



# Model 200-201 T-Stat LLC User's Manual



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## Revision History

Date	Rev #	Modifications	By:
8/27/20	1.0	Initial release	K. Nickel
5/14/21	1.1	Minor typographical changes	K. Nickel



## 1.0 Overview

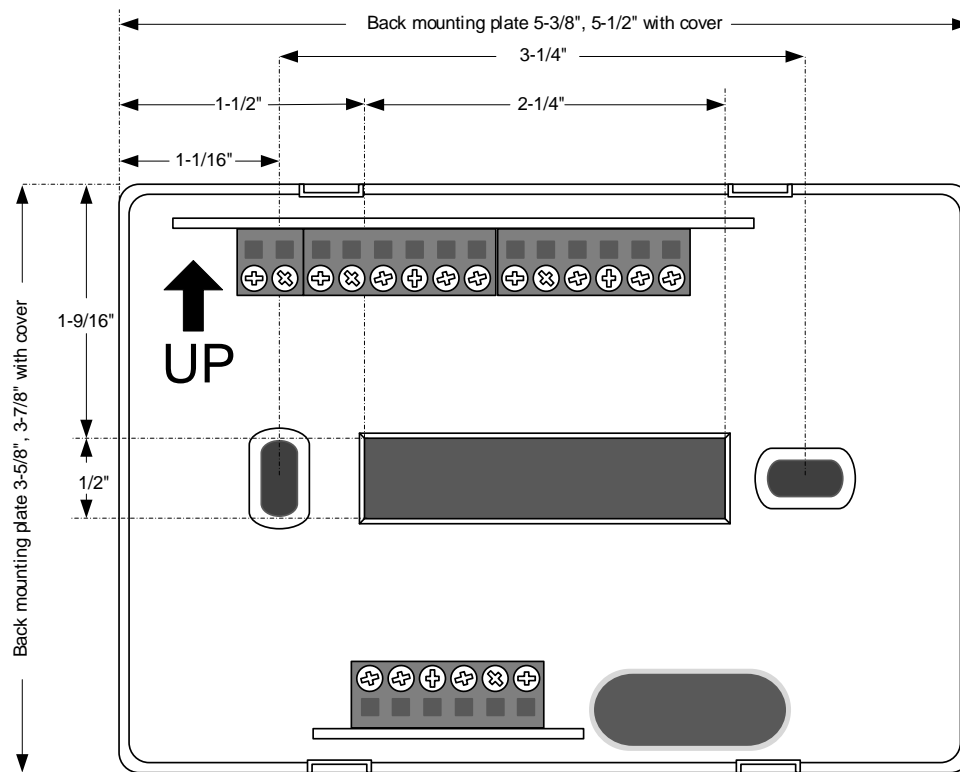
The Quest Controls Lead/Lag thermostat is designed for controlling 2 HVAC units with 2 stages of cool and 1 stage heat. The controller also features built in High temp/Low temp alarm(s) and inhibit run function. It is an easy to use thermostat for remote shelters that require a simple to use lead/lag controller with a wide profile operating range for cooling.

## 1.2 Features and Benefits

- Controls twin two stage HVAC systems for Fan, Cool 1, Cool 2, and Heat 1.
- High temp and Low temp alarm
- Inhibit function that allows you to turn off a unit for service or to just not run that unit.
- Powered from both HVAC 24VAC transformers.
- Automatic Lead/Lag changes every 24 hours.
- LCD display for current operating mode and shelter temperature readings.
- Comfort mode to allow “Occupied” settings for a one-hour timed duration.
- Five button keypad for navigation to other status screens.
- Built in zone temperature.
- Settings are secluded behind specific key combinations and password protected.
- All configurations and setpoints are stored in non-volatile flash memory.

## 2.0 Installation / Wiring

*The T-Stat LLC is a simple application specific controller designed to control twin two stage cool and single stage heat conventional HVAC units.*



**Figure 1 – Back Plate Mounting**

## 2.1 Installing the mounting plate

1. **Plan the Location** –The T-Stat should be mounted away from external sources of heat or cold (doors, HVAC supply grill, exhaust from equipment, radio heads, etc.) and provide a good representation of the shelter's temperature.
2. **Prepare the Area** - The mounting screw holes will line up on a standard duplex outlet box or can be flush mounted to the wall. When flush mounting, ensure clearance for the wires to exit through the center window on the back plate. Install outlet box or screw anchors and run thermostat wires.
3. **Remove the cover** - The cover of the T-Stat is held on by four clips, two on the top and two on the bottom. Remove the cover carefully, the cover may be snug and depressing the clips through the slot openings may help in getting the cover off.
4. **Mount the Plate** - Dress the wires through the center window on the back plate and install mounting screws. Tighten screws to ensure the plate is mounted securely, but do not over tighten and warp the back plate.

## 2.2 Wiring

1. **Terminate the Wire Connections** – Cut off excess wire, dress wire flush to the back panel and strip 1/4" of insulation to expose conductor. Insert and tighten using the Wire Terminations diagram. Label all point to point connections at both ends of the cable.
2. **Connection Descriptions:**

Terminal	Description – Wire Color	
<b>HVAC 1 – R</b>	24VAC POWER (+)	RED
<b>HVAC 1 - COMM</b>	24VAC COMMON (-)	BLACK
<b>HVAC 1 - G</b>	FAN/BLOWER (G)	GREEN
<b>HVAC 1 – Y1</b>	COOL 1 (Y1)	YELLOW
<b>HVAC 1 – Y2</b>	COOL 2 (Y2)	BLUE
<b>HVAC 1 – W1</b>	HEAT 1 (W1)	WHITE
<b>HVAC 2 - R</b>	24VAC POWER (+)	RED
<b>HVAC 2 - COMM</b>	24VAC COMMON	BLACK
<b>HVAC 2 - G</b>	FAN/BLOWER (G)	GREEN
<b>HVAC 2 – Y1</b>	COOL 1 (Y1)	YELLOW
<b>HVAC 2 – Y2</b>	COOL 2 (Y2)	BLUE
<b>HVAC 2 – W1</b>	HEAT 1 (W1)	WHITE
<b>HI TEMP ALARM</b>	HI TEMP ALARM (+)	NC – Normally Closed
<b>COMM ALARM</b>	HI TEMP ALARM (-)	C – Common
<b>LOW TEMP ALARM</b>	LOW TEMP ALARM (+)	NC – Normally Closed
<b>COMM ALARM</b>	LOW TEMP ALARM (-)	C – Common
<b>INHIBIT SWITCH</b>	STOPS BOTH RTU'S	NO – Normally Open

**Figure 2 - Connection Descriptions**

### 3. Typical Wiring Diagram

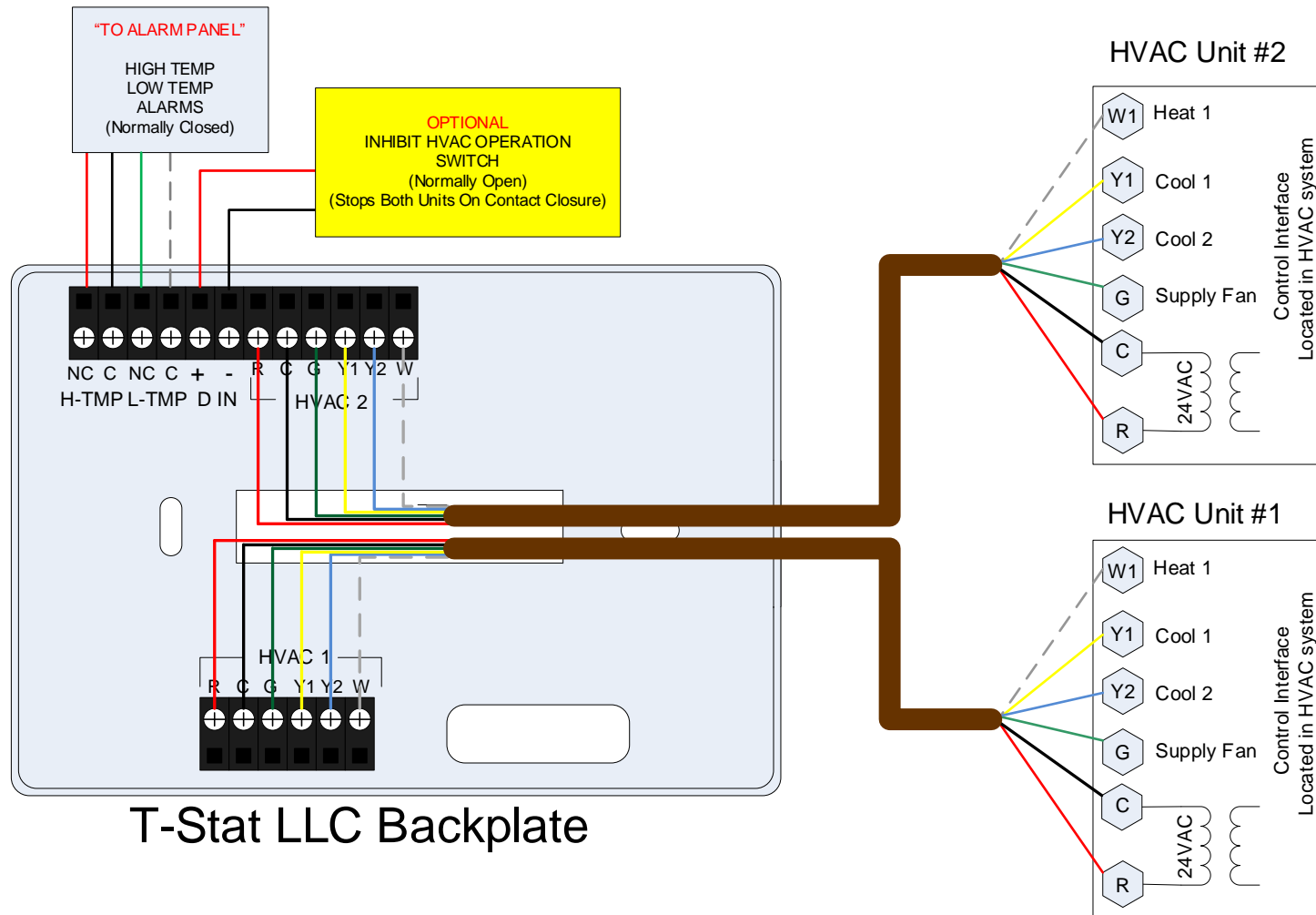


Figure 3 – Typical Wiring Diagram

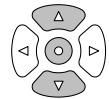
### 3.0 Front Panel Display/Keypad Operation

The Quest T-Stat LLC has a 2X16 character backlit LCD display and five buttons for status review and programming. The backlight is normally off but will turn on with a press of any key. The backlight will turn off after a few seconds of no keys being pressed. The first press of the keypad will turn on the backlight and tell the T-Stat to be ready for additional key presses. All keypad operation described below is after you press and release any key to enable the backlight.

#### 3.1 Run Mode

The display will show the current lead system along with the zone sensor reading on the top line. The second line will show the system status i.e. calling for cooling or heating along with the Lead fan status of ON or Auto. Additional status information can be reviewed by pressing the up or down arrow keys. This will cycle the display on the second line to show: Occupied status and control mode of each HVAC unit.

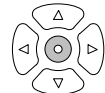
Lead Sys 1	80°F
Cool 1	Fan Auto



#### 3.2 Occupied Override

Press the center button until the T-Stat asks if you want to enter occupied override mode. The default value is No. Use the up or down arrow to change the value to Yes. Then press the center button again to accept your choice. If you choose Yes, then the T-Stat will be in occupied override mode for the programmed delay time or unless the user presses the center button again to disable the occupied override mode.

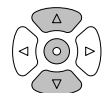
Enter Occupied?
No



#### 3.3 Lead Switch

The lead system will switch based upon an internal timer. The default setting is every 24hours. The Lead can be switched manually by pressing the up and down arrow simultaneously. The display will ask if you want to switch the lead with the default answer value of No. Press the up or down arrow to change the answer to Yes and then press the center button to do the change.

Make HVAC2 Lead?
No





### 3.4 Programming the T-Stat Settings

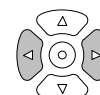
The T-stat LLC comes preprogrammed from Quest Controls, with the following settings:

Setpoint Name	Value
Normal mode - Lead unit cooling stage 1 on	80
Normal mode - Lead unit cooling stage 2 on	82
Normal mode - Lag unit cooling stage 1 on	84
Normal mode - Lag unit cooling stage 1 on	86
Normal mode - All cooling off	75
Normal mode - Lead unit heating on	45
Normal mode - Lag unit heating on	43
Normal mode - All heating off	50
Comfort mode - Lead unit cooling stage 1 on	76
Comfort mode - Lead unit cooling stage 2 on	78
Comfort mode - Lag unit cooling stage 1 on	80
Comfort mode - Lag unit cooling stage 2 on	82
Comfort mode - All cooling off	71
Comfort mode - Lead unit heating on	55
Comfort mode - Lag heating on	53
Comfort mode - All heating off	60
Lead Switch time	24 hours
Comfort mode time	1 hour
Lead unit fan operation	Automatic

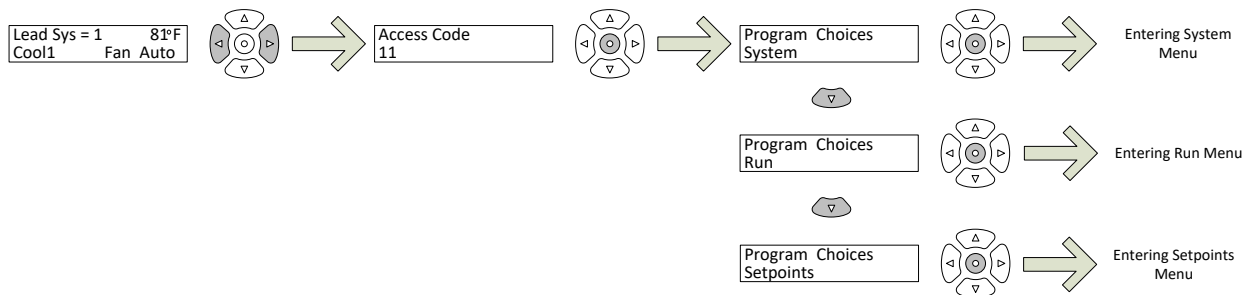
#### 3.4.1 Entering Program Mode (Model 201 only)

Press and hold the left and right arrow simultaneously until the display says Program Choices. The screen is password protected with the factory default password of 11. Use the up/down arrow keys to change the password value and press the center button to log in. Passwords can be changed to any value from 11 to 99. From this menu use the up/down arrows to navigate to the available choices: System, Setpoints, & Run. Choosing one of these options will present the available choices. Use the up/down arrows to cycle through the choices for each field and the center button to accept the change and move to the next choice. Once you start in one of the program menus, you must step through all choices until the end to accept your changes. Press the center button to accept the current program value and go on to the next choice. The factory default values are underlined below:

Access Code  
11



### 3.4.2 Programming flow:



**Figure 4 - Programming Flow**

### 3.4.3 Sub Menus

#### System:

This is the menu for doing the initial system setup. Items programmed under this menu are:

Lead Swap Hours (0 - 168 Hours) (Default 24)

Occupied Fan Mode: Auto, On (Default Auto)

Unoccupied Fan Mode: Auto, On (Default Auto)

Zone Sensor Spot: On Board or Off Board (Default On Board). \*Not Used\* - Leave as On Board

Zone Temperature Offset: -9 to 9 (0)

Occupied Override Time 0-240 minutes (Default 60)

Access Code 11-99 (Default 11)

#### Setpoints:

Used to set all the Thermostats parameters

Occupied Cool Setpoint: 70-90 (Default 74)

Occupied Heat Setpoint: 35-65 (Default 55)

Unoccupied Cool Setpoint: 70-90 (Default 80)

Unoccupied Heat Setpoint: 35-65 (Default 45)

(Lead) Cool Stage 2 Delta: 1-9 (Default 1)

(Lag) Cool Stage 3 Delta: 1-9 (Default 2)

(Lag) Cool Stage 4 Delta: 1-9 (Default 2)

Cool Off Delta: 1-9 (Default 5) -Both units go idle when below setpoint.

(Lag) Heat Stage 2 Delta 1-9 (Default 1)

High Temp Alarm 80-140 (Default 80)

Low Temp Alarm 30-60 (Default 50)

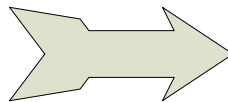
#### Run:

Puts the T-Stat back in run mode

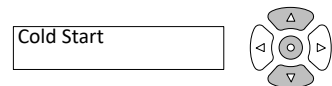
## 4.0 Care and Cleaning

The T-Stat LLC should provide years of uninterrupted service. Minimal preventive maintenance is required. However, it is important to make sure that the T-Stat is kept free of dust. A dusty T-Stat will not allow air to circulate properly around the built-in temperature sensor effecting proper operation of the unit.

Ensure temperature probe in this air tunnel is free of dirt and dust.



## 5.0 Troubleshooting

LCD Screen is dark, and no characters are displayed	Remove cover and verify presence of power on the “R” terminal, check connection of the common on the “C” terminal. Check for presence of 24VAC between R and C.
T-Stat mode say Cool1, but compressor does not engage	Verify connection to HVAC unit. Ensure short-cycle timer is not inhibiting unit.
Buttons do not respond	Press buttons slowly, some functions may take pressing the button twice.
Display is corrupted	<p>First, cycle power to the unit. If this does not correct the problem, reset system by removing the Thermostat from the mounting plate. Then return the body to the mounting plate while depressing the up arrow, center button and down arrow all at the same time. The display will respond with “Cold Sense”, these buttons must be held for a minimum 5 second. This will begin a system restart and the display will respond with “Cold Start”. Release the buttons. This action will reset the T-Stat and return all settings to their factory defaults.</p> <div data-bbox="1101 1535 1430 1619" data-label="Image">  </div>



## **Contact Information:**

### **Web Site**

[www.questcontrols.com](http://www.questcontrols.com)

### **Quest Controls, Inc.**

Tel: (941) 729-4799, Fax: (941) 729-5480  
208 9th Street Dr. West, Palmetto FL 34221

### **Technical & Applications Support:**

[CustomerService@QuestControls.com](mailto:CustomerService@QuestControls.com)

(941) 729-4799 Option 5

### **RMA Support:**

(941) 723-4112