

23 09 13 Instrumentation and Control Devices, Daikin One+ Smart Thermostat for Unitary Systems

Part 1 – GENERAL

1.01 SECTION INCLUDES

- A. Thermostat, **Daikin One+** Smart Thermostat.
 - a. Part Number:
 - DTST-ONE-CWBSA-NI-A

1.02 QUALITY ASSURANCE

- A. The thermostat shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark These meets the National Electric Code (NEC) and Canadian Electrical Code (CEC) requirements.

1.03 DELIVERY, STORAGE AND HANDLING

- A. The thermostat shall be stored and handled according to the manufacturer's recommendations.

1.04 WARRANTY

- A. NON-OWNER OCCUPIED RESIDENCE WARRANTY
 1. This warranty is provided to you by Daikin Manufacturing Company, L.P. ("Daikin"), which warrants all parts of this thermostat ("control"), as described below.
 2. This warranty applies to controls installed in residences not occupied by the owner.
 3. Warranty coverage begins on the "installation date." The installation date is one of two dates:
 - 1) The installation date is the date that the control is originally installed.
 - 2) If the date the control is originally installed cannot be verified, the installation date is three months after the manufacture date. The third through sixth digit of the serial number (YYMM) on the control indicate the manufacture date. For example, XX1906XXXXX, "1906" indicates the control was manufactured in June 2019
 4. Registration is not required to obtain warranty coverage, but registration entitles the owner to the Registered Additional Term Warranty described in the following paragraph. If the unit is not registered, the warranty lasts for a period up to 5 YEARS after the installation date (the "Initial Term Warranty").
 5. If the unit is properly registered online within 60 days after the installation date, an additional warranty (the "Registered Additional Term Warranty") is provided and lasts for as long as the original registered owner ("registered owner") owns the residence in which the unit was originally installed for a period up to 10 YEARS after the installation date. To register, go to www.daikincomfort.com and click "PRODUCT Registration."

6. Neither of these warranties continues after the control is removed from the location where it was originally installed. The replacement of a control under this warranty does not extend the warranty period. In other words, Daikin warrants a replacement control only for the period remaining in the warranty that commenced on the installation date
7. Complete warranty details available from your local Daikin representative or at www.daikincomfort.com.

1.1. Physical characteristics

A. General:

The thermostat shall have a capacitive multi-touch display for control and monitoring. The thermostat shall have a physical rotational dial for precise setpoint adjustment. The thermostat shall have a high-resolution touch screen that supports tactile-based interactions. The thermostat shall have a light pipe indication for heating/cooling operation.

1.2. Electrical characteristics

A. General:

The thermostat shall be able to obtain power directly from the indoor unit, 24VAC between common and power (connections C & R in the thermostat).

B. Wiring:

- a. Maximum wire distance between the thermostat and the indoor unit should not exceed 125 feet using 18-gauge wire. The thermostat shall be wired to connect 1, 2, C and R from the Daikin One+, to 1, 2, C and R at the indoor unit. Then, connect wires 1 and 2 from the indoor unit to 1 and 2 at the outdoor unit.
- b. The wiring from the thermostat to the indoor unit shall be 18 AWG (4-conductor wire) solid or stranded wire. However, communications reliability may be improved by using a high quality, shielded, twisted pair cable for the data transmission lines.

Part 2 - PERFORMANCE

2.01 DESIGN BASIS

The HVAC equipment basis of design is Daikin. All bidders shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein (see Appendix A for general information on HVAC equipment alternate supplier). In any event the contractor shall be responsible for all specified items and intents of this document without further compensation.

Part 3 – PRODUCTS

3.1. DTST-ONE-CWBSA-NI-A: DAIKIN *ONE+* SMART THERMOSTAT

A. General

The thermostat controls the indoor unit with an elegant design. The thermostat can also be controlled by an iOS/Android smartphone app. Only one thermostat can be placed to control the indoor unit on a unitary one to one solution (without zoning). Using the EWC UT-3000 zoning panel will allow connectivity for up to 5 thermostats (5 zones).

The thermostat shall be two-way communicating and serve as a cloud-connected hub and controller for Daikin communicating HVAC systems.

The thermostat cloud shall seamlessly integrates with open smart home architectures including Amazon Alexa and Google Assistant.

1. Mounting:
 - a. The thermostat shall be either flush mounted or surface mounted onto the wall.
 - b. A surface-mounted plate shall be provided with the thermostat.
 - c. For flush mounting the flush mount installation kit can be purchased as an option.
2. Power supply:
 - a. The thermostat shall be able to obtain power directly from the indoor unit, 24VAC between common and power (connections C & R in the thermostat).
3. Display Features:
 - a. The thermostat shall be approximately 6 3/4" x 3 3/8" x 1 3/16" in size with a capacitive multi-touch display.
 - b. The thermostat weight shall be approximately 10.5 oz.
 - c. The thermostat shall have a configurable light pipe that uses blue/red light to indicate for heating/cooling operation that can be turned on/off
 - d. The thermostat shall have a physical rotational dial for precise setpoint adjustment
 - e. Display language shall be selectable from English, French or Spanish.
 - f. The thermostat shall have selectable font size: standard, and large.
 - g. Display of temperature information shall be configurable for Fahrenheit or Celsius

- h. Errors and alerts shall be displayed using natural language in the event of system abnormality/error.
- i. The thermostat shall have configurable brightness level.

4. Operation:

- a. The thermostat shall control the following operations of the indoor unit:
 - i. Mode (Auto/Heat/Cool/Off/Emergency Heat (HP only)).
 - ii. Setpoint (Dual/Single). Set point ranges from 50°F to 90°F within a selectable 2°F to 9°F dead band.
 - iii. Fan Settings (always ON/Circulate/Auto/On Schedule).
- b. The thermostat shall have built-in temperature and humidity sensors to monitor the indoor environment as follows:
 - i. Indoor temperature
 - 1. Internal temperature sensor:
Operating range: 32°F -120°F
Accuracy: +/- 1.0 degree at 70°F, (required by Energy Star Connected Thermostat)
 - ii. Indoor humidity
 - 1. Internal humidity sensor:
Accuracy: +/- 5% RH from 30% to 50% RH at 75°F
- c. The thermostat shall be able to limit the user adjustable setpoint ranges individually for cooling and heating in the occupied period
- d. The thermostat shall be able to control the indoor unit towards a preset overcooling temperature for dehumidification. Overcool range is from 0°F to 3°F.
- e. The thermostat shall have a dehumidification feature, and shall be able to control the dehumidification demand as follows:
 - i. In the scenario for a dehumidification demand, the unit will try to overcool up to 3°F to satisfy the target humidity. If the system reaches the target humidity before exceeding the overcool limit, the unit will terminate the request for dehumidification. The thermostat shall have an internal humidity dead band of (+/-) 3% exists to prevent premature on/off cycles.
- f. The thermostat shall provide status, error code and service reminders notification through natural language
- g. The thermostat shall have an option to set service reminders for system maintenance. Preset reminders options include filter replacement/clean, AIQ, UV bulbs, dehumidification filter, humidifier pad, and service.
- h. The thermostat shall have home and away mode for comfort control
- i. The thermostat shall support Geofencing, using global positioning (GPS) to define a geographic boundary. This “virtual barrier” can be established through the thermostat or its iOS/Android smartphone app. Enabling the Geofencing feature the system can automatically turn ON the energy savings (AWAY mode) set points when a mobile device exists the specified area.
- j. The thermostat shall provide a screen saver when in AWAY mode.
- k. The thermostat shall have a 7-day programmable schedule with up to 6 scheduled events per day and adjustable hold function.

- l. The Daikin communicating outdoor units contain a temperature sensor. The thermostat will use the temperature reading from this sensor if the internet connection is down or no weather data is available.
 - m. The thermostat shall have an air quality screen to display the indoor air quality levels, outdoor air quality levels, and the weather (when connected to the internet and paired with the thermostat iOS/Android smartphone app).
 - n. The thermostat shall have a feature to run the indoor fan at a high speed for 3 hours to circulate air and filter the indoor air.
 - o. The thermostat shall keep clock running for 3 hours during a power outage
 - p. The thermostat shall have 2 auxiliary outputs 24V (dry contacts) to use with a humidifier and dehumidifier.
 - q. The thermostat shall have Quiet mode (Only available with the FIT outdoor unit), reduce the operation noise during a set time with up to 3 sound suppression levels. The user shall be able to input start and end time, the size of the house, and levels for vertical rise between outdoor and indoor (same/outdoor lower/indoor lower).
 - r. The thermostat shall have night mode. When enabled, night mode turns off the display and light bar during the selected schedule time.
- 5. Demand Response
 - a. The thermostat shall meet the requirements for Occupant Controlled Smart Thermostats requirements (The thermostat shall comply to Title 24 JA5 requirements, Occupant Controlled Smart Thermostat (OCST), sections 110.2, 110.2.b, and JA5 OCST).
 - b. The thermostat shall be capable of both receiving and responding to Demand Response Signals, through the OpenADR 2.0b. The product shall recognize two basic system event modes: price response and Demand Response periods (depending on the utility program). Both basic system event modes can be overridden by the occupant.
- 6. Operating temperatures:
 - a. The thermostat shall be stored at an ambient temperature range of 32°F to 120 °F
 - b. The thermostat shall be operated at a temperature range from 32 °F to 120 °F
 - c. The thermostat shall be operated at an ambient humidity range of 20% to 95% (non-condensing)
- 7. Communication:
 - a. The thermostat shall be able to update the software over-the-air.
 - b. The thermostat shall be able to report outdoor temperature, outdoor humidity, and weather forecast.
 - c. The thermostat shall be capable of communicating through Wi-Fi network .
 - d. The thermostat shall be capable of communicating through Daikin's proprietary ClimateTalk protocol.
- 8. iOS/Android App Operation:
 - a. The thermostat shall be capable of control the thermostat through iOS and Android App.

- b. The thermostat shall be able to control and monitor the following operations of the indoor unit:
 - i. Mode (Auto/Heat/Cool/Off).
 - ii. Setpoint (Dual/Single).
 - iii. Fan Settings (Always ON/Circulate/Auto/On Schedule).
 - iv. IAQ.
 - c. The thermostat shall be capable of controlling and monitoring the schedule of the thermostat.
 - d. The thermostat shall be able to monitor a specific thermostat location to look at:
 - i. system information and status.
 - ii. active alerts and alert history.
 - e. The thermostat shall have geo-fencing function to determine Home and Away mode based upon the user's smart device location.
- 9. Support Voice Control
 - a. The thermostat shall work with Amazon Alexa and Google Assistant.
- 10. Commissioning
 - a. The thermostat shall use a full set-up function to walk installer/homeowner through the entire commissioning process.
 - b. The thermostat shall use auto-discovery process to identify Daikin equipment connected to the system:
 - I. Enables random access to any setting.
 - II. Remembers settings as they are entered.
 - III. User may stop and restart as needed.

APPENDIX A
HVAC EQUIPMENT ALTERNATE (GENERAL INFORMATION)

- 1) The alternate equipment supplier shall provide to the bidding mechanical contractor a complete equipment data package.
 - a) This package shall include, but is not limited to, equipment capacities at the design condition, power requirements, indoor units CFM/static pressures, fan curves, installation requirements, and physical dimensions. Nominal performance data is not acceptable.
 - b) The mechanical contractor shall request and receive the equipment data package ___ days prior to bid date and submit this package with the alternate bid.
 - c) The mechanical contractor shall list the equipment supplier and submit the required data package with the bid detailing a complete comparison of the proposed alternate equipment to the specified equipment and the associated cost reduction of the alternate equipment. The contractor bids an alternate manufacturer with full knowledge that that manufactures product may not be acceptable or approved.
 - d) All equipment must have visible and permanent label clearly identifying the original manufacturer of the equipment. These labels shall have original manufacturer's name and contact information and be located both inside and outside the equipment and on all equipment-related literature. Submittals shall include the above statement as confirmation by supplier that all conditions are agreed to and complied to. Failure to comply with these requirements shall be sufficient cause for rejection of the submittal and product with no further consideration.
- 2) The alternate equipment supplier shall furnish a complete drawing package to the mechanical contractor ___ days prior to bid day for bidding and installation.
 - a) The drawing format shall be .dxf or equivalent, on 30"x42" sheets.
 - b) The HVAC and electrical series design documents will be made available in electronic format for use by the equipment supplier in preparing their drawings.
 - c) The alternate equipment supplier shall prepare the following drawings:
 - i) XXX HVAC Floor Plan
 - ii) XXX HVAC Refrigerant Piping/Controls Details
 - iii) XXX HVAC Details
 - iv) XXX HVAC Schedules
 - d) The alternate equipment supplier shall draft all refrigerant piping components, overall building control schematic, detailed control wiring diagrams, system details and schedules for their system. The drawings shall convey all requirements to successfully install the alternate equipment suppliers system.
 - e) Provide (2) drawing package sets plotted on 20 lb. vellum. Provide (1) drawing package in electronic format (.dxf files) on CD.
 - f) The submitted documents shall be complete system designs and show no less information than the HVAC equipment/controls contract bid documents.
- 3) The equipment supplier shall submit, as part of the equipment data package, outdoor unit data sheets. Data sheets to include the following:
 - a) COOLING capacities at project design conditions:
 - i) Cooling (Btu/h)
 - ii) Cooling Input Power (kW)

- iii) SEER
 - iv) EER
 - b) HEATING capacities at project design conditions:
 - i) Heating (Btu/h)
 - ii) Heating Input Power (Btu/h)
 - c) The submitted capacity and efficiency performance must meet or exceed the listed performance on the schedule at the designed outdoor ambient and indoor space temperature conditions including de-rate factors for defrost.
 - i) HSPF
 - ii) COP
 - iii) OPERATING TEMPERATURE RANGE:
 - (1) Cooling
 - (2) Heating
 - iv) POWER SUPPLY:
 - (1) Maximum Circuit Amps (MCA)
 - (2) Maximum Overcurrent Protection Amps (MOP)
 - (3) Maximum Starting Current (MSC)
 - (4) Outdoor Fan Motor
 - v) UNIT DATA:
 - (1) Sound pressure level at 3.3 ft (dBA)
 - (2) Weight (lbs)
 - (3) Dimensions
- 4) The equipment supplier shall guarantee the performance of their system and all published data submitted. Performance shall be based on the design criteria below.
 - a) Room Temperature (Cooling)
 - b) Room Temperature (Heating)
 - c) Ambient Temperature (Summer)
 - d) Ambient Temperature (Winter)
- 5) The alternate equipment supplier shall submit with bid, indoor unit data sheets. Data sheets to include the following:
 - a) Capacities at project design conditions:
 - i) Cooling (Btu/h)
 - ii) Heating (Btu/h)
 - iii) Air Flow (CFM)
 - iv) SEER
 - v) EER
 - vi) HSPF
 - vii) COP
 - b) External Static Pressure (ESP)
 - c) Electrical Data (MCA, MOP, MSC, RLA)
 - d) Weight (lbs)
 - e) Dimensions