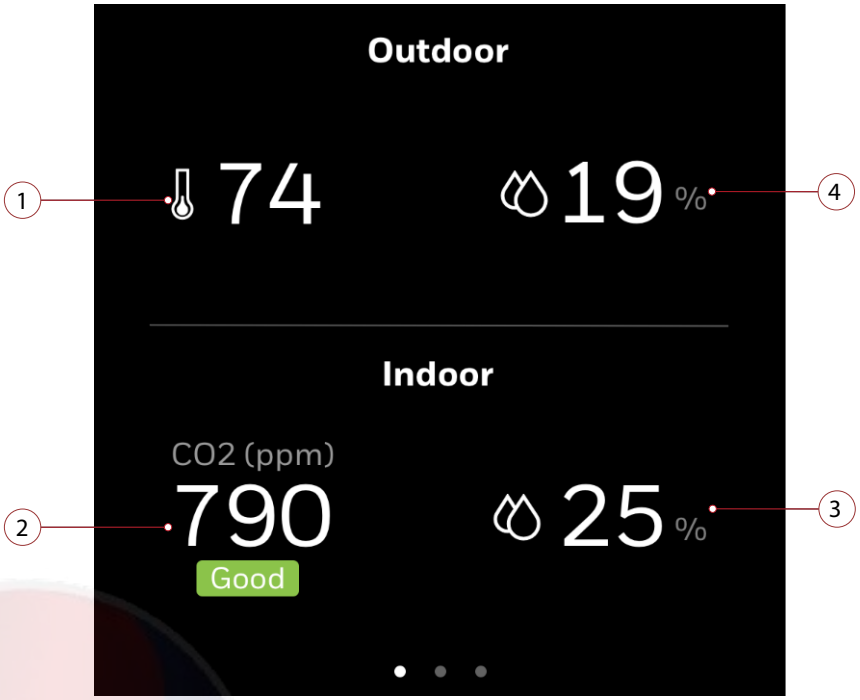


Table 9 Home Page (right screen) overview

Serial Number	Description
1	**Brightness**: Tap to increase or decrease the brightness of display
2	**Alerts:** Tap to view active alarms and reminders.
3	**Schedule**: Tap to set the schedules.
4	**Temperature Units**: Tap to toggle between Fahrenheit or Celsius
5	**Override:** Tap to override unoccupied or standby modes to allow setpoint adjustments
6	**Contractor information**: Tap to view contractor information.
7	**Config**: Tap to configure the thermostat.

Home Page (Left Screen): Weather and sensor reading



Note: *Home page (Left Screen) varies according to the sensor connected to the thermostat.*

Home screen icon overview

Table 10 Home screen icon overview

Icon	Description
	High severity alert
	Medium severity alert
	Low severity alert
	Auto mode
	Emergency heat mode
	Heating mode
	Cooling mode
	Occupied mode
	Standby mode
	Unoccupied mode
	Wi-Fi signal strength

Smart LED indication

Table 11 Smart LED indication

Display	Stages	LED, screen status and Description
		Interact with touchscreen • Screen ON • LED Lighting OFF
	Heating	The orange light pulses when in heating and auto mode • Screen OFF • LED Lighting ON (Light stops pulsing when indoor temperature reaches the set point)
	Cooling	The blue light pulsing when in cooling and auto mode • Screen OFF • LED Lighting ON (Lighting stops pulsing when indoor temperature reaches the set point)
	Off	• Screen OFF • LED lighting OFF

CHAPTER

3 Initial Configuration

Prerequisites

Before going through initial guided setup sequences, ensure the TC500A is installed and wired up according to the TC500A installation and mounting guide.

After installing the thermostat and powering it up, user will be guided through the first-run process. Complete these steps to configure the thermostat and connect Online. The Setup Assistant guide you through the process including:

- Setting a display language
- Specifying a name to the thermostat
- Selecting temperature measurement units
- Selecting an equipment type and setting up the details
- Setting an administrator password
- Setting up a network connection and choosing the network connection type

WARNINGS

- To reduce the risk of electrical shock do not open the thermostat. There are no user serviceable parts inside. Refer servicing to a qualified service personnel only.
- Cleaning — Use a dry cloth to clean the product. Do not use liquid cleaners or aerosol cleaners
- Water and moisture — Do not use the product near water. Do not install the product in a place where water may splash onto it.
- Do not operate the thermostat with a hard, sharp or pointed object such as a fingernail, pen.
- The screen used of the thermostat is made of glass. Therefore, it can break when the product is dropped or heavy impact is applied. Be careful not to be injured by broken glass pieces in case the screen breaks.

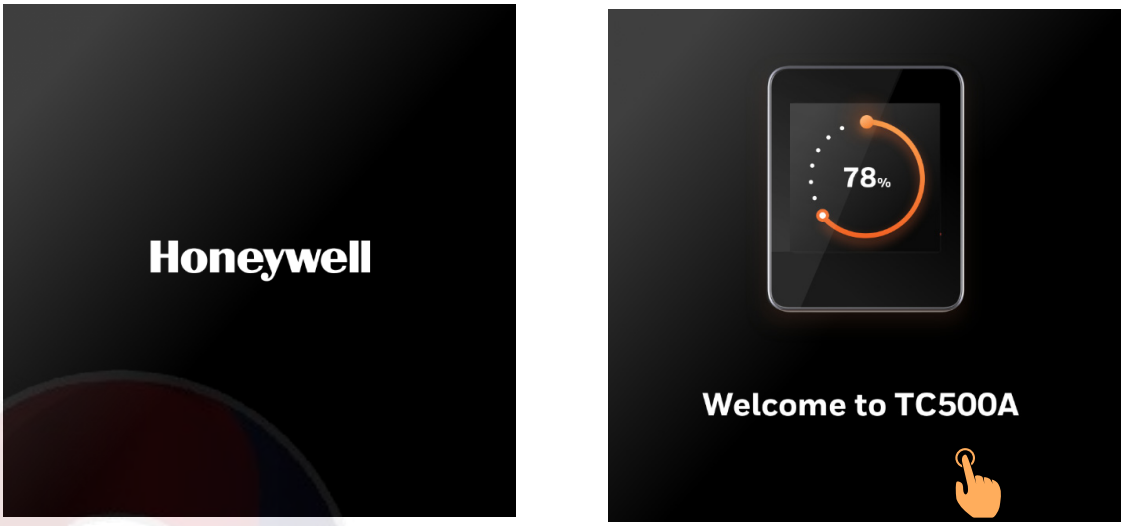
Step 1. Selecting a language

To select language:

Upon first power-up, Honeywell logo, followed by welcome screen appears on the display.

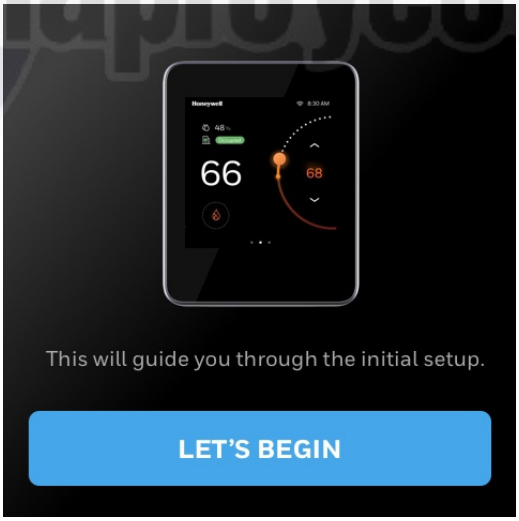
1. Tap anywhere on the screen.
   Welcome screen appears.

Figure 3 Welcome screens



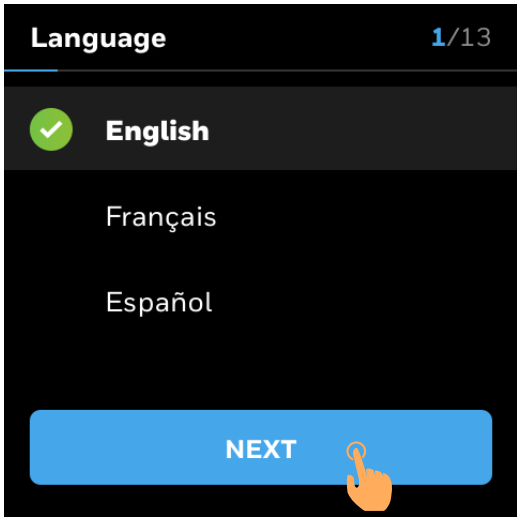
2. Tap **LET's BEGIN** screen to start the configuration.

Figure 4 Welcome screen



3. User will be prompted to select default language. Tap on the desired language

Figure 5 Choosing Language



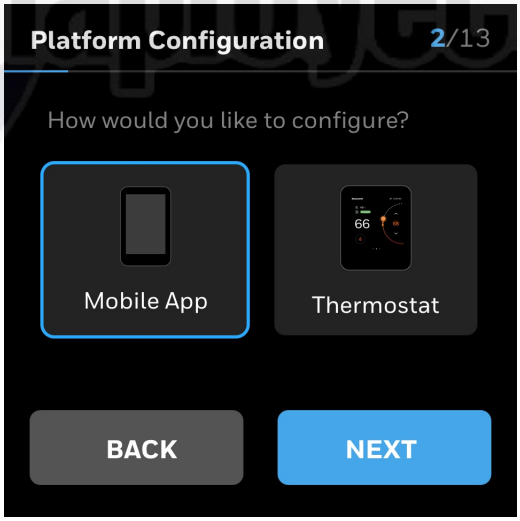
4. Tap **Next**
   Platform Configuration screen appears.

Step 2. Choosing a configuration platform

The TC500A can be configured via mobile application or through the thermostat screen.

The user can select one of the options to initiate the configuration.

Figure 6 Platform Configuration

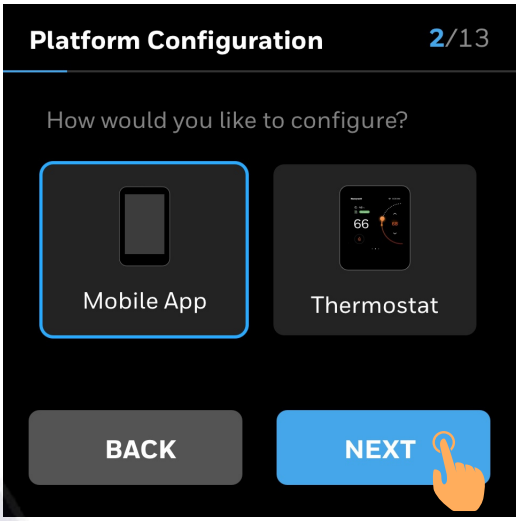


Configuration through App

To configure the thermostat via app:

1. On the **Platform Configuration** screen tap **App**
2. Tap **NEXT**
   A QR code displays on the thermostat screen

Figure 7 Platform configuration (app)



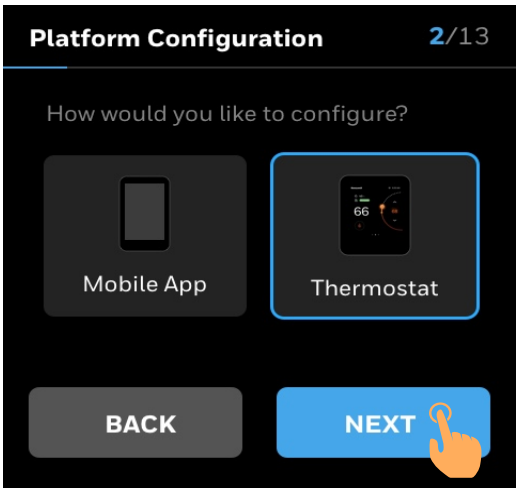
3. Scan the QR code by aligning QR code on Honeywell app within the frame.
4. The thermostat will be connected to the application.

Step 3. Configuration through thermostat touchscreen display

To configure the thermostat via on screen display:

1. On the platform configuration screen tap **Thermostat**
2. Tap **NEXT**
   Device Name screen appears.

Figure 8 Platform configuration (Thermostat)



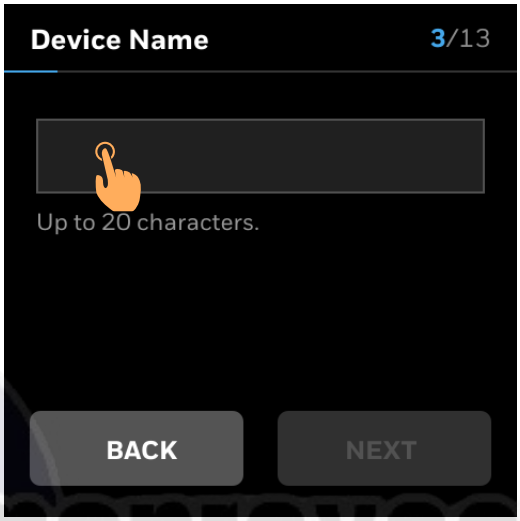
Naming a Device

User can assign a unique name to a thermostat specifying a name to the location where the thermostat is installed. It assist user to easily identify the device during remote operation of the thermostat.

To name a thermostat

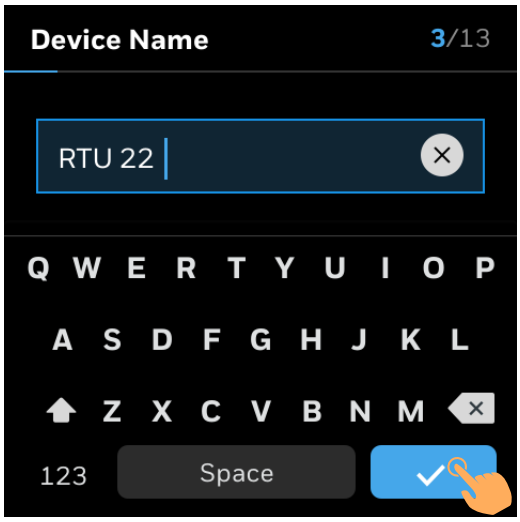
1. Tap on the text field
   A keyboard will be displayed on screen to enter the device name.

Figure 9 Device name



2. Enter the device name
Naming Rules:
   - Device name should not be more than 20 character.
3. After entering a valid device name tap **NEXT**.
   The device name will be saved.

Figure 10 Saving device name



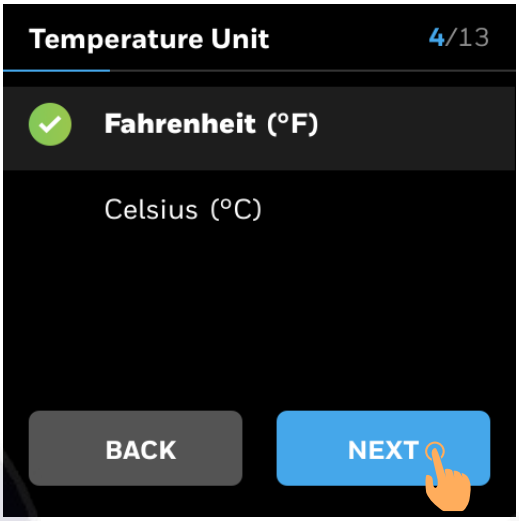
Selecting temperature unit

After saving the device name user will be prompted to set up default temperature units.

To select the temperature unit

1. Select the temperature unit, °F or °C.
2. Tap **Next**

Figure 11 Selecting Temperature Unit



After selecting the temperature unit, user will be prompted to select the type of equipment.

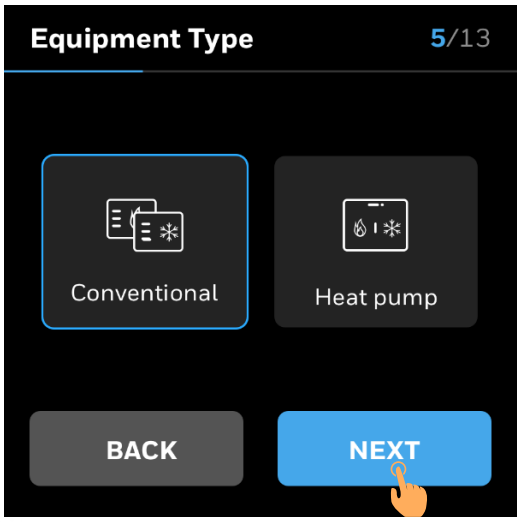
The TC500A is designed to control Heat Pump or Conventional HVAC heating and cooling applications. It can control up to three stages of heating and three stages of cooling in conventional systems and up to two compressors and two stages of auxiliary heat in heat pump systems.

Setting up the Conventional or Heat Pump equipments

Setting up conventional type of equipment

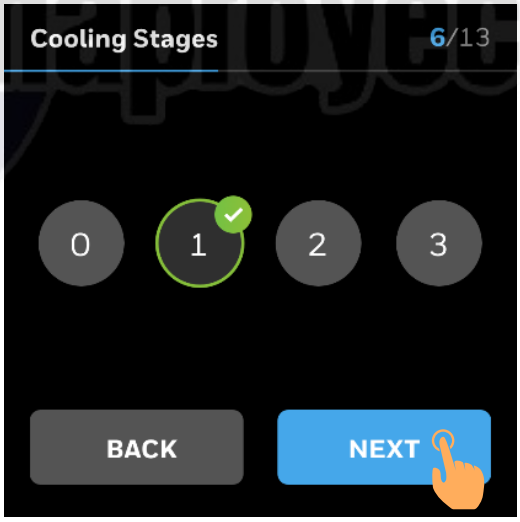
1. Tap **Conventional**.

Figure 12 Select Conventional type of equipment



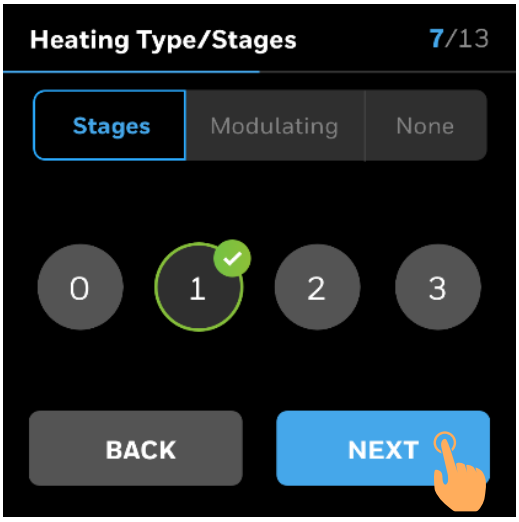
2. Select the number of **Cooling stages.**
   Tap corresponding number to select number of stages.

Figure 13 Select number of colling stages



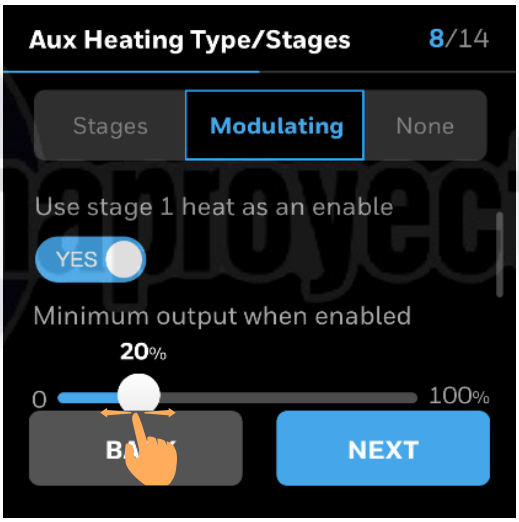
3. Tap **NEXT**
   User will be prompted to select the **Heating Type/Stages**
4. Tap corresponding number to select number of stages.
   To set up modulating heating type, tap on Modulating toggle.

Figure 14 Select heating stage



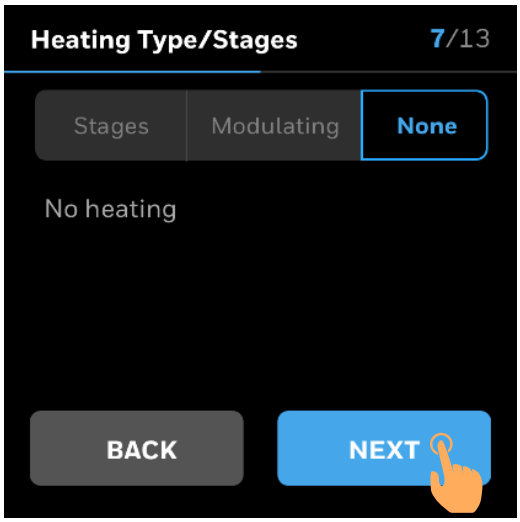
5. Use the toggle to enable the heat stages.
6. Swipe the slider to select the desired percentage of output.

Figure 15 Select modulated heating



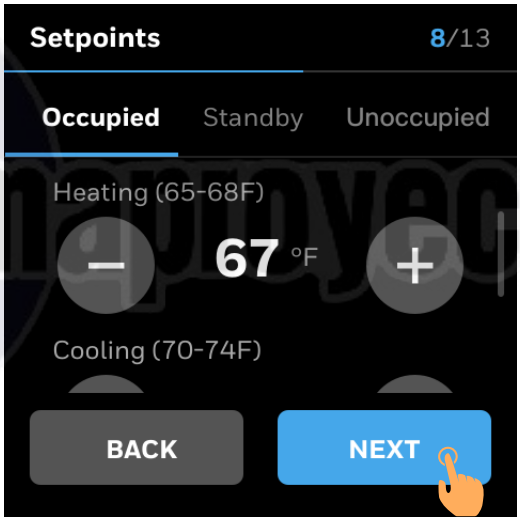
7. Tap **None** and tap **NEXT** in case no heating is required.

Figure 16 No heatingt



8. Using **+/-** set the desired **Setpoints** for **Occupied, Standby** and **Unoccupied modes.**

Figure 17 define the setpoints

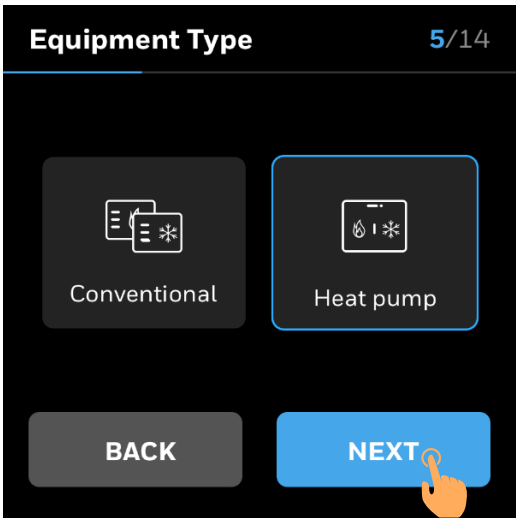


9. Click **NEXT**

Setting up Heat Pump

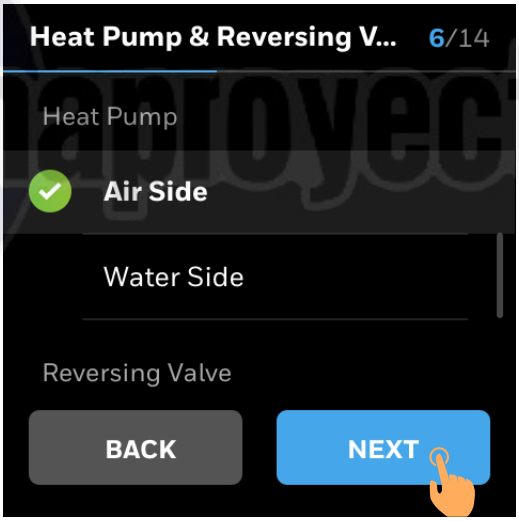
1. Tap **Heat Pump**.

Figure 18 Select Heat pumpt



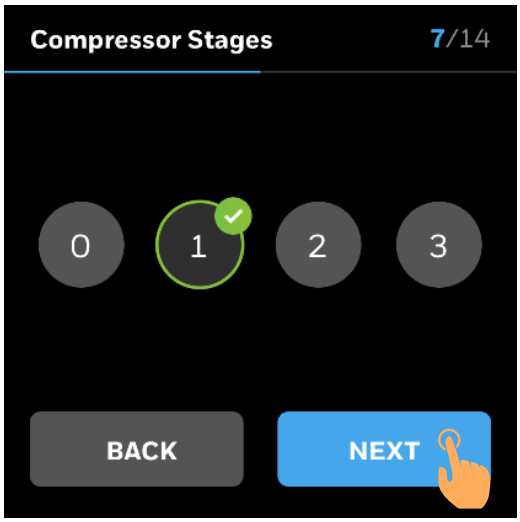
2. Select the type of **Heat Pump** and **Reversing Valve**

Figure 19 Select Type of Heat Pump and Reversing Valve



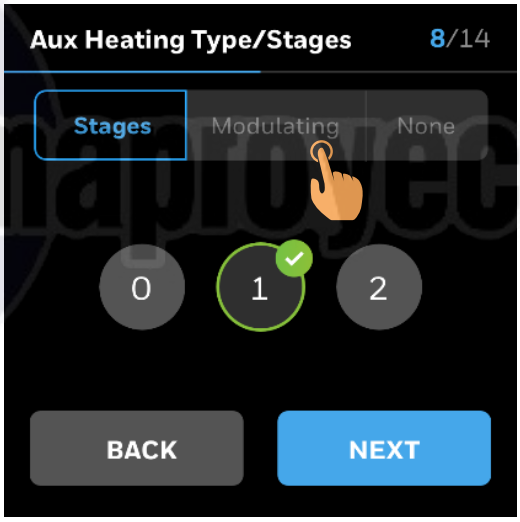
3. Select the number of **Compressor stages.**
   Tap corresponding number to select number of stages.

Figure 20 Select number of compressor stages



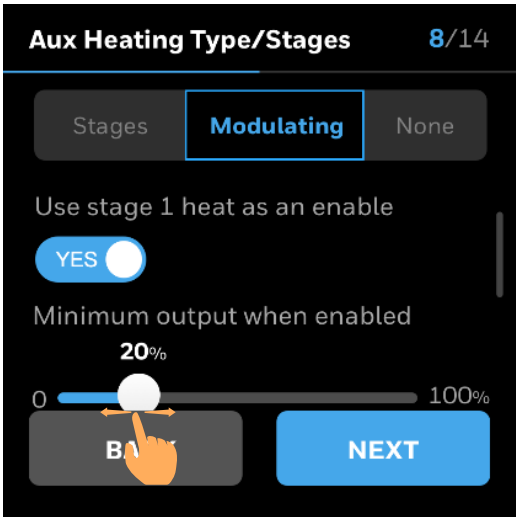
4. Tap **NEXT**
   User will be prompted to select the **Aux Heating Type/Stages**
5. Tap corresponding number to select number of stages.
   To set up modulating heating , tap on Modulating toggle.

Figure 21 Select modulating Aux heating type



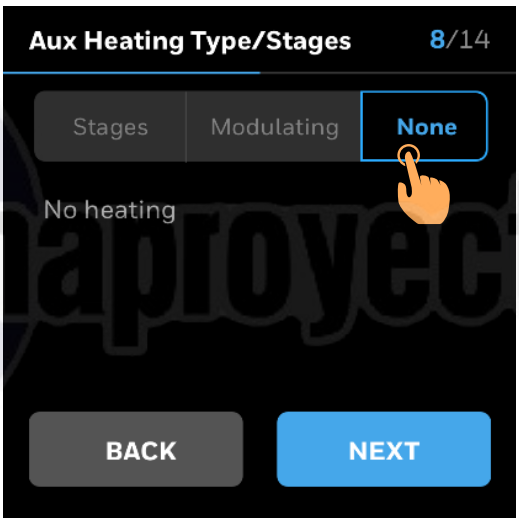
6. Use the toggle to enable the stage 1 heat.
7. Swipe the slider to select the desired percentage of output.

Figure 22 Enable stage 1 heat



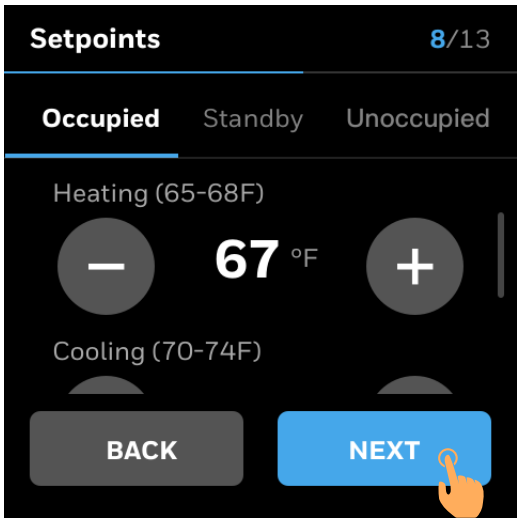
8. Tap **None** and tap **NEXT** in case no heating is required.

Figure 23 No heating



9. Using **+/-** set the desired **Setpoints** for **Occupied, Standby** and **Unoccupied modes.**

Figure 24 define the Setpoints



10.Click **NEXT**

Step 4. Setting Installer Pin

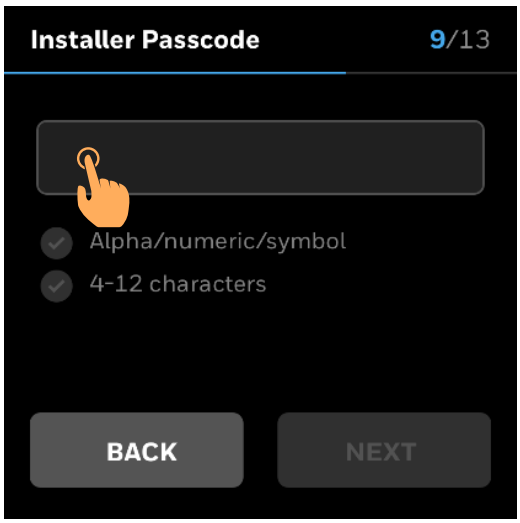
After selecting the equipment type, to prevent unauthorized changes user will be prompted to enter installer pin.
Password rules:

- Password should be alphanumeric.
- It should be between 4 to 12 characters

To set up a installer pin

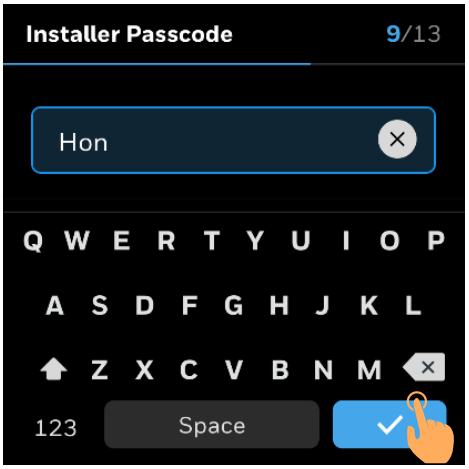
1. Tap on the text field
   A keyboard will be displayed on screen to enter the device name.

Figure 25 Setting Installer Pin



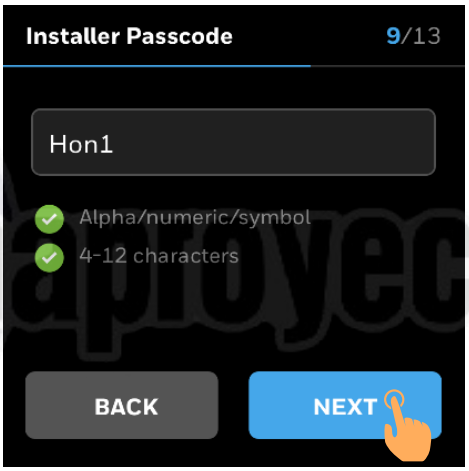
2. Enter the **Installer Pin** and tap  .

Figure 26 Entering Installer Pin



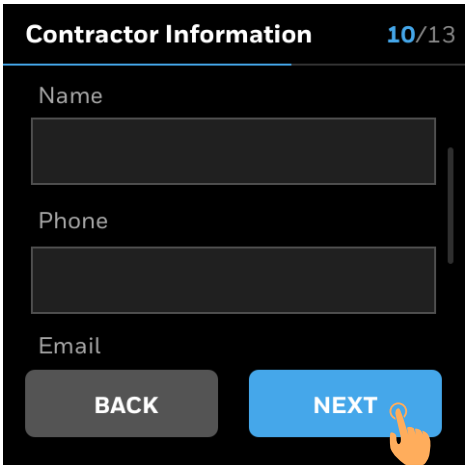
3. Enter a valid **Installer PIN** and tap **NEXT**.

Figure 27 Valid Password



4. Fill the **Contractor Information.**

Figure 28 Contractor Information



5. Tap **NEXT**

Step 5. Connecting a thermostat

The TC500A integrates into a supervisory controller using following communication protocols.

- Wi-Fi

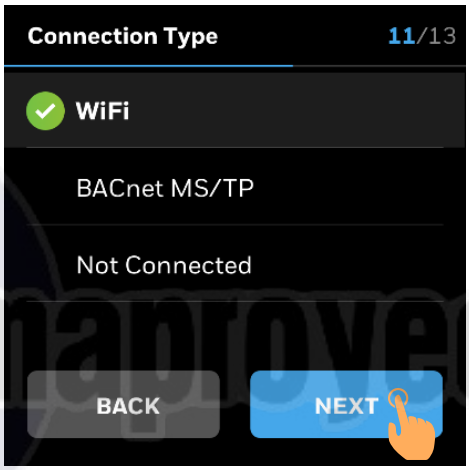
Thermostat connection using Wi-Fi

Connecting to a WLAN network allows you to connect to the cloud server and control your thermostat from a smartphone. during initial setup user will be prompted to select how to set the thermostat to connect to the Internet. The TC500A Thermostat can be connected to the Internet using Local router, Honeywell Gateway or BACnet IP.

In order to connect to Wi-Fi

1. Select **Wi-Fi**

Figure 29 Select Wi-Fi



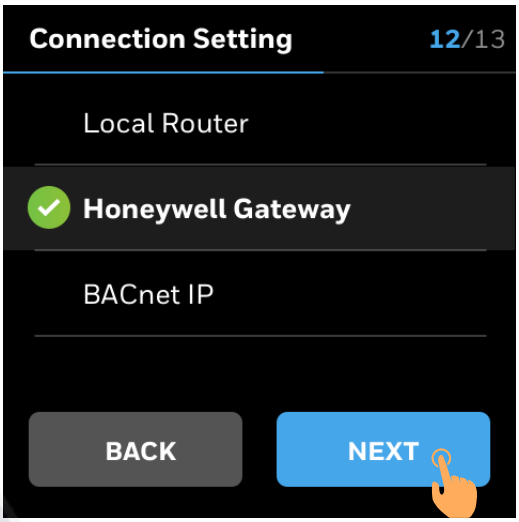
2. Tap **NEXT**
3. User will be prompted to select a type of connection

Thermostat connection using Honeywell Gateway

In order to connect through Honeywell Gateway

1. Tap **Honeywell Gateway**

Figure 30

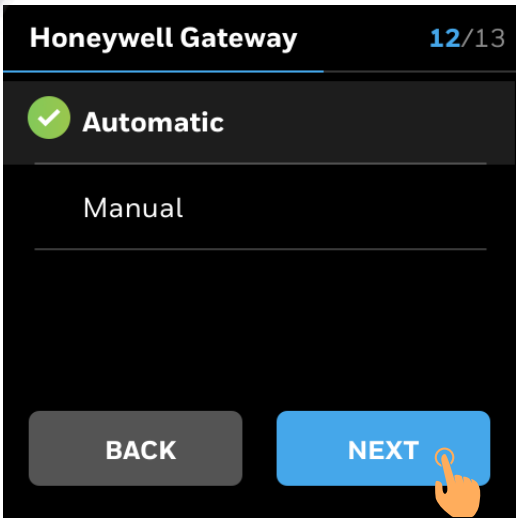


2. User will be prompted to choose between **Automatic** or **Manual** connection.

Automatic Settings

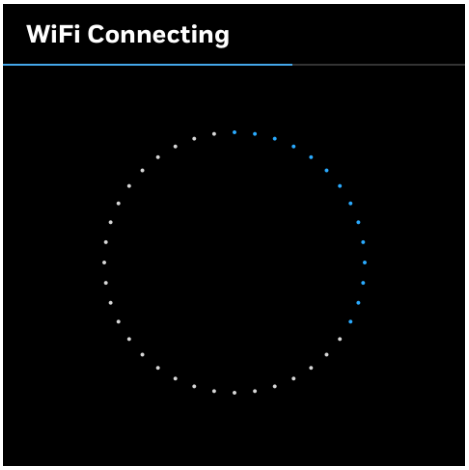
1. Tap **Automatic**

Figure 31 Automatic connection



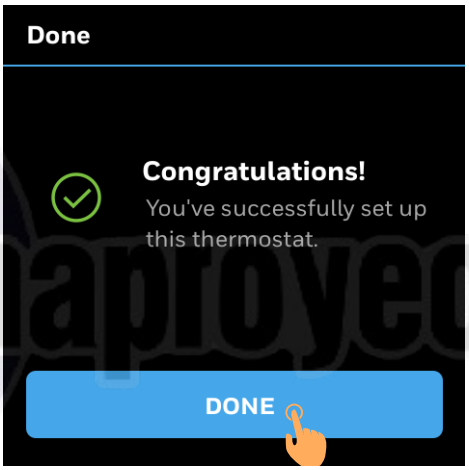
2. The thermostat automatically start connecting.

Figure 32 Connection in progress



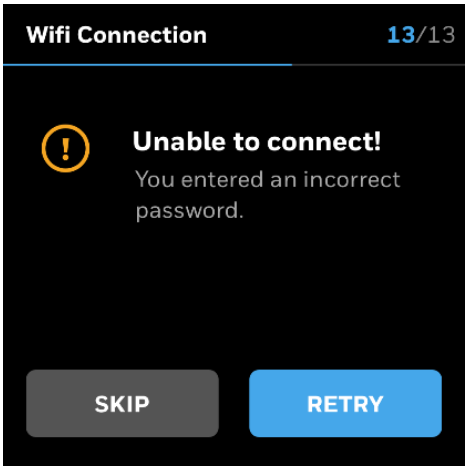
3. If the connection is successful, Click **DONE**

Figure 33 Successful connection



4. If the connection is unsuccessful user can **RETRY or SKIP** setting Wi-Fi connection.

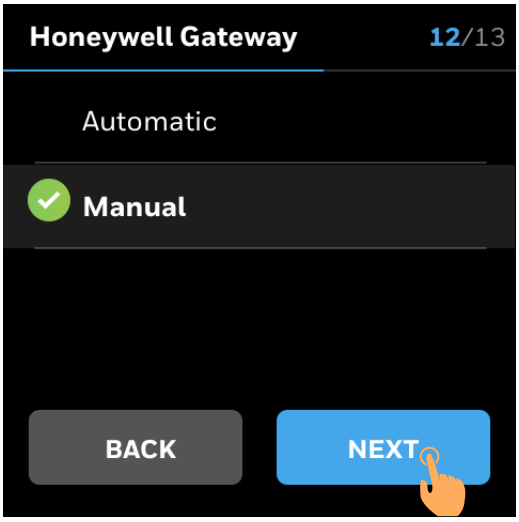
Figure 34 Unsuccessful Wi-Fi connection .



Manual Settings

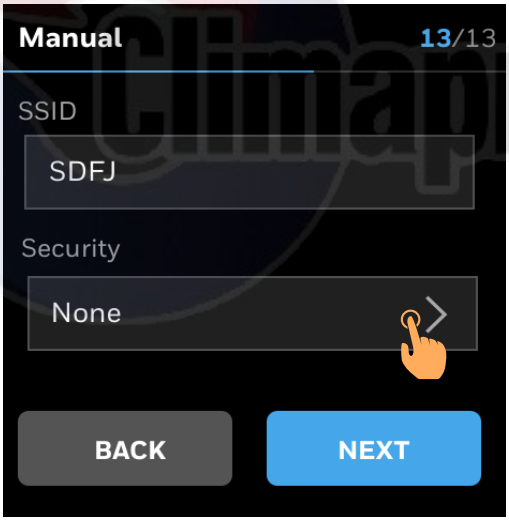
1. Tap **Manual** and tap **NEXT**

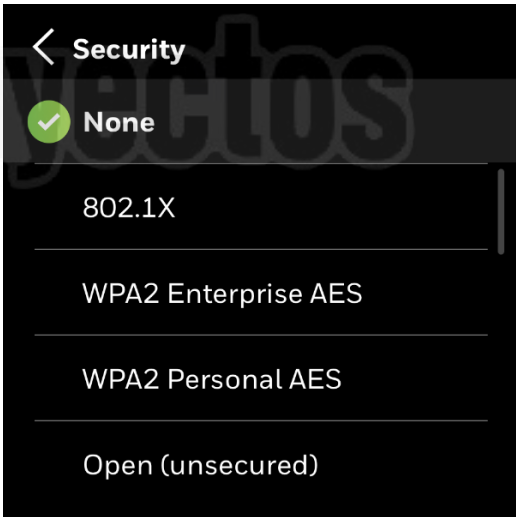
Figure 35 Manual connection



2. User will be prompted to enter **SSID** and choose **Security**.
3. Select the type of security and tap  .

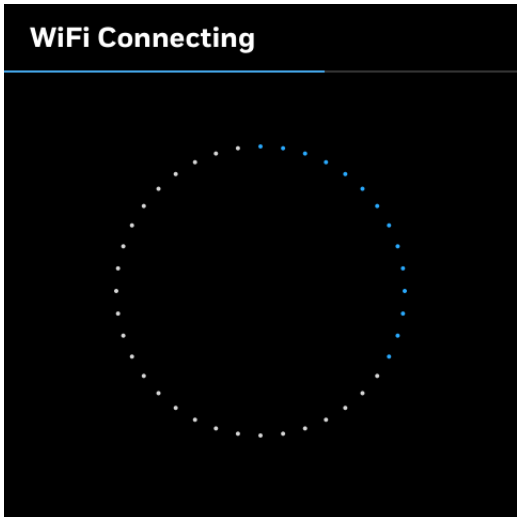
Figure 36 Selecting SSID and Security





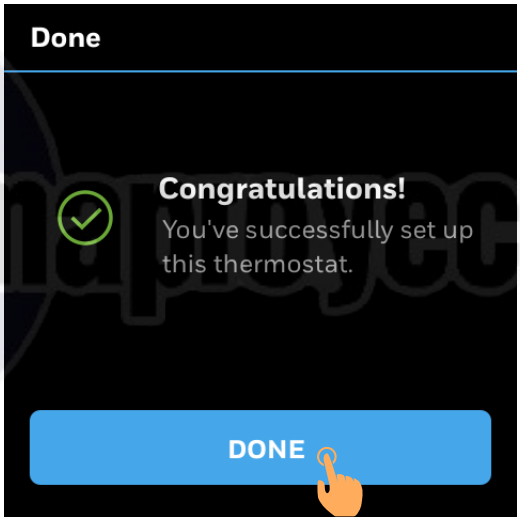
4. The thermostat automatically start connecting.

Figure 37 Connection in progress



5. If the connection is successful, Click **DONE**

Figure 38 Successful connection



6. If the connection is unsuccessful user can **RETRY or SKIP** setting Wi-Fi connection.

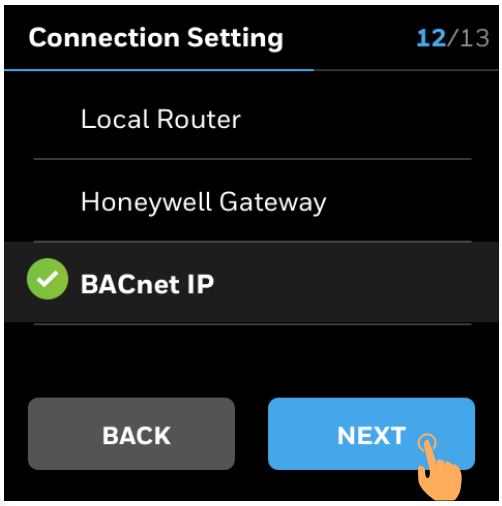
Connecting through BACnet IP over Wi-Fi

The TC500A is BACnet/IP connected using a wireless connection to a Wi-Fi router/ access point.

In order to connect through BACnet IP over Wi-Fi

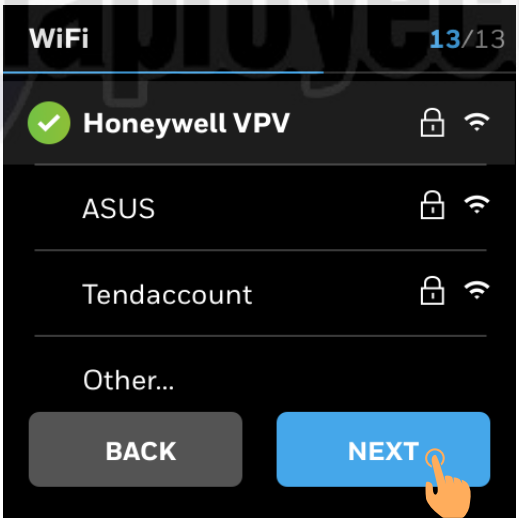
1. Tap BACnet IP

Figure 39 Select BACnet IP



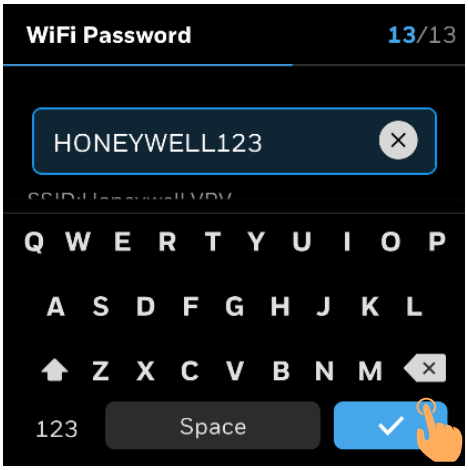
2. User will be prompted to select from available networks.

Figure 40 Choose a network



3. Select the network, enter password and tap  .

Figure 41 Enter Password

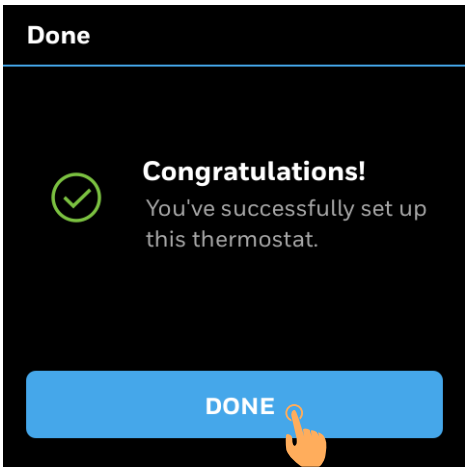


4. The thermostat automatically start connecting.

Figure 42 Connection in progress

5. If the connection is successful, Click **DONE**

Figure 43 Successful connection



6. If the connection is unsuccessful user can **RETRY or SKIP** setting Wi-Fi connection.

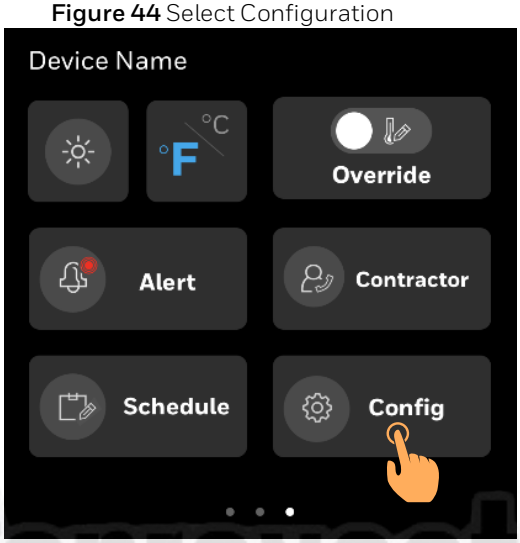
Basic Configuration

The TC500A allows user to change or modify the configuration setting after guided setup.

To configure the basic settings of thermostat

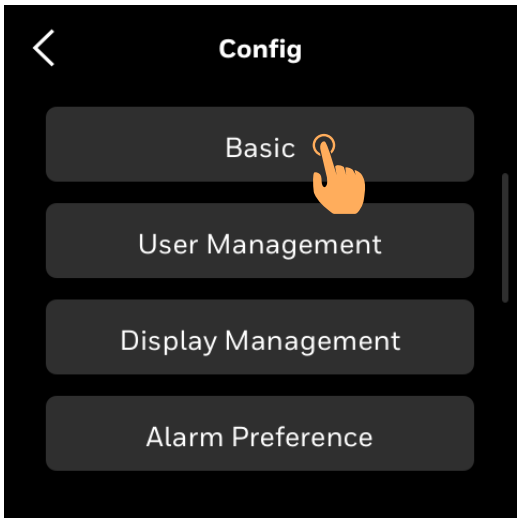
1. On the Home page, tap the **Config** icon.
   The Config main page appears with all types of configuration options available in the thermostat.

Figure 44 Select Configuration



2. Tap **Basic.**
   Basic Configuration page appears.

Figure 45 Basic Configuration



3. Tap **General** or **Equipment** to modify the configuration.
4. Tap the option to modify from the list.
   For step by step setup refer guided initial setup..

Basic configuration - General

User can modify following configuration using General tab in Basic configuration. Swipe up or down to view additional options on the screen.

For step by step setup refer the initial setup.

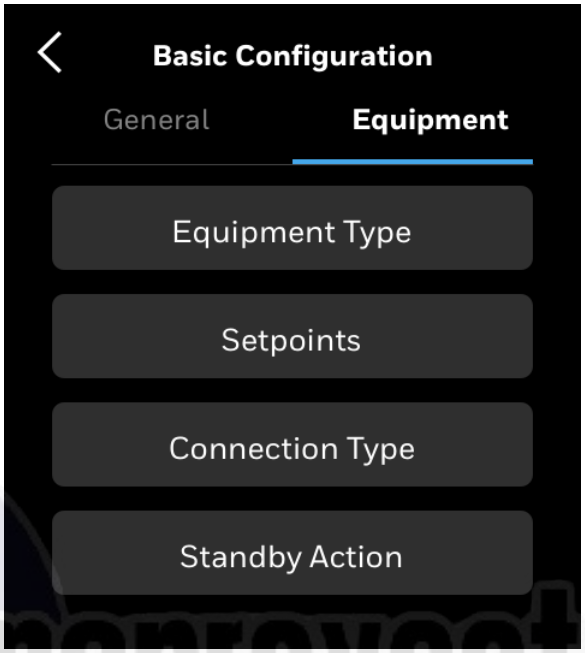
Figure 46 Basic Configuration - General

Basic configuration - Equipment

User can modify following configuration using Equipment tab in Basic configuration.

For step by step setup refer the initial setup.

Figure 47 Basic Configuration - Equipment



CHAPTER

4 User Management

User Roles

The TC500A supports four kinds of user identities. Here's an overview of the identity types and permissions available for various roles.

1. **Visitor**: The visitor has access to read only the components associated with visitor. The visitor can view room temperature, desired temperature, humidity and mode.

Note: *If permitted, visitor will be able to regulate the desired temperature.*

2. **Basic User**: The Basic User has access to read and write to components associated to basic control such as Setpoint changes, screen brightness, as configured in the User Management set up section. This type of user role is applicable for user requiring limited control of thermostat such as store clerks, receptionist.
3. **Advanced User**: Group Owner has access to read and write all components related to advance control. The advanced user will be able to perform system overrides, schedule changes or modify the basic configuration. This type of user role is applicable for user requiring more control of thermostat such as store manager, business owner.
4. **Installer:** This is an Admin User who has access to read and write all components in application. Through this role, user can control all elements of the thermostat.

Table 12 User roles and permissions

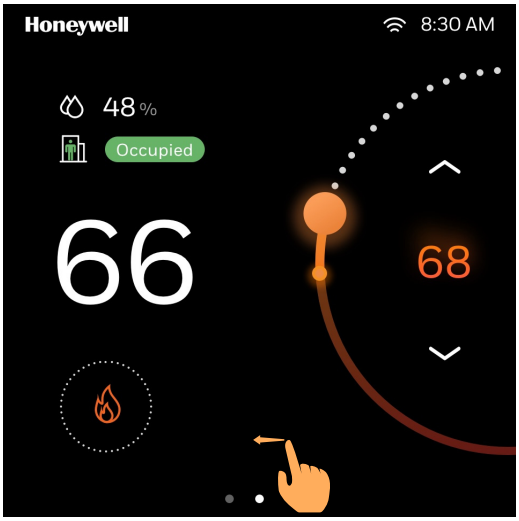
	Visitor	Basic User	Advance User	Installer
System Modes		X	X	X
Overrides		X	X	X
View Alerts		X	X	X
Temperature Units		X	X	X
Contractor Information		X	X	X
Brightness		X	X	X
Schedule Changes			X	X
Basic Configuration			X	X
System Status			X	X
Advanced Configuration				X

Configuring the user roles

To manage the type of users and permission follow the steps below.

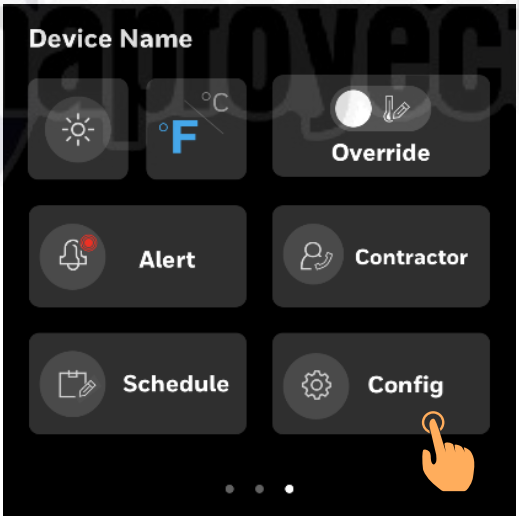
1. On the home screen swipe right to view Quick access and device management home-screen.

Figure 48 Navigate to Quick access and device management.



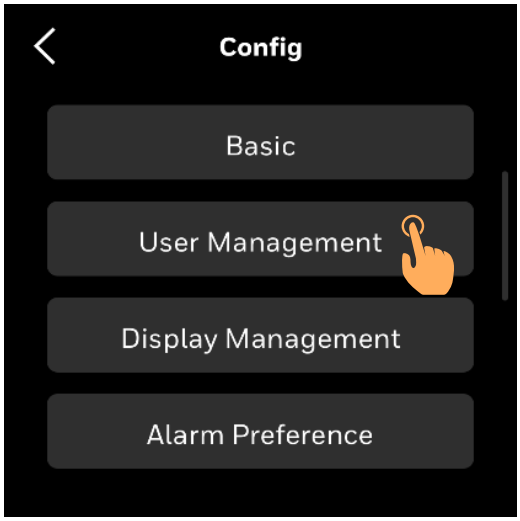
2. Tap **Config.**
   Config management page will appear.

Figure 49 Quick access and device management



3. Tap **User Management**

Figure 50 Configuration Page

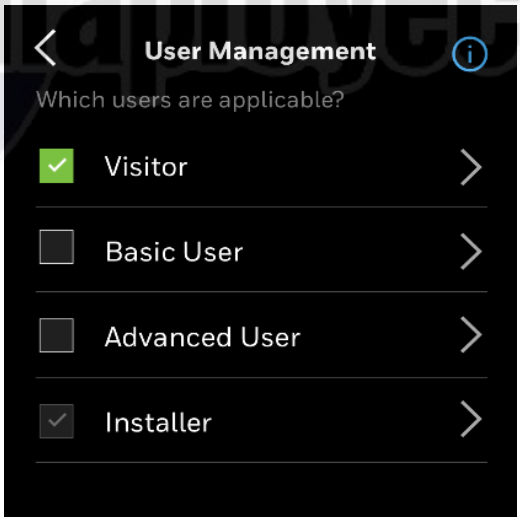


Visitor

To manage the Visitor user role:

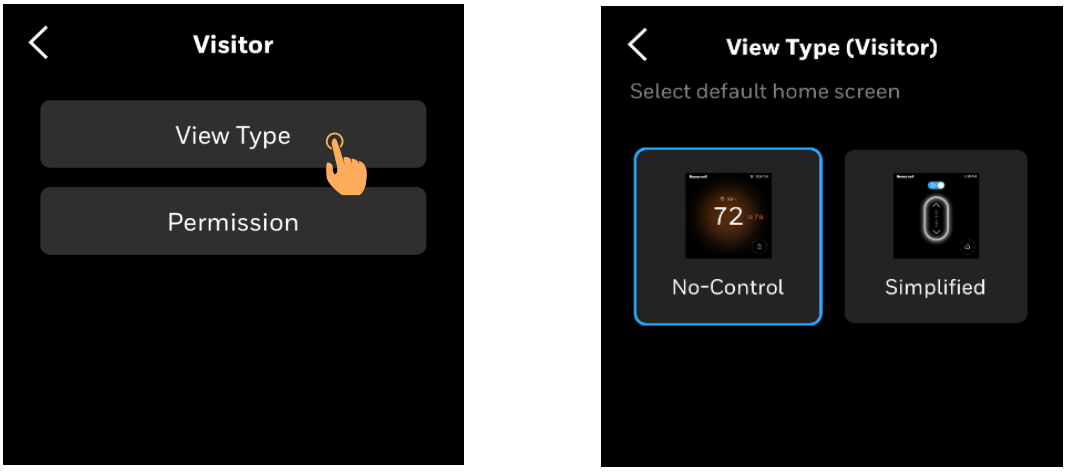
1. Select **Visitor**
   Tap > to select **View Type** and **Permission**

Figure 51 User Management page.



2. Select the **View Type**.

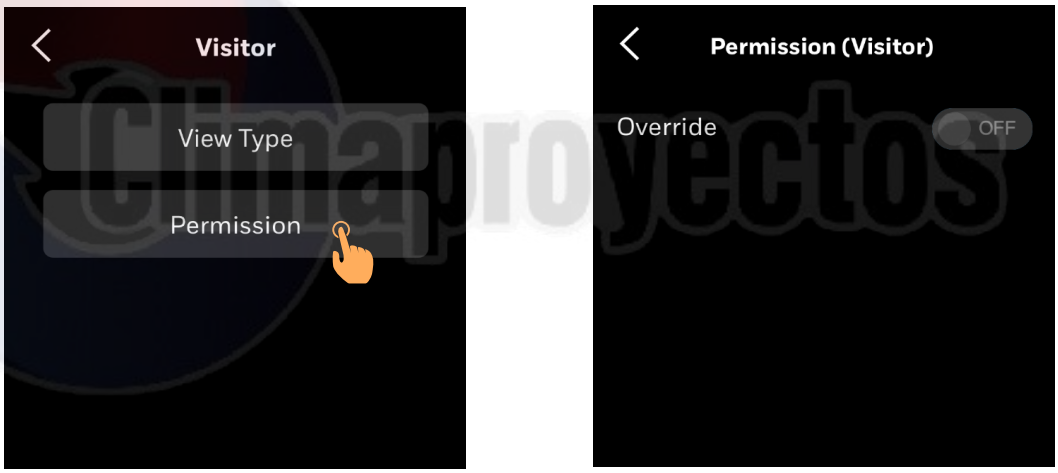
Figure 52 Select view type..



3. Tap **Permission** to allow visitor to override the Setpoints.

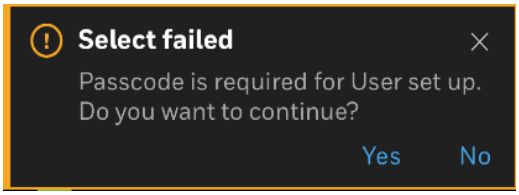
Note: *Visitor will have access to increase or decrease temperature in Simplified view only.*

Figure 53 Set Visitor Permission



4. Tap < to go to previous menu
5. If passcode is not entered a notification banner appears. Tap **Yes** to enter the passcode.

Figure 54 No passcode.



Simple View Home Screen Controls

The Simple view home screen enables visitors (if permitted) to change the setpoints in occupied or unoccupied mode.

User can tap  or  to increase or decrease the temperature.

In non-occupied state the simple view has a override toggle option on top. User must slide the toggle to override to make changes in setpoint.

Figure 55 Simple View - Occupied

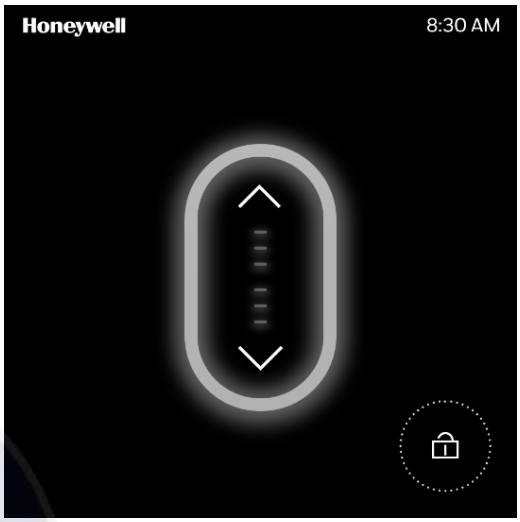
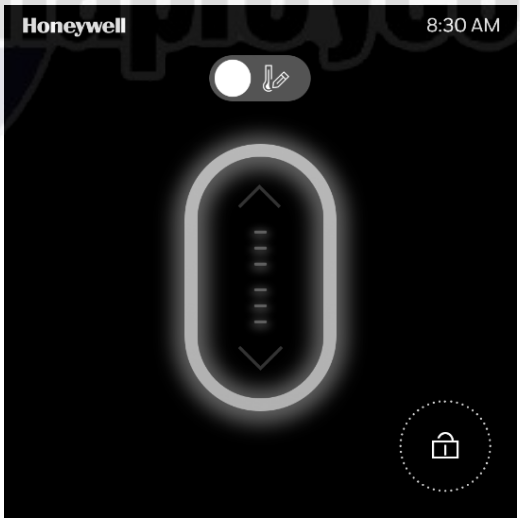


Figure 56 Simple view - Unoccupied



User can tap  or  to increase or decrease the temperature. The thermostat screen provides a visual indication of heating or cooling in different colors. The same is also represented using horizontal bars in the display.

Table 13 Increasing Temperature

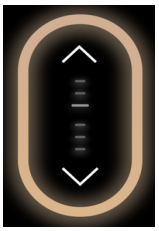
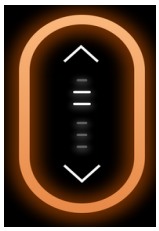
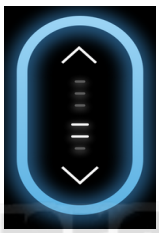
Low	Medium	High
		

Table 14 Decreasing Temperature

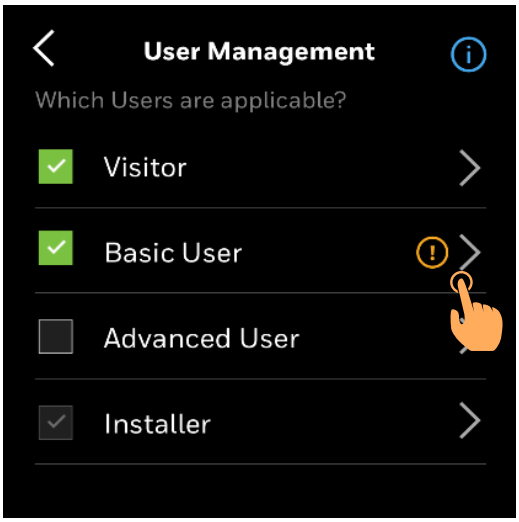
Low	Medium	High
		

Basic User

To manage the Basic User role:

1. Select **Basic User** and Tap 

Figure 57 User Management screen.



2. Set a Passcode, View Type and user Permission:
   - Password should be alphanumeric.
   - It should be between 4 to 12 characters

Figure 58 Basic user

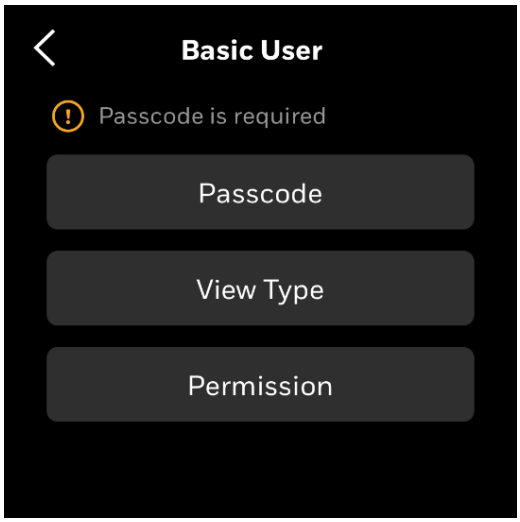
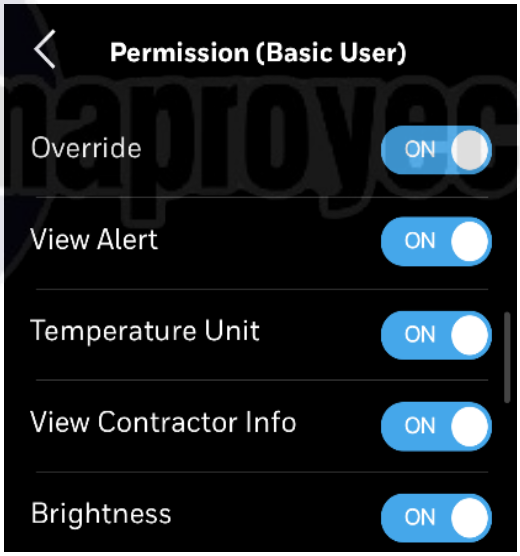
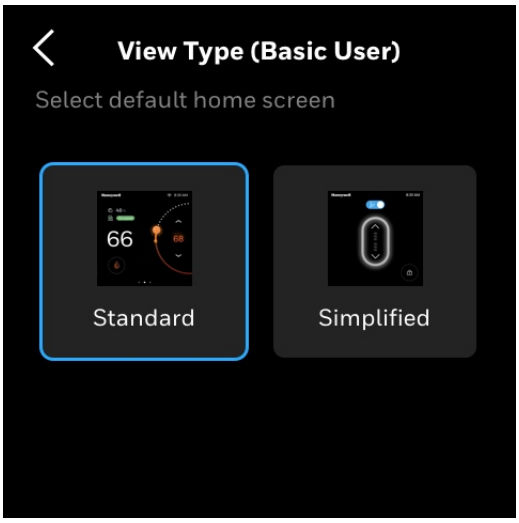


Figure 59 Basic User Permission.



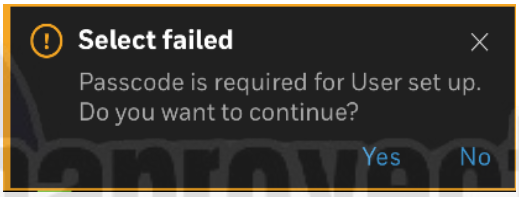
3. Select the **View Type.**
   Scroll up or down to view additional options.

Figure 60 Select View type



4. Tap < to go to previous menu.
5. If passcode is not entered a notification banner appears. Tap **Yes** to enter the passcode.

Figure 61 No passcode

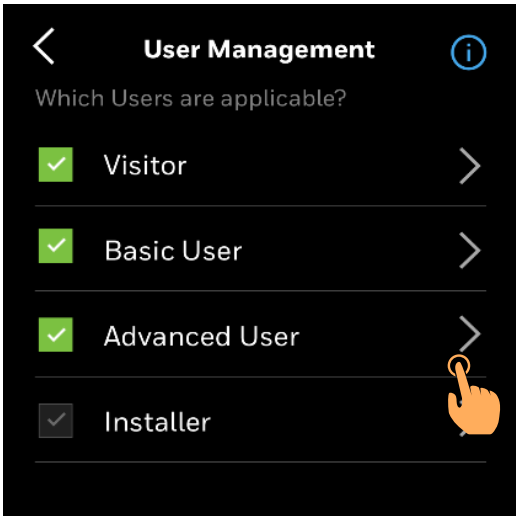


Advanced User

To manage the Advanced User role:

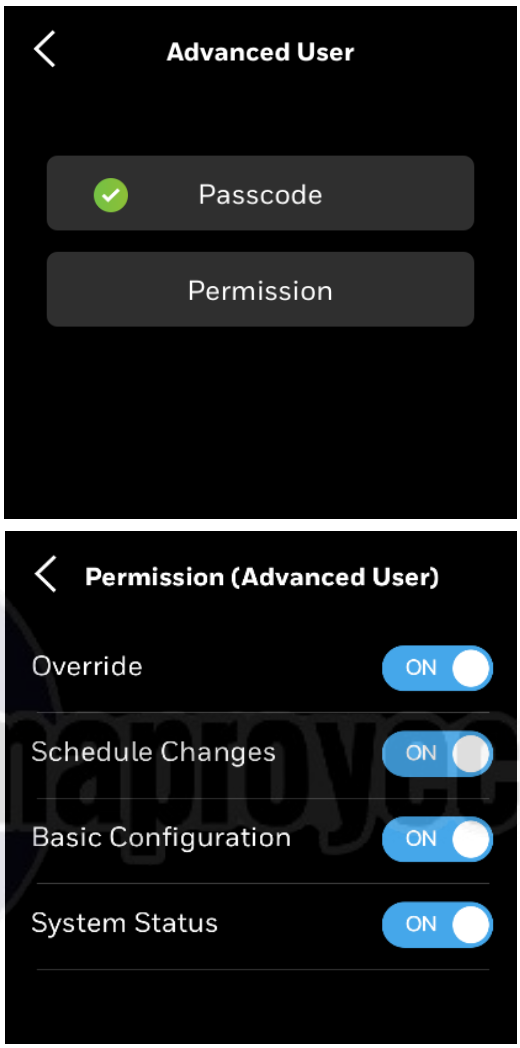
1. Select **Advanced User** and Tap >.

Figure 62 Advanced User



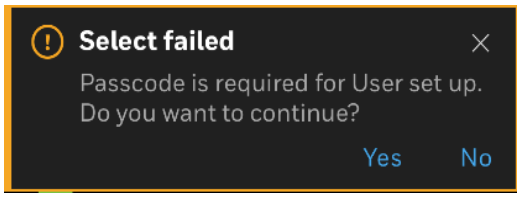
2. Set a Passcode, Permission:
   - Password should be alphanumeric.
   - It should be between 4 to 12 characters

Figure 63 Advance user



3. Tap  to go to previous menu
4. If passcode is not entered a notification banner appears. Tap **Yes** to enter the passcode.

Figure 64 No passcode

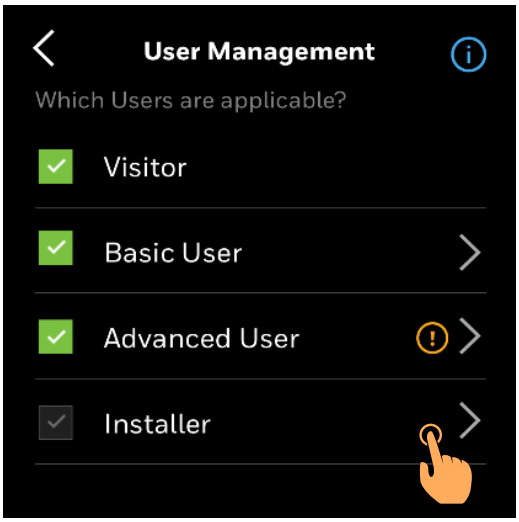


Installer

To manage the Advanced User role:

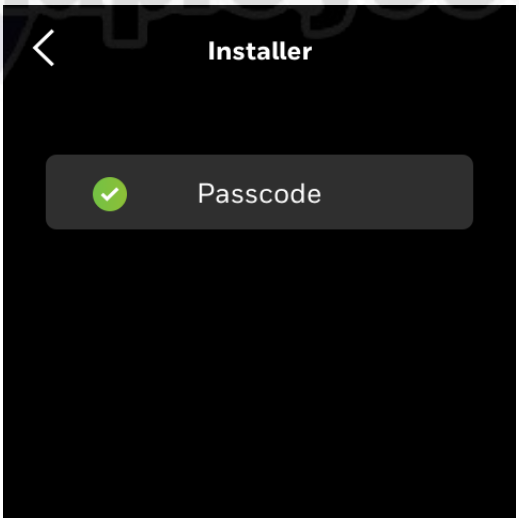
1. Select **Installer.**and Tap .

Figure 65 User Management



2. Set or change a Passcode, Permission:
   - Password should be alphanumeric.
   - It should be between 4 to 12 characters

Figure 66 Installer



CHAPTER

5 Managing Alarms

About Alarms

Alarms are configured for data points to indicate the conditions that may require control. The TC500A helps to view and manage the data points alarm. It also groups the alarms into High, Medium and Low categories. You can view and acknowledge the alarms on the TC500A screen.

Additionally, the alarm icon on the Home page shows active alarms as an icon notification such as  .

Alarm notification signs

The alarm menu notification icon has different color codes to indicate the severity of the alarm. The following table describes the available signs with color codes of the alarm pages.

Icons	Description
	High
	Medium
	Low

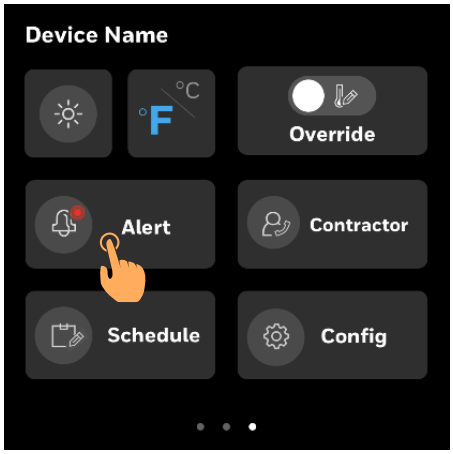
Unacknowledged Alarms

The alarm tab displays the alarms that have not been acknowledged by the user. If there are unacknowledged alarms, the alert button will have a visual notification as per the severity of the alarm.

To view the unacknowledged alarm

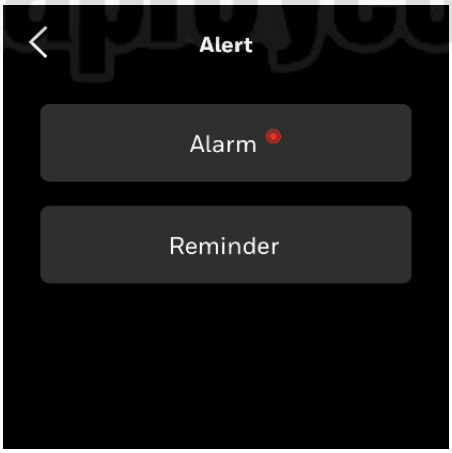
1. On the quick access and device management home-screen, tap the **ALERT** icon. **Alert** page displays.

Figure 67 Home page - Alert Tab



2. The alert page appears. Select **Alarms**. List of unacknowledged alarms displays.

Figure 68 Alert Preference - Alarm



Note: *Under the ALARM tab, tap the Red, orange, or yellow colored Alarms. The relevant data points list appears to acknowledge the alarms.*

Red *icon: Displays only the data points with High severity alarm.*

Orange *icon: Display only the data points with Medium severity alarm.*

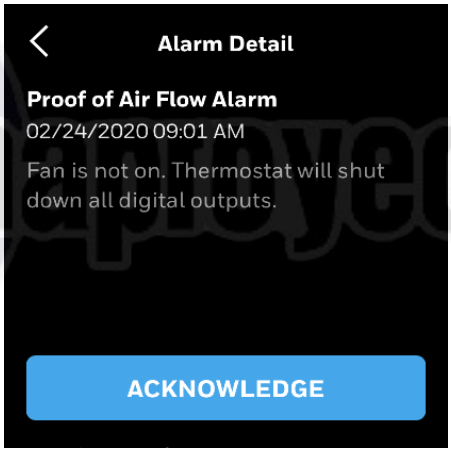
Yellow *icon: Display only the data points with Low severity alarm.*

3. Tap an Alarm name.
   The corresponding alarm property page appears. The alarm property page describes the nature of event state transition.

Figure 69 Alarm Page - Select the alarm

4. Tap **ACKNOWLEDE** to view additional information and acknowledge the alarm.

Figure 70 Acknowledge alarms



Note: *Except Alarms "Unknown Time" and "Wi-Fi Network Not Configured" all alarms can be acknowledged by tapping ACKNOWLEDGE.*

Note: *For "Unknown Time", set Date and Time page appears. Click SAVE to acknowledge alarms.*

Note: *For "Wi-Fi Network Not Configured", Configuration Settings appear. Select the Wi-Fi network to acknowledge the alarms.*

List of Alarms and their severity

The list of alarms in Commercial Connected thermostat is as follows:

Table 15 List of alarms

Alarms	Severity
Proof of Air Flow Alarm	High
Space Freeze protection Alarm	High
Proof of Water Flow Alarm	High
Internal temperature Sensor Failure	High
Sylk Device Communication Failure	High
Analog Input Fault	High
Discharge Air Temperature Out of Range	High
Space Temperature Out of Range Protection	High
Internal Temperature Sensor Failure	Medium
Internal Humidity Sensor Failure	Medium
Internal Proximity Sensor Failure	Medium
Unknown Time	Medium
Network Communication Failure Alarm	Low
Wi-Fi Network Not Configured	Medium
Wi-Fi Connection Lost	Low

Managing Alarms

Table 16 Managing Alarms

Alarm	Trigger Scenario	Action	Level
Proof of Air Flow Alarm (fan state)	An input (such as a current switch or differential pressure switch) shall be available to monitor proof of air flow in the Rooftop Unit. When configured, the control will monitor this digital input once per second. If the fan should be on, but it is not on, it should generate an alarm and disable stages. For example, if the stage should be on, then digital input indicates no air flow for 10 consecutive seconds.	Interlock stage: the control shuts down heating and cooling outputs and will continue to try to restart the fan. Alarm indicator is displayed.	High
Space Freeze Protection Alarm	The frost alarm shall occur if space temperature drops below 42.8F (6C) even when the controller is in manual mode, night purge mode, or pressurize/ depressurize. No frost alarm shall occur if the controller is disabled, in test mode, or in some higher priority mode as defined by the application.	The alarm shall be generated within 2 minutes of the temperature sensor going below the frost setpoint.	High
Proof of water flow Alarm	Heat pump proof of water is for water source heat pumps only and needs extra configuration (water flow detector). If the stage should be on, then the input indicates loss of water flow in a Heat pump application.	Interlock stage: The controller shall disable the heat pump compressor.	High
Wi-Fi Network Not Configured	If user selects Wi-Fi as the means of communication, but the thermostat isn't configured to join Wi-Fi network	Wi-Fi alarm is displayed on home screen.	Medium
Wi-Fi Connection Lost	If user selects Wi-Fi as the means of communication, and Thermostat lost Wi-Fi connection with Gateway	Wi-Fi alarm is displayed on home screen.	Low
Unknown Time	Thermostat has been powered off for a long time thus RTC time is lost	Prompt user to set date/time	Medium
Internal Temperature Sensor Failure	Onboard temp. sensor fault is detected	1.If the sensor is used to control loop and network temp/humidity space sensors are available, the thermostat will generate an alarm 2.If the sensor is used to control loop and network temp/humidity space sensors are unavailable, The application shall shut down all output control of Heating and Cooling equipment. The fan shall remain under normal control.	High (Action 2)/ Medium (Action 1)

Alarm	Trigger Scenario	Action	Level
Internal Humidity Sensor Failure	Onboard humidity sensor fault is detected	1.If the sensor is used to control loop and network humidity space sensors are available, the thermostat will generate an alarm 2.If network temp/humidity space sensors are unavailable, the application shall disable all control functions (E.g Humidity control for humidification or dehumidification) associated with the failed sensor.	High (Action 2)/ Medium (Action 1)
Internal Proximity Sensor Failure	Onboard proximity sensor (I2C bus) fault is detected	The thermostat is the same as that no proximity sensor is configured.	Medium
CO2 sensor failure alarm	1. Open/short limit is detected on CO2 sensor (UI1/UI2/UIO1/UIO2) 2. CO2 outside of range(CO2 < 0ppm or DA sensor > 2000ppm)	1. The application shall disable all control functions associated with the failed sensor; i.e. it will react as if the sensor was not configured. 2. CO2 out of range: Will not disable control function, check equipment for proper operation.	High (failure)/ Medium (out of range)
Outdoor air sensor failure alarm	1. Open/short limit is detected on outdoor air sensor(UI1/UI2/UIO1/ UIO2) 2. OAT outside of range (OA sensor < -40F or OA sensor > 150F)	1. The application shall disable all control functions associated with the failed sensor; i.e. it will react as if the sensor was not configured. 2. OAT out of range: Will not disable control function, check equipment for proper operation.	High (failure)/ Medium (out of range)
Mixed air sensor failure alarm	1. Open/short limit is detected on mixed air sensor (UI1/UI2/UIO1/ UIO2) 2. MAT outside of range: (MA sensor < 40F or MA sensor > 120F)	1. The application shall disable all control functions associated with the failed sensor; i.e. it will react as if the sensor was not configured. 2. MAT out of range: will not disable control function, Check equipment for proper operation.	High (failure)/ Medium (out of range)
Discharge air sensor failure alarm	1. DAT sensor fault: Open/short limit is detected on Discharge air sensor (UI1/UI2/UIO1/UIO2) 2. DAT outside of range: (DA sensor < 35F or DA sensor > 165F)	1. DAT sensor fault: The application shall disable all control functions associated with the failed sensor; i.e. it will react as if the sensor was not configured. 2. DAT out of range: Check equipment for proper operation.	High (failure)/ Medium (out of range)
Space Temperature out of range alarm	Space temperature outside of range (SA sensor < 35F or SA sensor >125F). (No matter which sensor act as space temperature)	If the sensor is used to control loop and network temp are available the thermostat will just generate an alarm.	Medium

CHAPTER

6 Scheduling

About Schedule

TC500A enables enable you to plan operations based on the time of day and holidays.

This scheduling structure allows you to control day-to-day operations with the standard schedule. The holiday schedule controls days or times when a facility is typically unoccupied. The event schedule controls time periods outside normal occupied times. The holiday schedule overrides the standard schedule and the event schedule overrides the holiday and standard schedules within a schedule set.

How schedules works

When you set up schedules, it is important to understand the relationship of the schedules in the schedule set and how to use each one.

- **Standard schedule:** Use weekly schedules to control equipment with ON and OFF commands during routine hours of operation. This schedule may contain ON commands for operating hours.
- **Holiday schedule** Use holiday schedules to override standard schedules for an entire day. Holiday schedules command the system OFF.

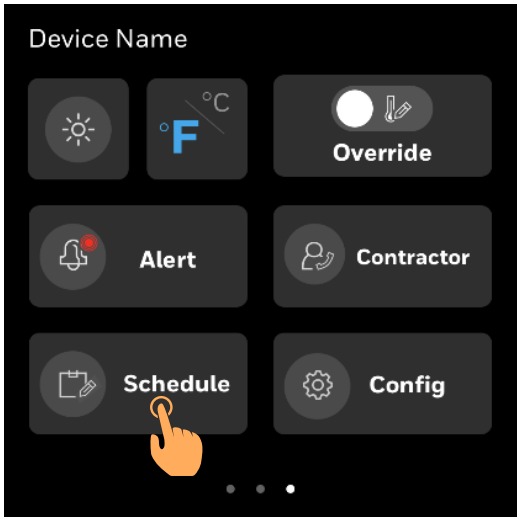
Note: *Holiday schedules automatically write a 12:00 AM OFF time, which is in effect unless it is overridden by an event schedule.*

Setting up a Weekly Schedule

To add a new time value to a weekly schedule

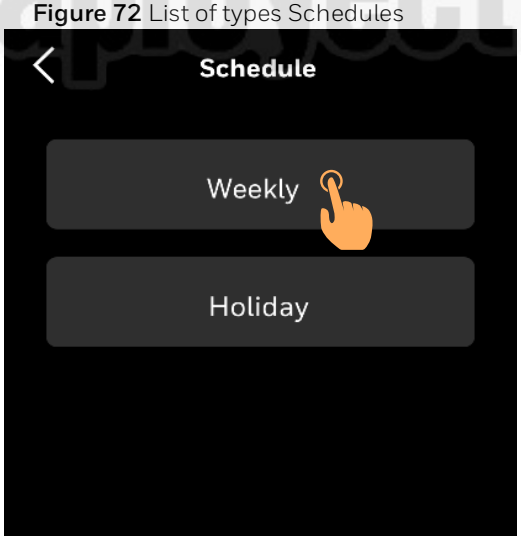
1. On the Home page, tap the **Schedule** icon.
   The schedule main page appears which lists all types of schedules available in the thermostat.

Figure 71 Select Schedule



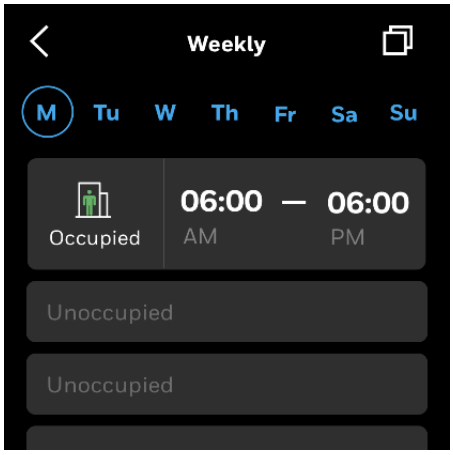
2. Tap **Weekly** to add a new schedule.
   The corresponding regular schedule page appears.

Figure 72 List of types Schedules



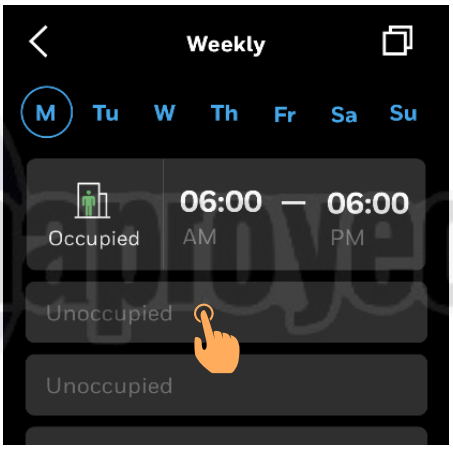
3. Select a day where you want to add a new schedule.
   The corresponding day page appears which contains existing schedules.

Figure 73 Existing Time values of a day



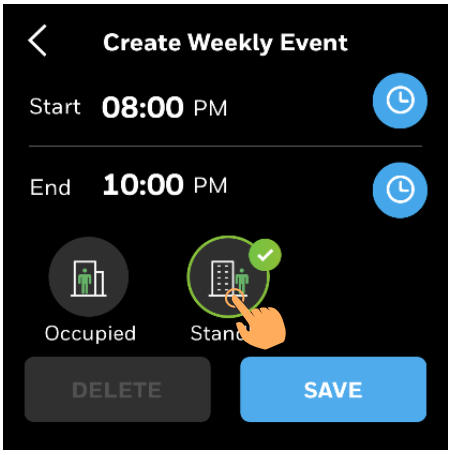
4. To add a new schedule tap on the **Unoccupied** button.
   The **Create Event** page will appear.

Figure 74 Adding a schedule



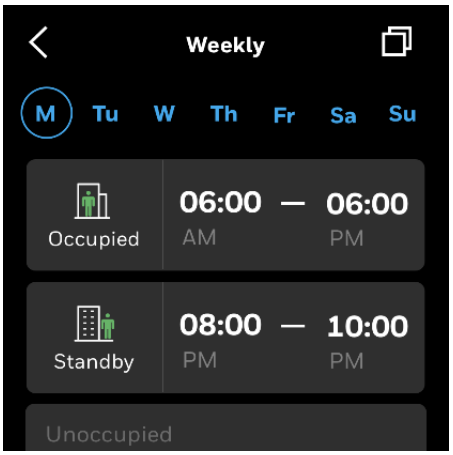
5. Select **Start** and **End** time of schedule by tapping clock symbol.
   Select the mode (**Occupied or Standby**) from the selections below it.

Figure 75 Add Time and select type of schedule



6. Tap **Save.**
   The corresponding day page with all schedules will appear..

Figure 76 Save Schedule



7. Tap  to exit scheduling.

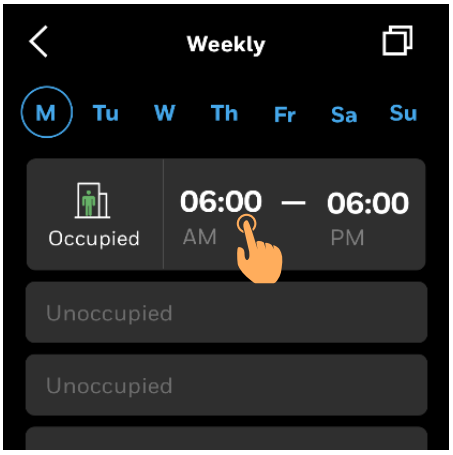
Editing or Deleting Weekly Schedules

The existing weekly schedules can be edited from the Weekly schedule page.

To change or delete an existing weekly schedule

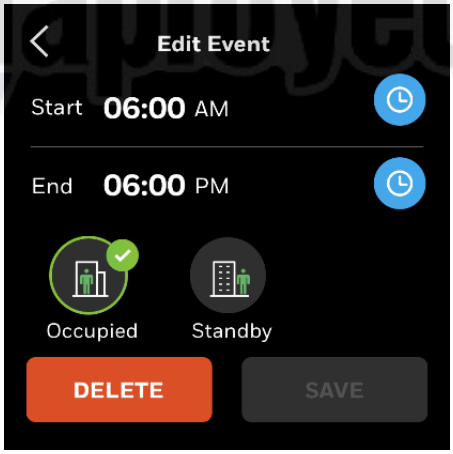
1. On the Weekly schedule page, tap the schedule to be modified.
   The **Edit Event** page will appear.

Figure 77 Editing a Regular Schedule



2. Select the new **Start** and **End** time and mode.
   Tap **Save** to save changes or Tap **DELETE** to delete the schedule.

Figure 78 Edit Event



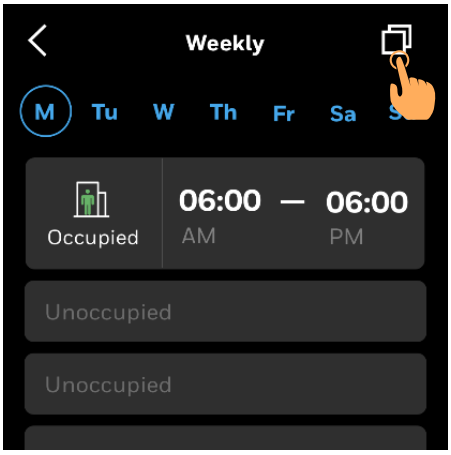
Copying a Existing Weekly Schedule

The TC500A enables user to copy a existing regular schedule.

To copy a schedule from one day to another

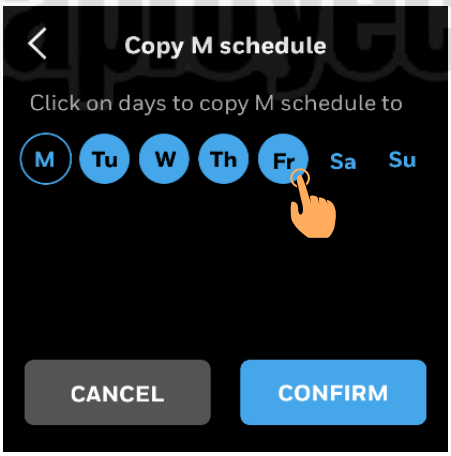
1. Navigate to Weekly schedule page from where schedule is to be copied.
   Select day to copy.
   Tap  to copy schedules. Copy screen will appear.

Figure 79 Copy Schedule



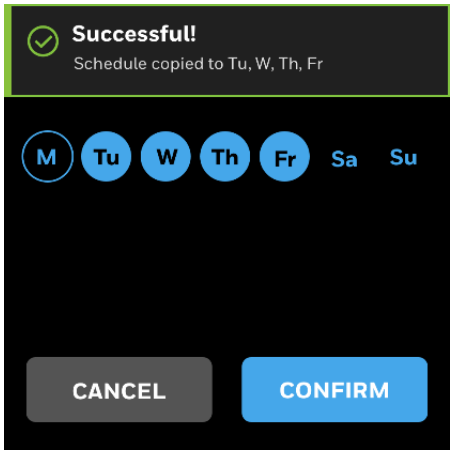
2. Tap on the days of the week for which scheduled is to be copied.

Figure 80 Select Days



3. Tap **Confirm**.
   A banner indicating successful copying will pop up.

Figure 81 Copy successful

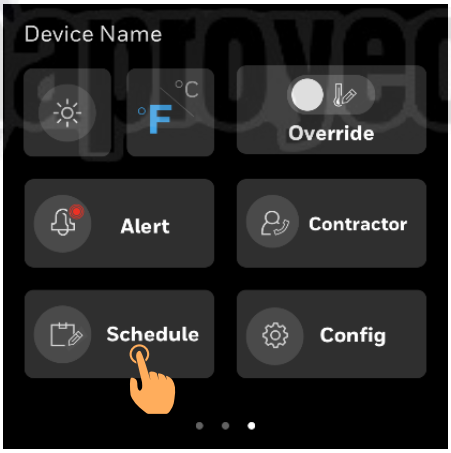


Setting up a Holiday Schedule

To schedule a holiday

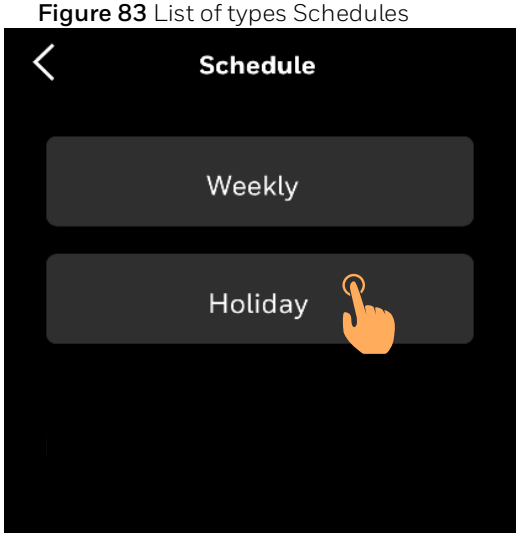
1. On the Home page, tap the **Schedule** icon.
   The schedule main page appears which lists all types of schedules available in the thermostat.

Figure 82 Select Schedule



2. Tap **Holiday** to add a new holiday schedule.
   The corresponding Holiday schedule page appears.

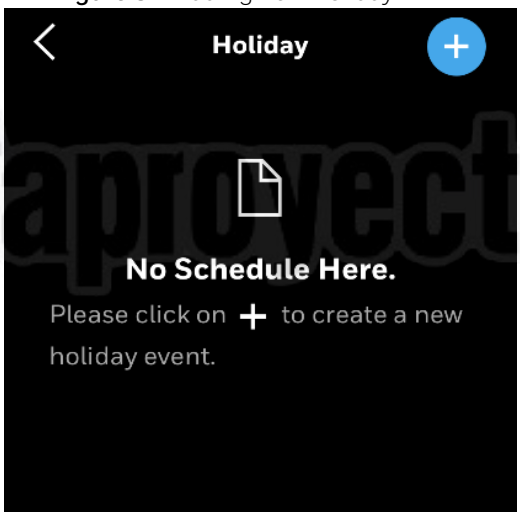
Figure 83 List of types Schedules



3. Tap  to add a Holiday.

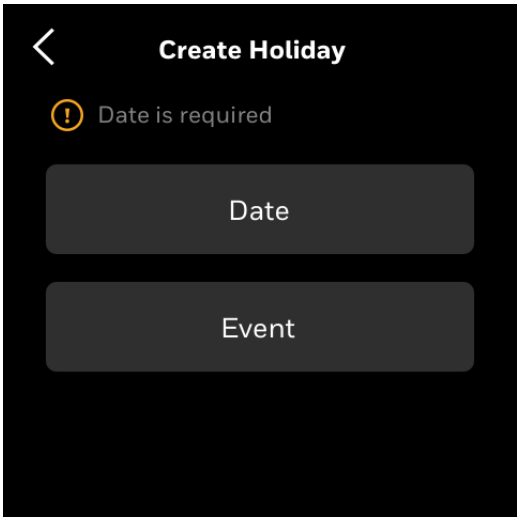
Note: *User can create unlimited number of Holidays.*

Figure 84 Adding new Holiday



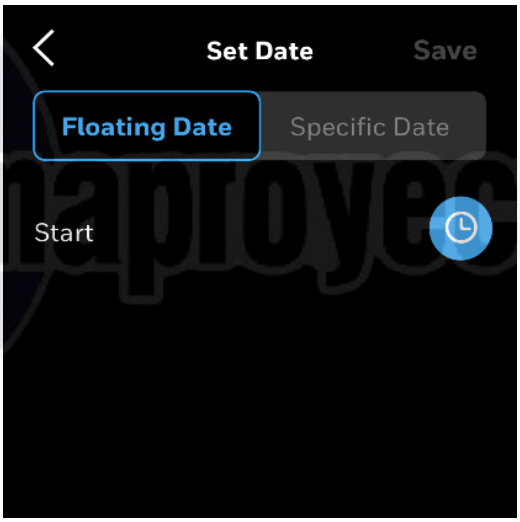
4. Tap on **Set Date.**

Figure 85 Creating Holiday



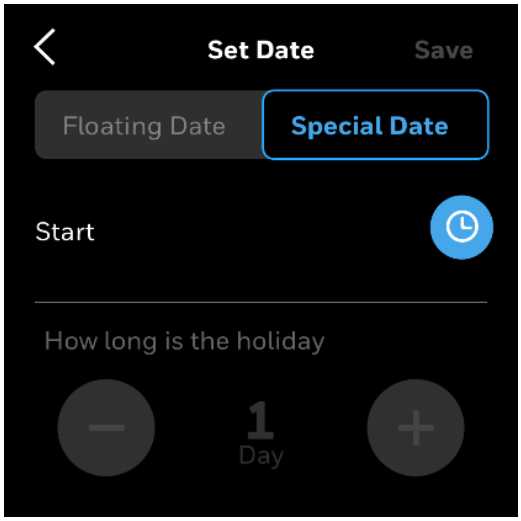
5. Tap on **Floating date** or **Specific Date**
   Set Date page displays.

Figure 86 Set Date



6. Tap  to select a date.
   User will be able to choose number of days for specific date holiday.

Figure 87 Set Start date



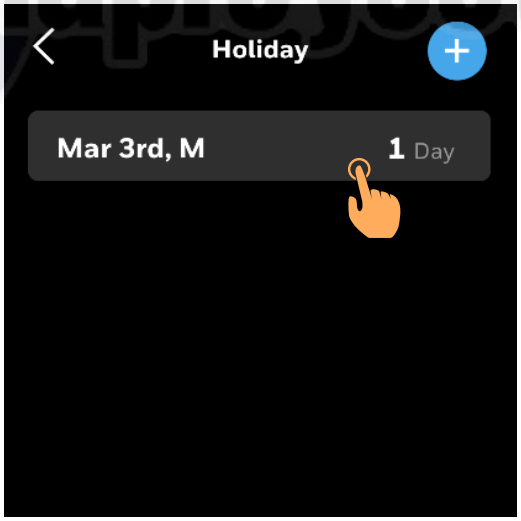
7. Tap **Save**.

Deleting a Holiday Schedule

To delete a holiday

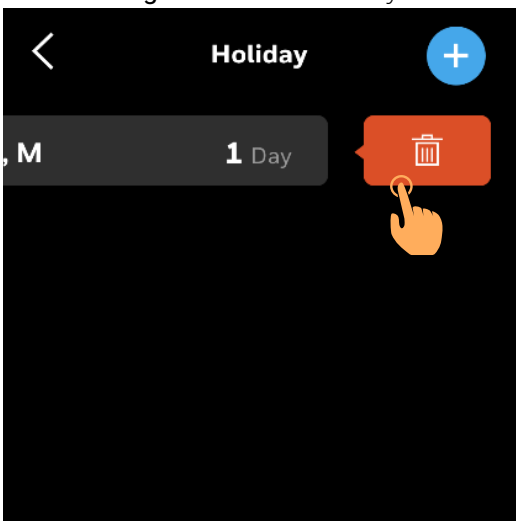
1. On the Holiday page, swipe right to delete Holiday. Trash bin appears on right.

Figure 88 Select Holiday



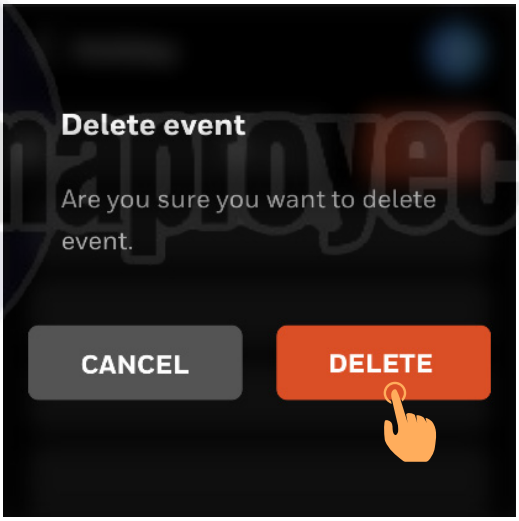
2. Tap  to delete the Holiday.

Figure 89 Delete Holiday



3. User will be prompted to confirm to delete holiday.
   Tap **DELETE**

Figure 90 Pop up to delete Holiday



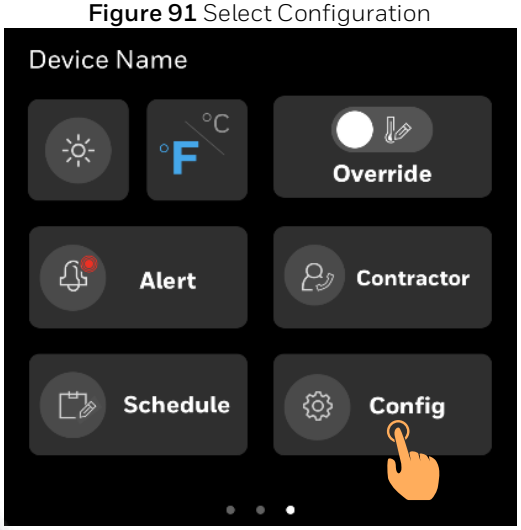
4. The holiday will be deleted.

Resetting Schedule

To reset all the schedule

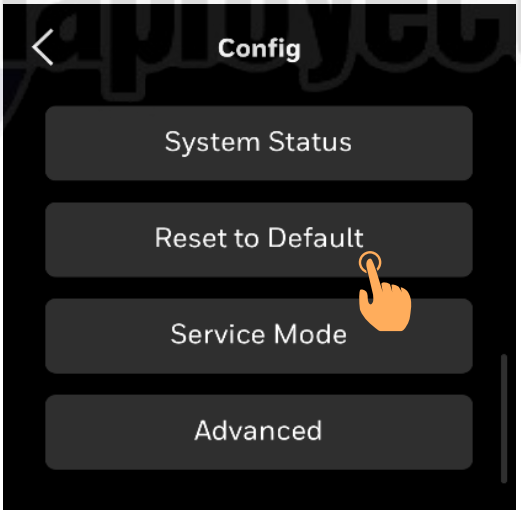
1. On the Home page, tap the **Config** icon.
   The Config main page appears which lists all types of configuration options available in the thermostat.

Figure 91 Select Configuration



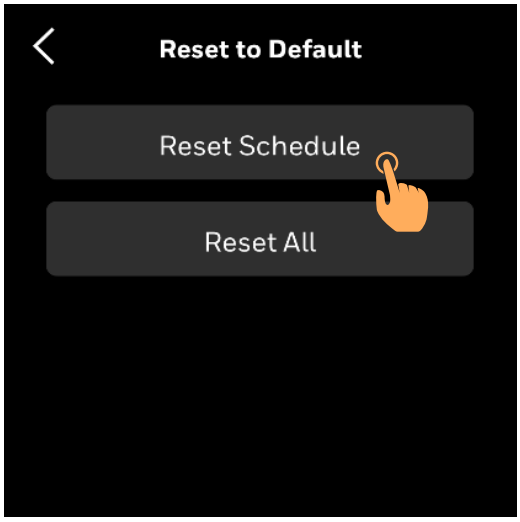
2. Tap **Reset to Default** to reset the schedules.
   Config page appears. User will be prompted to reset the schedule or the device.

Figure 92 Reset to default



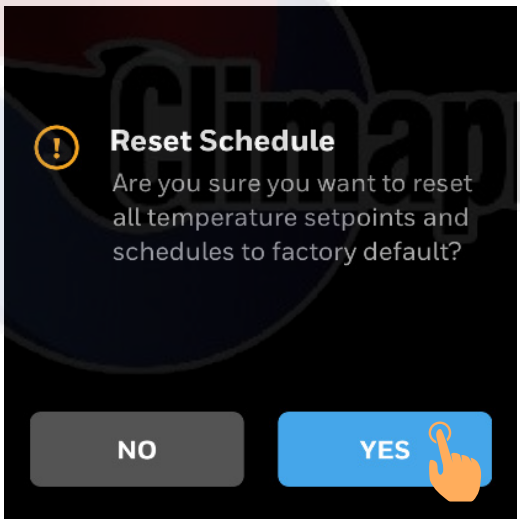
3. Tap **Reset Schedule**.
   User will be prompted to confirm the action before reset.

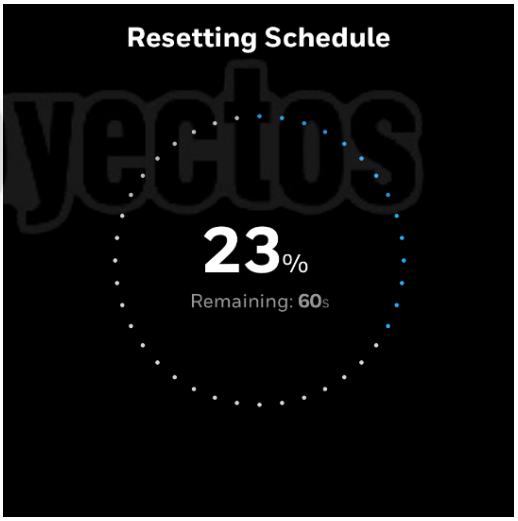
Figure 93 Reset Schedule



4. Tap **YES** to reset schedule.
   Progress screen appears.

Figure 94 Reset Schedule

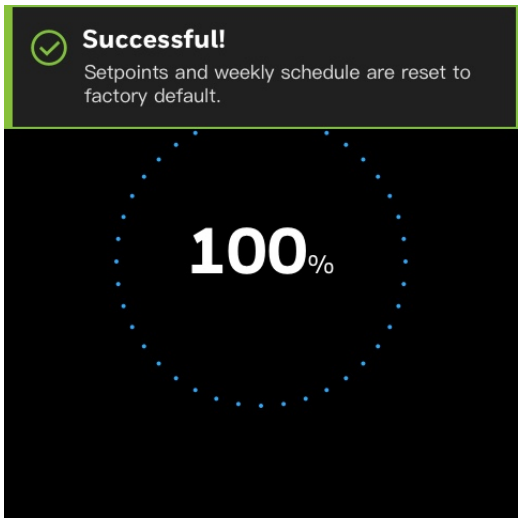




5. Upon successful reset, user will be notified by a notification banner.

Note: *Resetting schedule will reset weekly schedule and setpoints of occupied, unoccupied, and standby to factory default.*

Figure 95 Reset Confirmation

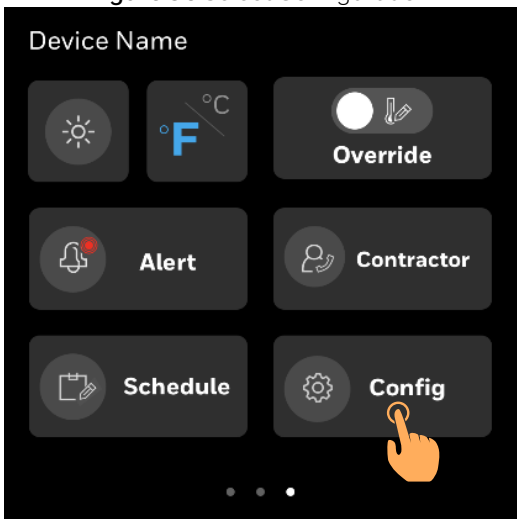


Factory reset

To restore factory default setting

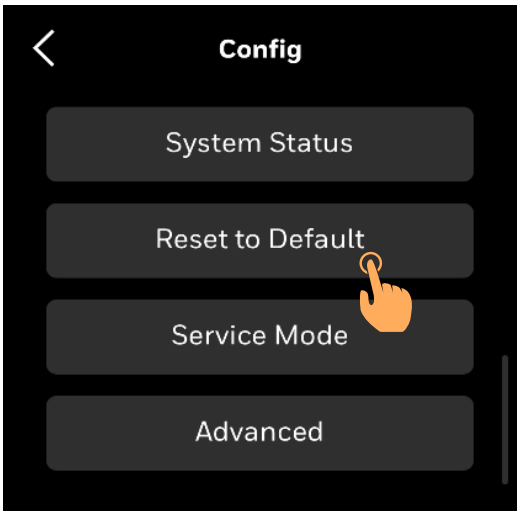
1. On the Home page, tap the **Config** icon.
   The Config main page appears which lists all types of configuration options available in the thermostat.

Figure 96 Select Configuration



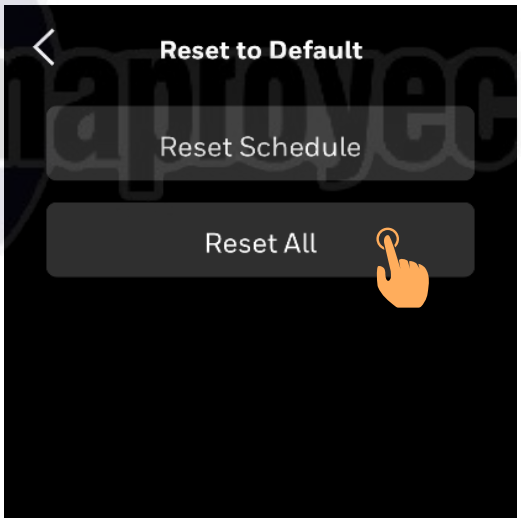
2. Tap **Reset to Default** to reset the thermostat.
   Config page appears. User will be prompted to reset the schedule or the device.

Figure 97 Reset to default



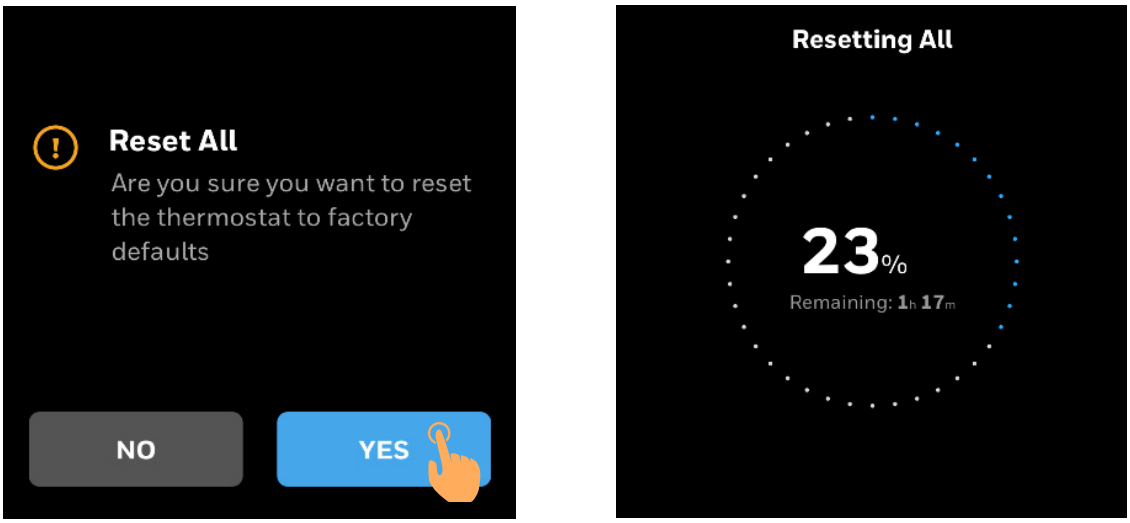
3. Tap **Reset All**.
   User will be prompted to confirm the action before reset.

Figure 98 Reset All



4. Tap **YES** to reset schedule.
   Progress screen appears.

Figure 99 Reset Schedule



5. Upon successful reset, user will be notified by a notification banner.

Figure 100 Reset All

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