

WalTech UST – Smart RV Thermostat Specification Sheet

The UST is a next-generation smart thermostat designed for recreational vehicles (RVs), combining universal compatibility, advanced connectivity, and IoT gateway functionality. It replaces existing RV thermostats while enabling remote control, automation, and sensor integration.

Key Features

- Universal compatibility with most existing RV HVAC systems (single-zone and multi-zone)
- Dual connectivity: 2.4 GHz Wi-Fi and LTE Cat M1 with NB-IoT fallback
- IoT gateway functionality for Bluetooth Low Energy (BLE) and Zigbee devices
- Integrated mobile app for iOS and Android for remote monitoring and control
- Full-color touchscreen interface for intuitive local control

Hardware Architecture

- ****Main Processor****: ESP32-S3 – handles touchscreen UI, UART communications, and MQTT data exchange
- ****Cellular Module****: Quectel BG95M3LA-61-SGNS – LTE Cat M1 with NB-IoT fallback for wide-area connectivity
- ****IoT Gateway MCU****: STM32WB55 – operates concurrently as BLE and Zigbee gateway, passing data to ESP32-S3 over UART
- ****Power Input****: 7.5V – 32V DC and AC
- ****Antenna Setup****: External chip antenna for LTE, internal PCB antenna for Wi-Fi, BLE, and Zigbee

Connectivity & Communication

- Wi-Fi: 2.4 GHz 802.11 b/g/n (via ESP32-S3)
- Cellular: LTE Cat M1 with NB-IoT fallback (via BG95)
- BLE: Bluetooth Low Energy (via STM32WB55)
- Zigbee: Zigbee 3.0 protocol (via STM32WB55)
- MQTT: Communication with cloud services and mobile apps
- UART: Data exchange between ESP32-S3, BG95, and STM32WB55

Mobile App

The companion mobile app (iOS & Android) enables users to control temperature settings, monitor HVAC status, receive alerts, and manage connected Zigbee/BLE devices from anywhere. The app communicates securely with the thermostat over MQTT through cloud or local network connections.

Physical & Environmental

- Dimensions: 5.5 in (L) x 3.25 in (W) x 1.25 in (H)
- Weight: ~220g
- Operating Temperature: -10°C to 60°C
- Storage Temperature: -20°C to 70°C
- Humidity: 5% – 90% RH (non-condensing)

Compliance

- FCC Part 15 compliance for unlicensed radio operation
- Modular certifications for ESP32-S3 and BG95 (subject to antenna gain limits)
- Zigbee 3.0 and BLE interoperability

FCC Caution.

a、 § 15.19 Labeling requirements.

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.

b、 § 15.21 Changes or modification warning.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

c、 § 15.105 Information to the user.

Note: 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.

*RF warning for Mobile device:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.