Honeywell TC300 Commercial Thermostat

For Fan Coil Unit and 1H/1C, 2H, 2C Conventional and 2H/1C Heat Pump Systems

General

A. Overview: The contractor shall furnish, install, and install in operating condition an HVAC control system described herein. All units shall be located in accordance with the plans.

B. System Requirements:

1. FCU applications
    i. 4-Pipe single coil, 4-Pipe dual coil, & 2-Pipe single coil
    ii. Floating, modulating, 6-way valves, On/Off valves, Changeover valve (4-pipe)
    iii. Up to 3-speed fan or variable speed fan (3-speed variable or 10-speed variable)
    iv. Option for enabling valve output for heating and cooling w/modulating valves
    v. Discharge air temperature control
    vi. Dehumidification, dehumidification w/reheat, and configurable sub-cooling setting
    vii. Peripheral heating output option
    viii. Auxiliary heating output option 2-pipe
    ix. Configurable freeze stat and freeze protection
    x. Drain pan sensor option
    xi. 2-pipe heat/cool changeover via network input option
    xii. Complies with FCU High-Performance Sequences of Operation ASHRAE Guideline 36-2024/Sec, 5.22
2. Conventional 1Heat/1Cool or 2Heat or 2Cool
3. Heat pump air/water source 2Heat/1Cool (2nd stage heat is auxiliary)
    i. Water source heat pump enable/disable via network input option
    ii. Water source heat pump configurable pump activation output with compressor time delay and/or proof of waterflow sensor input
4. Simple humidification or dehumidification relay output option for Conventional or heat pump applications
5. Low voltage input variants - (24VAC, 20-30VAC)
6. Line voltage input variants – (100-240VAC)
7. Integral temperature and humidity sensor with option to configure humidity setpoint for humidification or dehumidification
8. Optional radar-based (non-PIR) onboard occupancy sensor + light sensor for Commercial or Hospitality mode applications
9. Optional onboard CO2 sensor with configurable CO2 equivalent (0-2000ppm) output 0/2-10VDC
10. Optional onboard CO2 sensor with configurable CO2 threshold setting and configurable relay output with configurable CO2 deadband for ventilation output and CO2 level alert
11. BACnet MS/TP communications via wired RS485 network
12. Modbus RTU communicates via wired RS485 network
13. Optional wireless variants support BACnet IP over Wi-Fi 2.4 GHz
14. Optional wireless variants support cloud-based remote user app
15. Optional wireless variant support concurrent BACnet IP BMS integration and remote user app functionality via Wi-Fi

16. Supports Foreign Device Registration (FDR) to BBMD on separate subnet when using BACnet IP via Wi-Fi
17. Configurable Automatic Demand Response (ADR) network input with configurable temperature setbacks and ADR response notification in display
18. Four schedule configurations
    i. All variants --commercial, residential, fixed setpoint (no schedule), and hospitality mode for variants w/onboard occupancy sensor
    ii. Hospitality mode with advanced energy savings utilizing rented/unrented state via BMS and associated temperature settings. Advanced occupancy logic function for temperature setbacks combining light level during awake time, sleep time, door switch integration for optimal guest comfort and energy savings
    iii. Commercial Schedule -Up to four occupied or standby periods per day, special event/holiday schedule
    iv. Residential Schedule - Up to four unique setpoint periods per day (Awake, Away, Return, Sleep) plus Custom period for weekends. Vacation/Holiday schedule
19. Multiple language support: English, Spanish, French, German, and Italian
20. Daily schedule copy feature to multiple days of week
21. 365-day schedule with options for holidays and special events
22. BACnet system scheduling and holiday configuration
23. Real-time Clock with 72-hour retention during power loss
24. Automatic heat/cool changeover with 2°F (1°C) minimum dead band
25. Temporary override for a 0 to 18-hour configurable period, with 3-hour default
26. Programmable temporary setpoint adjustment limit of up to +/-45°F (+/-25°C)
27. Configurable heating and cooling parameters including minimum operating cycle time. throttling range, and cycles per hour
28. Configurable recovery ramps for heating and cooling
29. Discharge air temperature cooling/heating lockout (optional sensor)
30. Display or control room temperature in °F or °C
31. Selectable BACnet object or Modbus register temperature units in °F or °C
32. Customizable sensor inputs 0-10VDC, binary input, or 10K Type I/III, 20K ohm NTC temperature sensors with custom input naming for remote monitoring via BACnet or Modbus
33. Integration with multiple remote temperature sensors (2-wire Sylk bus or analog) with configurable weighted averaging (optional)
34. Integration w/TR100 wall module providing remote setpoint adjust, system mode, schedule with temperature sensor (2-wire Sylk) with configurable weighted averaging (optional)
35. Provide four levels of user management – installer, admin, basic user, and visitor
36. Remote occupancy sensor input for auto Standby/Occupied mode regulation
37. Remote shutdown input option to suspend all thermostat functions (ex. from fire detection system)
38. Thermostat reset option to restore factory default settings
39. Onboard humidity sensor with configurable setpoint for humidification or dehumidification
40. Auxiliary and peripheral reheat option
41. Power-up delay after power failure (0- 300 seconds, default 10 seconds)
42. Auto sleep display to reduce energy consumption without user interaction after time-out
43. Configurable always on or blank display

44. Display activates via touch screen detection
45. Edge to edge glass display for easy cleaning
46. 2.4” Diagonal capacitive color touch screen LCD display (320x240 pixel)
47. Two color LED indicator ring to show the operational status (heat, cool)
48. Service mode to manually command the outputs to test the operation of mechanical equipment
49. System status screen showing device information, live status, and sensor readings
50. Configurable drain pan sensor or shutdown input configurable for thermostat shutdown mode of operation
51. Hybrid 2-pipe changeover allowing more rapid transition to support heating or cooling function before chilled water or hot water reaches target threshold

C. Codes and Standards: The system shall comply with applicable provisions of ASHRAE 90-75. These specifications are based on equipment from Honeywell to set a standard for design and quality.

D. Wiring: All wiring shall meet National Electrical Codes and local electrical codes.

E. Testing Guarantee Service: Prior to installation, the contractor shall provide copies of submittals. The contractor is responsible for assuring that conduit and wire quantity, size, and type are suitable for the equipment supplied. Upon completion of thermostat installation, the contractor shall conduct a total system test for the owner and engineer.
Warranty service shall be performed by the contractor.

Sequence of Operations

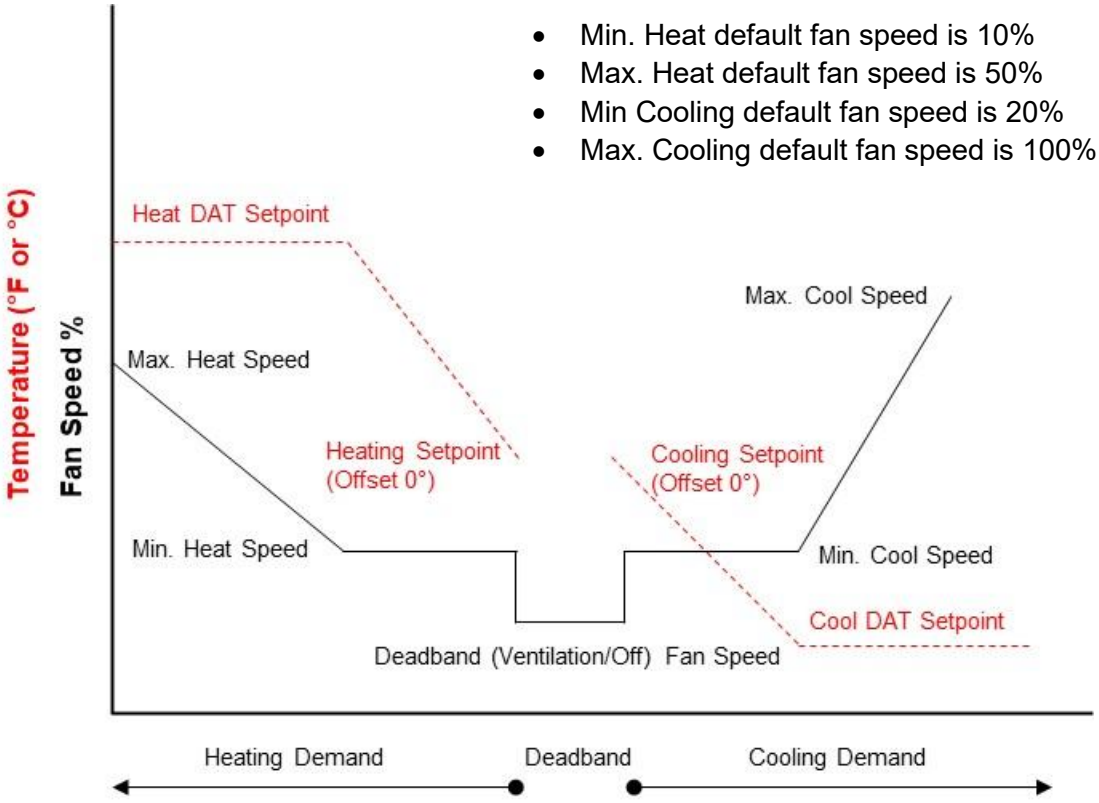
The heating and cooling setpoints shall be individually adjustable for both the occupied, unoccupied, and standby periods. The thermostat shall have a minimum deadband of 2°F (1°C) (no mechanical heating or cooling shall operate within this deadband). Space temperature deviation above the cooling setpoint or below the heating setpoint shall generate a demand signal to control the system as follows:

A. Heating: The thermostat shall control the heating output based on space temperature deviation (proportional gain), the duration of that temperature deviation (integral gain), and the rate of change of the deviation (derivative gain). The thermostat shall call regulated heated water and fan when space temperature falls below heating setpoint.

B. Cooling: The thermostat shall control the cooling output based on space temperature deviation (proportional gain), the duration of that temperature deviation (integral gain), and the rate of change of the deviation (derivative gain). The thermostat shall regulate chilled water and fan when space temperature exceeds cooling setpoint.

C. Heating Setback and Cooling Setup: Initiation of heating setback or cooling setup for each of 7 days or holidays, special events shall be provided by a programmed time schedule entered into the thermostat, mobile app, and/or building automation system.

D. ASHRAE guideline 36-2021, Sec. 5.22 Compliance: Follows ASHRAE FCU high efficiency sequence of operations for floating or modulating heating/cooling valve configurations including 3-speed or variable speed fan configurations including discharge air temperature control with adjustable heating and cooling discharge air setpoints. Configurable minimum and maximum heating and cooling speeds. Reference Figure 1 below



- Min. Heat default fan speed is 10%
- Max. Heat default fan speed is 50%
- Min Cooling default fan speed is 20%
- Max. Cooling default fan speed is 100%

Figure 1

E. Setpoint Recovery from Unoccupied to Occupied: The thermostat shall incorporate a programmable ramping feature for both heating and cooling that gradually changes the space setpoints with settings for both min. and max. setpoint recovery in degrees per hour. During recovery operation, the setpoint changes at a rate in degrees per hour

F. Fan Operation: Fan operation shall be selectable as follows:
   a. Manual: Fan operates continuously in occupied mode, and during standby modes, and during a heating or cooling cycle.
   b. Circulate: Operates fan a minimum of 20 minutes/hour including heating-cooling cycles.
   c. Auto: Fan is energized with active heating or cooling cycles.
   d. Variable: 3 or 10 user manually adjustable fan speed settings. Continuously variable in auto mode
   e. Hidden: Display management setting for applications without need for fan control

G. Power Interruption:
   a. On loss of power, the thermostat shall maintain programmed times and temperatures indefinitely
   b. Clock and day information shall be retained for a minimum of 72 hours.

H. Temporary Override:
   a. Temporary Override may be used when the thermostat is in Unoccupied or Standby mode. It shall switch to the Occupied mode for an installer-configured number of hours. The default shall be three hours.
   b. Selecting Temporary Override shall cancel the overrides and return to the programmed schedule

I. Permanent Override:
   a. Permanent Override may be initiated to provide 24/7 fixed setpoint schedule
   b. No temperature setback or occupied, unoccupied, standby schedule will be observed when permanent override is active

J. Outdoor Air Temperature Lockouts (Heat Pump – Air Source)
   a. Optional outdoor air temperature sensor configuration analog or Sylk bus type
   b. Compressor and auxiliary heat lockouts

K. Water Source Heat Pump Enable/Lockouts
   a. Configurable digital output to enable water valve or pump
   b. Proof of water flow function using configurable digital input (flow pressure switch or current switch)
   c. Proof of water flow function configurable as alerts or lock-out plus alert

Features and Specifications

TC3xxB/TC3xxC Thermostat Features

A. Color Touch Screen Interface— Three main informational screens
   1. Home Screen: operational status, current temperature, occupancy, humidity, WiFi, alerts and setpoint
   2. Indoor Conditions: temperature, humidity

3. Settings Menu: scheduling, Override, setpoints, configuration, alarms, backlight brightness, contractor info., °F/°C

B. Wired Control—BACnet MS/TP & Modbus RTU
C. Flexible Installation—FCU 2-Pipe/4-Pipe, 1H/1C Conventional, 2H/1C Heat Pump air/water, RS485, 2-wire bus
D. Multi-Level user types—Visitor, Basic, Admin, Installer
E. Scalable control—Upgradable to provide advanced energy savings analytics for cloud-based remote supervisor/dashboard
F. 365-day schedule with up to total 20 holidays/special events, Up to 4 schedule events/day
G. Flexible Schedule options
   a. Commercial Schedule
   b. Residential Schedule
   c. Fixed Setpoint (No Schedule)
   d. Hospitality mode (requires onboard occupancy and light sensor)
H. Configurable fan speeds (up to 3-speed, or variable speed w/3 or 10 adjustable settings
I. Onboard humidity sensor to support dehumidification functions
J. Optional onboard CO2 sensor
K. Optional onboard Occupancy and light sensors
L. Remote Sensor support: Space Temperature & Averaging, Discharge Air (Temperature and Humidity), Indoor Humidity, Occupancy, Pipe Sensor
M. Sylk sensor support
N. Tamper-proof housing
O. Auto-changeover
P. Configurable alarms
Q. 5-year warranty

Electrical Characteristics

A. Power Supply Rated voltage: 24VAC 50/60Hz,
B. Working voltage range: 20-30VAC, UL listed class-2 transformer or IEC 61558 listed transformer.
C. Power Consumption (Display ON) Max. 8.5VA @ 24VAC (355mA @ 24VAC)
D. Min. Load 4VA (all Digital Outputs OFF, No Sylk sensor)
E. Max. Load 96VA (all Digital Outputs ON)
F. Rated Impulse Voltage: 500 V
A. Relay Type: Type 1, Form B
B. Pollution Degree: 2

Display

A. Display Type 24 BPP TFT display with CTP
B. Resolution 320x240 pixel
C. Active Display Area 2.4” diagonally (Dimmable)
D. Backlight LCD (Dimmable)
E. LED Color Ring Blue (cooling), Orange (heating)

Operating Environment

A. Ambient Operating Temperature 32 to 122 °F (0 to +50°C)
B. Ambient Operating Humidity 10 to 90% relative humidity (noncondensing)

C. Storage Temperature -40 to 150 °F (-40 to 65.5°C)
D. Protection Class IP20

I/O Characteristics

UIO x 3	• Resistive Temperature Sensor Input — NTC10K Type II, C7021 series — NTC10K Type III (Space Temperature Sensor only), C7023 series — NTC20K, TR21, and C7041 series • 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
AI (DIO1 DIO2) 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 • Digital Input — Dry contact closure — Open circuit (≥ 100Kohms) — Closed circuit (≤100ohms)
DO1-3, DIO1-2	• Relay Output • Rated Average Current — 1A Resistive at 24VAC • Rated Pulse Current — 3.5A Resistive at 24VAC

Supported Sensors and Devices

Sensors	Options	Part Numbers
Occupancy Sensor	Direct (Normally Open) Reverse (Normally Closed)	Dry contact occupancy sensor
Proof Of Air Flow Sensor	Direct (Normally Open) Reverse (Normally Closed)	DPS200, DPS400, DPS1000 MCS, CS, CSP current switches (Dry contact switches)
Discharge Air Temperature Sensor	NTC 20K NTC 10K Type II NTC 10K Type III Sylk	C7250A, C7041 Series C7021 Series C7023 Series C7400S
Space Temperature Sensors	NTC 20K NTC 10K Type II NTC 10K Type III Sylk	TR21, C7041 Series, C7772A C7021 Series, C7772F C7023 Series, C7772G TR40, TR40-H, TR40-CO2, TR40-H-CO2, TR50-3N, TR50-3D
Changeover Pipe Sensor	NTC 20K NTC 10K Type II NTC 10K Type III	C7250A, C7041 Series C7021 Series C7023 Series
Changeover Switch	Closed with heat Closed with cool	Digital input
Drain Pan / Leak Detector	Direct (Normally Open) Reverse (Normally Closed)	Dry contact float switch or water sensor
Proof of Water Flow Sensor	Direct (Normally Open) Reverse (Normally Closed)	Dry contact pressure switch or current switch (pump)

Communication Technologies and Standards

BACnet MS/TP	RS485 (9.6, 19.2, 38.4, 76.8, 115.2 Kbps)
Modbus RTU	RS485 (1.2 to 115.2 Kbps)
Sylk™	Honeywell Sylk™, 2-wire, non-polarity sensitive

Certifications and Standards

- CE
- FCC
- ICES-003
- UL/cUL
- RoHs
- REACH
- Prop65
- UK
- EN 60730-1
- EN 60730-2-9
- EN 300 328,
- EN 301 489-1
- EN 301 489-17
- EN 62479
- EN 62311
- EN305 550 Part 15C 15.255 RSS210
- UL60730-1
- UL60730-2-9
- Title 47 part 15 subpart B
- ICES-003