

TC500A Commercial Thermostat

CONNECTED DEVICE FOR COMMERCIAL BUILDINGS

PRODUCT DATA



APPLICATION

TC500A-N Thermostats is an advanced, configurable, connected devices for commercial buildings. It controls and monitors Rooftop Unit, Heat Pump equipment, and their accessories. This device communicates over Wi-Fi, Bluetooth, BACnet I/P over Wi-Fi, BACnet MS/TP, and Sylk to easily integrate 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 and MS/TP 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.

Users can connect to the thermostat via Wi-Fi with the Honeywell Connect Me app. The Honeywell Connect Me app gives authorized users access to the Honeywell TC500 Thermostats in their commercial buildings. They can remotely monitor sites, schedules, settings, and override controls. Users can add and configure devices, manage users, and more – all from a mobile device.

FEATURES

- Easily customizable and intuitive user interface.
- Multiple, configurable, levels of user privilege access for features such as 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 screen lockouts to prevent unauthorized settings changes.
- Advanced commercial control algorithms such as auto changeover, scheduled purge, power-up delay time, freeze protection, demand limit controls, and same reliable optimized recovery methods established over decades of use.
- Settings to switch Fahrenheit to Celsius and vice-versa.
- Heat setpoints are limited automatically between 40°F to 90°F and cool setpoints are limited automatically between 50°F to 99°F
- Auto display goes into sleep mode when there is no user action.
- 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.
- Thermostat can be configured via HMI, the Honeywell Connect Mobile app, or BACnet.
- BACnet settings can be configured via HMI or the Honeywell Connect Mobile app.

Equipment Control Features

- 5H/3C Heat Pump, 3H/4C Conventional, Fan coil, modulating heat system, and modulating cool system.
- Constant speed Fan, 3-speed Fan, Multispeed, and Variable Speed Fan
- Packaged Economizer Enable Output
- Multiple Dehumidification and Humidification options
- Service mode to manually command the outputs to test the operation of the mechanical equipment
- Auto mode to switch between heating and cooling according to the current space temperature
- Staging control, PID Tuning, CPH, OAT Lockout, DAT Lockout, Modulating control
- Demand Limit Control to save energy
- System Switch Options
- Smoke Monitor
- Purge, Delta T, Internal, External Economizer controls, and Auto Demand Response.
- Exhaust fan configuration in the Internal Economizer controls.

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	4VA (all DOs OFF, No Sylk sensor)
Max. Load	96VA (all DOs ON)

Display

Table 2. Display

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

IO Characteristics

Table 3. IO Characteristics

UIO x 2	- Resistive Temperature Sensor Input - NTC10K Type II, C7021 series - NTC10K Type III (Space Temperature Sensor only), C7023 series - NTC20K, TR21, and C7041 series - Temperature Accuracy $\pm 1^{\circ}\text{F}(\pm 0.5^{\circ}\text{C})$ at 50 to 90 °F(10 to 32°C) $\pm 2^{\circ}\text{F}(\pm 1.1^{\circ}\text{C})$ at 30 to 122°F(-1.1 to 50°C) - Voltage Input, SELV 0-10V, $\pm 5\%$ of full scale - Digital Input - Dry contact closure - Open circuit ($\geq 100\text{Kohms}$) - Closed circuit ($\leq 100\text{ohms}$) - Voltage Output 0-10V, $\pm 3\%$ of full scale @2K ohms
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Table 3. IO Characteristics (Continued)

UI x 2	- Resistive Temperature Sensor Input - NTC10K Type II, C7021 series - NTC10K Type III (Space Temperature Sensor only), C7023 series - NTC20K, TR21, and C7041 series - Temperature Accuracy $\pm 1^{\circ}\text{F}(\pm 0.5^{\circ}\text{C})$ at 50 to 90 °F(10 to 32°C) $\pm 2^{\circ}\text{F}(\pm 1.1^{\circ}\text{C})$ at 30 to 122°F(-1.1 to 50°C) - Voltage Input, SELV 0-10V, $\pm 5\%$ of full scale - Digital Input - Dry contact closure - Open circuit ($\geq 100\text{Kohms}$) - Closed circuit ($\leq 100\text{ohms}$)
DO (G, Y1,Y2,Y3,W1,W2 ,W3)	- Relay Output - Rated Average Current 1A at 24VAC - Rated Pulse Current 3.5A at 24VAC
DO (AUX)	- Relay Dry Contact - Rated Average Current 1A at 24VAC/DC - Rated Pulse Current 3.5A at 24VAC/DC

Operating Environment

Table 4. 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

Onboard Sensors

Table 5. Onboard Sensors

Temperature	Heat: 40 to 90°F (4.5 to 32°C) Cool: 50 to 99°F (10 to 37°C) Resolution: 1 °F (0.5°C) Control Accuracy: $\pm 1.5^{\circ}\text{F}$ (0.8°C) at Room Temperature
Humidity	Range: 20~90% RH Resolution: 1%RH Control Accuracy: $\pm 5\%$ RH at Room Temperature and 20~90%RH

Compliances

Table 6. Compliances

Certificates	CE, FCC, ICES, UL/cUL, RoHs, REACH, California Title 24, BTL, 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

Communication Technologies

Table 7. Communication Technologies

BACnet IP	Over Wi-Fi
Wi-Fi	802.11 b/g/n Supported security levels OPEN, WPA, WPA2, WPA3_WPA2_AES
Bluetooth	BLE 4.2 with 1 Mbps Classic Bluetooth with max. 3 Mbps
Sylk™	Honeywell Sylk™
BACnet MS/TP	Over RS485 (9.6, 19.2, 38.4, 76.8, 115.2 Kbps)

Electrical Characteristics

Table 8. 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 Functions

Table 9. Supported Sensors and Functions

Sensors	Options	Part Numbers
Occupancy Sensor	Direct (Normally Open) Reverse (Normally Closed)	Dry contact occupancy sensor

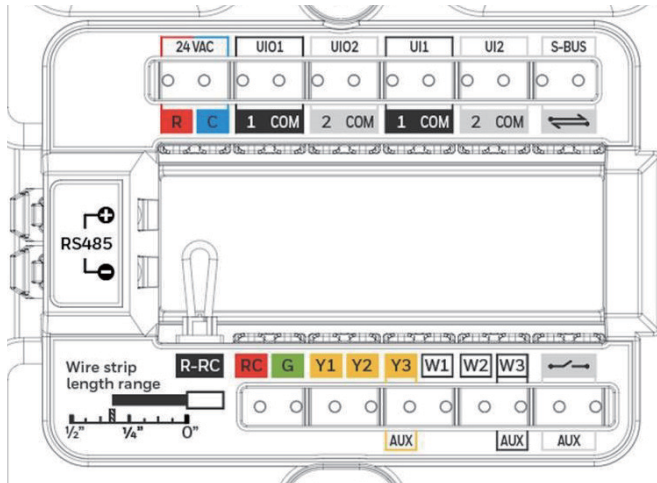
Table 9. Supported Sensors and Functions

Sensors	Options	Part Numbers
Dirty Filter Sensor	Direct (Normally Open) Reverse (Normally Closed)	DPS200, DPS400, DPS1000 (Dry contact differential pressure switch)
Proof Of Air Flow Sensor	Direct (Normally Open) Reverse (Normally Closed)	DPS200, DPS400, DPS1000 (Dry contact airflow switch)
Shutdown Sensor	Direct (Normally Open) Reverse (Normally Closed)	Dry contact shutdown switch
Mixed Air Temperature Sensor	NTC 20K NTC 10K Type II NTC 10K Type III Sylk	C7250A, C7041 C7021 C7023 C7400S
Outdoor Air Temperature Sensor	NTC 20K NTC 10K Type II NTC 10K Type III Sylk	C7250A, C7041 C7021 C7023 C7400S
Return Air Temperature Sensor	NTC 20K NTC 10K Type II NTC 10K Type III Sylk	C7250A, C7041 C7021 C7023 C7400S
Discharge Air Temperature Sensor	NTC 20K NTC 10K Type II NTC 10K Type III Sylk	C7250A, C7041 C7021 C7023 C7400S
Space Temperature Sensors	NTC 20K NTC 10K Type II NTC 10K Type III Sylk	TR21, C7041, C7772A, C7021, C7772F, C7023, C7772G TR40, TR40-H, TR40-CO2, TR40-H-CO2 TR120 (max 1)
CO2 sensor	0-10 / 2-10 VDC Sylk	C7233, C7263, C7232 TR40-CO2 TR40-H-CO2
Proof of waterflow	Digital Input	Dry contact waterflow switch
Window Open Sensor	Direct (Normally Open) Reverse (Normally Closed)	Dry contact window open sensor

Table 9. Supported Sensors and Functions

Sensors	Options	Part Numbers
Drain Pan / Leak Detector	Direct (Normally Open) Reverse (Normally Closed)	Dry contact float switch or water sensor

Terminal Identification

**Fig. 1. Terminals****Table 10. Terminal Identification**

Terminal	Label	Connection
24VAC	R	24VAC power from heating transformer
	C	24VAC common (Neutral). For 2 transformer systems, use common wire from cooling transformer
UIO1	1	Universal input/output
	COM	Common
UIO2	2	Universal input/output
	COM	Common
UI1	1	Universal input
	COM	Common
UI2	2	Universal input
	COM	Common
Sylk (S-BUS)		Sylk bus, master, power output
		Sylk bus, master, power output

Table 10. Terminal Identification

Terminal	Label	Connection
RS485	+	BACnet Communications (BACnet MS/TP A)
	-	BACnet Communications (BACnet MS/TP B)
	R-RC	Jumper between R and RC for single transformer system
24VAC	RC	24VAC power from cooling transformer
	G	Fan
	Y1	Relay output, Compressor contactor (stage1)
	Y2	Relay output, Compressor contactor (stage2)
	Y3	Relay output, Compressor contactor (stage3)/Configurable Output
	W1	Relay output, Heat (stage1)
	W2	Relay output, Heat (stage2)
	W3	Relay output, heat (stage3)/Configurable Output
Aux		Relay dry contact, Aux-1
		Relay dry contact, Aux-2

Thermostat Variants

Table 11. Thermostat Part Numbers

TC500A-N	Thermostat with North American Wi-Fi conformance
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Accessories

Table 12. Accessories Part Numbers

Decoplate-N	TC500 deco plate for NA junction boxes
3011-7144-001	Replacement Backplate for TC500A-N

Terminal Assignments

Table 13. Terminal Assignments

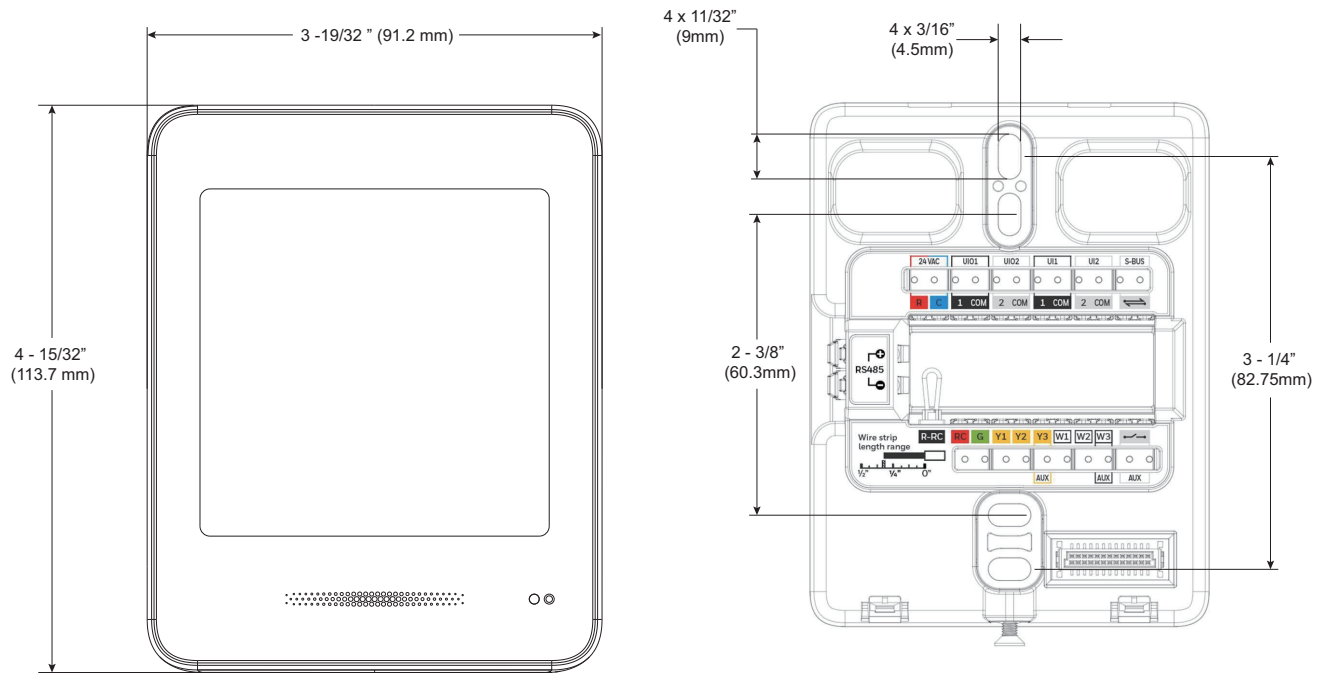
Type	Terminal	Label	Terminal Assignments (Default & Optional Assignments)		
			DEFAULT	INPUTS	OUTPUTS
Digital Outputs	DO1	G	Supply Fan	NA	Fan Command High Speed Fan
	DO2	W1	Heat Stage 1		Heating Floating Open
	DO3	W2	Heat Stage 2		Heating Floating Closed
	DO4	W3 / Aux	NA		Heat Stage 3, Cool/Compressor Stage 4, Reversing Valve OB, Low Speed Fan, Medium Speed Fan, Occupancy, Dehumidification, Humidification, Purge Output, Exhaust Fan 1, Exhaust Fan 2.
	DO5	Y1	Cool/Compressor Stage 1		Cooling Floating Open
	DO6	Y2	Cool/Compressor Stage 2		Cooling Floating Closed
	DO7	Y3 / Aux	NA		Cool/Compressor Stage 3, External Economizer, Low Speed Fan, Medium Speed Fan, Occupancy, Dehumidification, Humidification, Purge Output, Exhaust Fan 1, Exhaust Fan 2.
	DO8 (Dry Contact, 2 terminals)	Aux			Cool/Compressor Stage 4, External Economizer, Low Speed Fan, Medium Speed Fan, Occupancy, Dehumidification, Humidification, Purge Output, Exhaust Fan 1, Exhaust Fan 2.

Table 13. Terminal Assignments

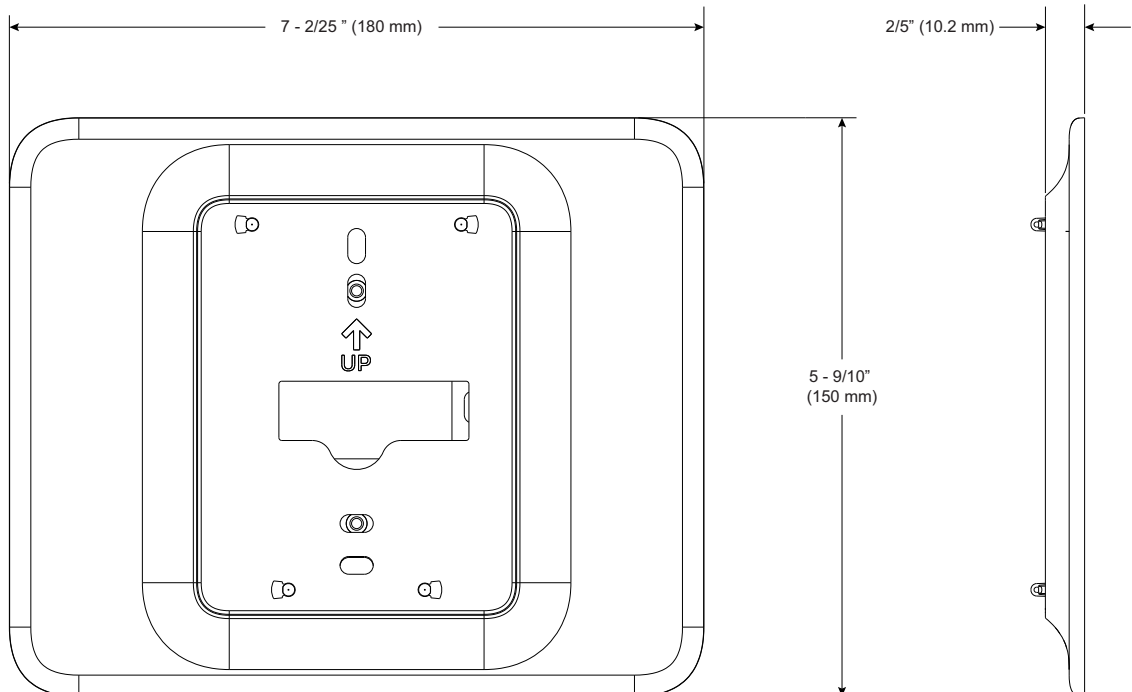
Type	Terminal	Label	Terminal Assignments (Default & Optional Assignments)		
			DEFAULT	INPUTS	OUTPUTS
Universal Inputs	UI1 (2 terminals)	UI1	NA	CO2 Sensor Input, Dirty Filter, Discharge Air Sensor, Drain Pan Sensor, External Economizer Fault, Mixed Air Sensor, Occupancy Sensor, Outdoor Air Sensor, Proof of Airflow, Proof of Waterflow, Return Air Sensor, Shutdown, Space Temperature Sensor, Window Open Sensor.	
	UI2 (2 terminals)	UI2	NA		
Universal Inputs/ Outputs	UIO1 (2 terminals)	UIO1	NA		CO2 Output, Fan Speed Control, Modulating Cool, Modulating Heat, Purge Output.
	UIO2 (2 terminals)	UIO2	NA		
Power	R	R		24v Power	
	C	C		Common	
	RC	RC		24v Power / Cooling	
Sylk Bus	1	S-Bus		Sylk connection	Selectable type pre-defined by Sylk address number
	2				

DIMENSIONS

Thermostat



Decoplate-N



GENERAL SAFETY INFORMATION

- When performing any work (installation, mounting, start-up), all manufacturer instructions and in particular the mounting Instructions guide (31-00399M) and the user guide (31-00400M) are to be observed.
- TC500A-N Thermostat may be installed and mounted only by authorized and trained personnel.
- Rules regarding electrostatic discharge should be followed.
- If TC500A-N Thermostat is modified in any way, except by the manufacturer, all warranties concerning operation and safety are invalidated.
- Make sure that the local standards and regulations are observed at all times.
- Use only accessory equipment which comes from or has been approved by Honeywell.
- 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-N 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-N Thermostat is Class B digital apparatus and complies with Canadian ICES-003.
- 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.
- Caution: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
 1. This device may not cause interference.
 2. This device must accept any interference, including interference that may cause undesired operation of the device.
- L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada

applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
 2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
 - To satisfy FCC&IC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.
 - Les antennes installées doivent être situées de façon à ce que la population ne puisse y être exposée à une distance de moins de 20 cm. Installer les antennes de façon à ce que le personnel ne puisse approcher à 20 cm ou moins de la position centrale de l'antenne. Region Selection (for Wi-Fi 2.4G device)
 - Limited by local law regulations, version for North America does not have region selection option.

Safety Information as per EN60730-1

TC500A-N Thermostat is intended for residential, commercial environments.

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

TC500A-N 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.

Note

All images used in this document are for illustrative purposes only and may not match the actual product.

Honeywell Building Technologies

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THE
FUTURE
IS
WHAT
WE
MAKE IT

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