

Description

This full-featured thermostat is designed for cooling and heating systems in residential and commercial buildings. The thermostat can be configured for use with air handlers, fan coils, VAV's, modulating valves and many other HVAC applications. All models support BACnet and Modbus protocols which allows for easy integration with big name control systems like Niagara, Siemens, Honeywell, Johnson Controls, Delta, Reliable and Kreuter just to name a few. There are five relays outputs and two analog outputs as well as 8 universal inputs. These can be configured using the T3000 free software avialable for download. There are more than 300 settings with many options. This makes it possible to configure these devices for most any HVAC application. Once the unit is configured, you can save the file and copy it to other controllers and backup project settings.

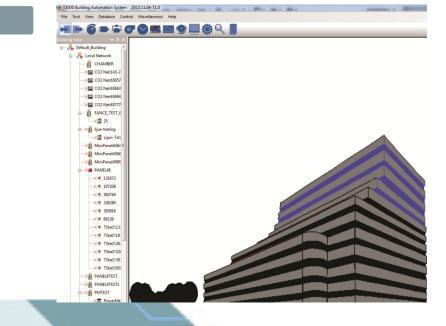
Options are available for occupancy, zigbee wireless and humidity / enthalpy control.



Highlights

- BACnet MS/TP and Modbus RTU protocols over RS485.
- Baudrates of 1.2k, 4.8k, 9.6k, 14.4k, 19.2k, 38.4k, 57.6k, 76.8k and 115.2k.
- Well documented register list for easy integration with other systems.
- 8 universal inputs for external temperature, voltage, contacts, etc.
- 5 relay outputs, rated at 12~24vac @ 2 amps each.
- 2 analog outputs, 0-10V @ 100ma each.
- Color LCD display with configurable scroll bar.
- · Easily configure the thermostat for practically any application.
- On board clock with infinite life supercap battery backup.
- Uses a 32 bit Arm CPU with 12 bit analog resolution.

T3000 Software



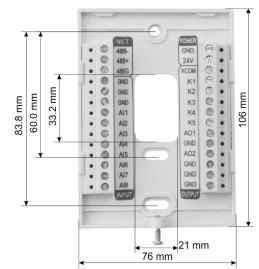
Typical Applications



Specifications

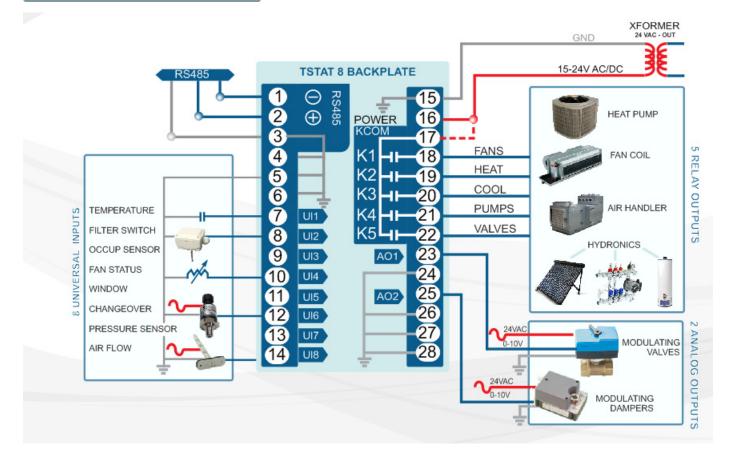
| Outputs | 5 relay outputs 24vac @ 2 amps; 2 analog outputs 10V @100mA |
|-----------------------|--|
| 8 Universal Inputs | 10k therm, contacts, 4-20ma, 0-5V,0-10V |
| Operating range | -30~70°C(-22~158°F) / 0 to 99% RH |
| Supply voltage | 12~24VAC/DC ±20%, 50-60Hz |
| Power consumption | 100mA at 12VDC |
| Relay contacts | 5 relays, 2A @ 24VAC UL File No.: E169380 |
| Plastic Housing | Flammability rating UL 94 file E56070 |
| Enclosure rating | IP31 |
| Protocols | BACnet MS/TP and Modbus RTU RS485 |
| Baudrate | 9600, 19200, 38400, 57600, 76800, 115200 |
| Temperature sensor | 10K thermistor ±0.5°C |
| Setup Software | Free, no licensing, open source, down- load from website |





stat8 Bacnet Thermostat

Typical Applications



Approvals

| Relay | UL File No. E169380 |
|-------------------|---------------------------|
| Plastic Enclosure | PA66 UL 94 V0 file E56070 |
| PCB | FR-4 Epoxy Glass Cloth, |
| | UL E479892 |
| Terminal Block | PA66 UL 94V-0 |

Software

- 8 analog inputs, 2 analog outputs; 5 digital outputs
- Industry standard BACnet MS/TP& Modbus proto cols
- Configurable user screen displays
- Day at home, work time, night at home, sleep and holiday Schedules

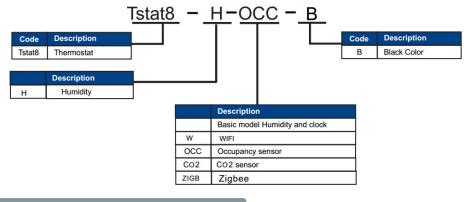


Bacnet Objects

| Device | Object identifier;Object name;Object type;Vendor name;Vendor identifier;Model name;Firmware revision;Application software version;Protocol version;Protocol revision;Object list;Max apdu length accepted;Segmentation supported |
|-----------------|--|
| Universal Input | UI1:temperature present value;UI2~UI9:present value Object identifier;Object name;Description;Object type;Present value;Out of service;Units |
| Analog Output | AO1:analog output 1 value;AO2:analog output 2 value Object identifier;Object name;Description;Object type;Present value;Out of service;Units;Priority array |
| Analog Value | AV0:baudrate select Object identifier;Object name;Description;Object type;Present value;Out of service;Units;Priority array |
| Binary Output | BO1~5:Relay Output 1~5 Object identifier;Object name;Description;Object type;Present value;Out of service;Units;Priority array;Polarity;Relinquish default;Active textInactive text |

Part Number Scheme

* Tstat8 - Black : MOQ 50PCS



Structure Highlights

 NEI

 485

 485

 485

 6ND

 GND

 GND

 GND

 GND

 AI1

 AI2

 AI3

 AI4

 AI5

 AI6

 AI7

 AI8
 GND 24V **Deenee** KCOM K1 K2 Self reset fuses К3 Mount on electrical K4 K5 . box or surface mount AO1 GND 0 0.. 0 AO2 GND GND GND -Pluggable base 0. Jack to network Mounting screw

Menu Item Details

Tstat8 have several advanced menu items which can be adjusted in the field to suit the specific application and tune the operation of the thermostat. All the parameters are set up at the factory on an order-by-order basis and will give satisfactory results out of the box.

| 64.5°F SET 20.0°C FAN Med SYS Auto | SYS (1000 :85.8% Ti |
|--|---|
| Occupied Time 00:16 Specify displayed items and order,register 564 Fan Day/Night Cooling/Heating Occupied/Unoccupied | Last menu Item Decrease value Increase value |

LCD Screen Display

1 .When you press \blacktriangleleft or \blacktriangleright , it will increase or decrease the set point value. The value will flash two times, then it will confirm the setting automatically.



2.In normal mode, press both and at the same time, and hold for several seconds, this will switch to the menu mode. Press or to scroll through the menu options such as 'Add', 'CAL', 'bAU', 'UNI TS' and many others. To change the values at a particular menu, press or the value will be stored automatically.

To change the unit's address, scroll through the menu until you reach 'Add'. Press \blacktriangle or \checkmark to increase or decrease the unit's address from 1 to 254.

To change the baudrate, locate 'bAU' within the menu and use \square and \blacksquare to choose 1 9200 or 9600.



stat8 Bacnet Thermostat





Tstat8-H-OCC



Tstat8-H-Zigbee

1.Visit https://tinyurl.com/y7uyu9n3, download T3000 software and install it;

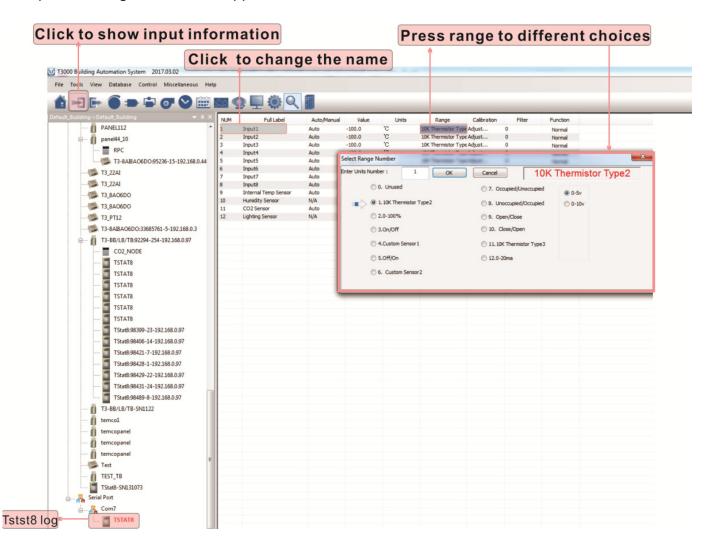
2.Plug Tstat8 in power, connect the Tstat8 to a PC via RS485 or Ethernet;

3.Start the T3000 software, click *Q* to scan, the following view will appear. Close after the scan is complete.

| | 6 🔹 🛱 | | <u>~</u> | 🖳 🏟 🔍 | |
|---|-----------------------------------|---|------------------------|---|-----------|
| Information Inputs Outputs | Variables Programs Loops | Graphics Schedules Holidays | Trend Logs Alarms | Network Configuration Discover Points | Buildings |
| | C | lick to scan | Tstat8 conne | ected | |
| ST3000 Building Automation System 2016.11.1 | 7 | | | | |
| File Tools View Database Control Misce | ellaneous Help | | | | |
| ≜ +3 E+ 🌍 ⇒ 🛱 O | 🛇 🏥 🔤 🔍 🛄 🏟 🖸 | | | | |
| Default_Building->Default_Building | ✓ Ø × ID Address 64 | Change ID Serial Number 95238 | | | |
| | Firmware Version 1.9 | Model T3-8AI8AO6DO | | | |
| | Hardware Version 3 TCP/IP Info | Scan Result | | | × |
| | IP Model | SCAN RESULT: | | | |
| | IP Address | Model Building Floor TStats fault Build floor1 | Room Sub_net Serial# A | ddress Port Protocol 254 COM7 Modbus 485 | |
| | 192 . 168 . 0 . 98 | | | 168.0.29 502 TCP/IP | |

| | | Tstat8 de | etecte | d | | С | lick | to clos | se w | hen d | liscus | ssingTs |
|--|------|--|--|---|--|---|---|---|---|--|--------|---------|
| T3000 Building Automation System 2017.03.02 | | 1 I | | - | | | | | | | | |
| ile Tools View Database Control Miscellaneous Help | | | | | | | | | | | | |
| ti 🕞 🕞 🌘 🖚 🖨 🐨 🛇 🚟 🛤 🔮 🖳 🤅 ding Yiew — a X | | | | | | | | | | | | |
| | Scan | Result | | | | | | | | | | X |
| | | | | | | | | | | | | |
| | | SCAN RESULT: | | | | | | | | | | |
| | | SCAN RESULT: Model | Building | Floor | Room | Sub net | Serial# | Address | Port | Protocol | | - |
| | | and the second second second | Building fault_Buildi | Floor floor1 | | Sub_net fault_Buildi | Serial# 97144 | Address 254 | Port COM7 | Protocol Modbus 485 | | - |
| | | Model | | | | fault_Buildi | | | | | | _ |
| | | Model TSTAT8 | fault_Buildi | floor1 | room1 | fault_Buildi | 97144 | 254 | COM7 | Modbus 485 | | |
| | | Model TSTAT8 BTUMeter | fault_Buildi fault_Buildi | floor1 Floor1 | room1 Room1 | fault_Buildi Sub_net1 | 97144 92661 | 254 192.168.0.140 | COM7 502 | Modbus 485 TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO | fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi | floor1 Floor1 Floor1 | room1 Room1 Room1 | fault_Buildi Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 888888888 | 254 192.168.0.140 192.168.0.15 | COM7 502 10000 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO FlowMate | fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi | floor1 Floor1 Floor1 Floor1 Floor1 Floor1 | room1 Room1 Room1 Room1 | fault_Buildi Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 | 254 192.168.0.140 192.168.0.15 192.168.0.140 | COM7 502 10000 502 502 502 502 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO FlowMate FD_TEST_144 | fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi | floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 | room1 Room1 Room1 Room1 Room1 | fault_Buildi Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 88888888 92294 98609 | 254 192.168.0.140 192.168.0.15 192.168.0.140 192.168.0.144 192.168.0.97 192.168.0.33 | COM7 502 10000 502 502 502 502 502 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO FlowMate FD_TEST_144 temcopanel Humdity | fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build | floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 | room1 Room1 Room1 Room1 Room1 Room1 | fault_Buildi Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 88888888 92294 98609 98399 | 254 192.168.0.140 192.168.0.15 192.168.0.140 192.168.0.144 192.168.0.97 192.168.0.33 192.168.0.97 | COM7 502 10000 502 502 502 502 502 502 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO FlowMate FD_TEST_144 temcopanel | fault_Build fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi | floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 | Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 | Fault_Buildi Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 888888888 92294 98609 98399 98421 | 254 192.168.0.140 192.168.0.15 192.168.0.140 192.168.0.144 192.168.0.97 192.168.0.97 192.168.0.97 | COM7 502 10000 502 502 502 502 502 502 502 502 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO FlowMate PD_TEST_144 temcopanel Humdity TSTAT8-7 | fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build | floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 | room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 | fault_Buildi Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 888688888 92294 96609 96399 96421 98469 | 254 192.168.0.140 192.168.0.15 192.168.0.144 192.168.0.97 192.168.0.97 192.168.0.97 192.168.0.97 192.168.0.97 | COM7 502 10000 502 502 502 502 502 502 502 502 502 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO FlowMate FD_TEST_144 temcopanel Humdhy TSTAT8-7 armtest_11 | fault_Build fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi fault_Buildi | floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 | room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 | fault_Buildi Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 88888888 92294 98609 96399 96421 96489 66781 | 254 192.168.0.140 192.168.0.15 192.168.0.140 192.168.0.33 192.168.0.37 192.168.0.97 192.168.0.97 192.168.0.97 192.168.0.97 | COM7 502 10000 502 502 502 502 502 502 502 502 502 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO FlowMate FD_TEST_144 temcopanel Humdky TSTAT8-7 armtet_11 TSTAT8 | fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build | floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 | room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 | Fault_Build Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 88888888 92294 96609 98399 96439 96489 66781 96419 | 254 192.168.0.140 192.168.0.15 192.168.0.140 192.168.0.33 192.168.0.37 192.168.0.97 192.168.0.97 192.168.0.97 192.168.0.97 | COM7 502 10000 502 502 502 502 502 502 502 502 502 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO FlowMate POTEST_144 temcopanel Humdby TSTAT8-7 armtet_11 TSTAT8-7 Bemo | fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build | floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 | room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 | Fault_Build Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 888888888 92294 99609 98399 96421 96489 66781 96419 66781 | 254 192.168.0.140 192.168.0.15 192.168.0.15 192.168.0.37 192.168.0.37 192.168.0.97 192.168.0.97 192.168.0.97 192.168.0.97 | COM7 502 10000 502 502 502 502 502 502 502 502 502 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP | | |
| | | Model TSTAT8 BTUMeter T3DEMO FlowMate FD_TEST_144 temcopanel Humdky TSTAT8-7 armtet_11 TSTAT8 | fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build fault_Build | foor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 Floor1 | room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 Room1 | Fault_Build Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 Sub_net1 | 97144 92661 90023 0 88888888 92294 96609 98399 96439 96489 66781 96419 | 254 192.168.0.140 192.168.0.15 192.168.0.140 192.168.0.33 192.168.0.37 192.168.0.97 192.168.0.97 192.168.0.97 192.168.0.97 | COM7 502 10000 502 502 502 502 502 502 502 502 502 | Modbus 485 TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP TCP/IP | | |

4. Click Tstat8 log, then click 2, this will display all of the Tstat8 inputs. Change the name of the input and range that fits the application.



stat8 Bacnet Thermostat

5.Click to see the status of the Tstat8. This window will display setpoints, temperature, inputs and outputs.

| T3000 Building Automation System 2017.03.02 | 1 | | | | | | |
|--|------------------------------------|---|------------------------|----------|-------------------------------------|------------|--------------|
| File Tools View Database Control Miscellaneous Help | | | | | | | |
| 🕯 🖃 🕞 🌒 🖨 🐨 🕙 🖮 🛛 | 900 | 0 | | | | | |
| Inputs [Alt-I] Sensors and feedback points wired to the controlle | r ID Address 254 | | Serial Number 0 | | emperature and Setpoint Setpoint | | |
| | Name: TSTAT8 | | | | | DAY | NIGHT |
| panel44_10 | | | | | | Occupied 🔄 | Unoccupied V |
| RPC | Firmware Version | 2.9 | Model TStat8 | | Cooling | 25.0 C | 22.0 C |
| T3-8AI8AO6DO:95236-15-192.168.0.44 | Hardware Version | 0 | PIC 0 | - | Heating | 23.0 C | 20.0 C |
| T3_22AI | Tidi Girdi e Version | 0 | PIC | | | | |
| T3 22AI | | | | | | | |
| - | Date Friday, Dec | 23, 2016 Time | e 01:39:27 PM Sy | Inc Time | | 30 | 30 |
| T3_8AO6DO | | | | | Current | | |
| T3_8A06D0 | | | | | Temperature | | |
| T3_PT12 | Temperature 27.9 | C - | Fan Mode Off | - | | | |
| T3-8AI8AO6DO:33685761-5-192.168.0.3 | Overide Period 0 | | Time Left 0 | | 27.9 C | | |
| T3-BB/LB/TB:92294-254-192.168.0.97 | | Output | Time Left 0 | | | | |
| CO2_NODE | PID1 Mode COO | DLING 1 0% | Co | oling () | | | - |
| | PID2 Mode HEA | TING 1 100% | Hei | ating 🔿 | | | |
| TSTAT8 | | | | | | | |
| TSTAT8 | Free Cool Available | No Free Co | ol Feature Normal N/A | | | | |
| TSTAT8 | | | (| | | | |
| - TSTAT8 | Adva | nced Setup | | | | 15 | 15 |
| TSTAT8 | | | 0.5.1 | | | | |
| TStat8:98399-23-192.168.0.97 | Input | | Output | | | | |
| TStat8:98406-14-192.168.0.97 | 0 Input1 | Value -100.0 | 1 Output1 | Value | - | | |
| | 1 Input2 | -100.0 | 2 Output2 | Off | | | |
| TStat8:98419-21-192.168.0.97 | 2 Input3 | -100.0 | 3 Output3 | Off | | | |
| TStat8:98421-7-192.168.0.97 | 3 Input4 | -100.0 | 4 Output4 | Off | _ | | |
| TStat8:98428-1-192.168.0.97 | 4 Input5 5 Input6 | -100.0 | 5 Output5 6 Output6 | Off 0.0* | 16 | | |
| TStat8:98429-22-192.168.0.97 | 6 Input7 | -100.0 | 7 Output7 | 0.09 | | | |
| TStat8:98431-24-192.168.0.97 | 7 Input8 | -100.0 | | | | | |
| | 8 Internal Temp S | and the second se | | | | | |
| TStat8:98489-8-192.168.0.97 | 9 Humidity Sensor 10 CO2 Sensor | N/A 400 | | | | | |
| T3-BB/LB/TB-SN1122 | 11 Lighting Sensor | 8 | | | | | |
| temcol | | | | | | | |
| | | | | | | | |

6.Click 🔅 to to edit advanced settings. The window below will open. Click "PIDs Tables" to edit PIDs and change the function of the outputs.

| \bigcirc L | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|-----------------|------------------------------|-------------|----------------------|---------------------|---------------------------------|----------------------|---------------|------------------|--------------|-----------------|-------------|------|-------------------|--------------------|-----------|-----------|---------------|---------|-----------------------------------|
| arameter | | | 10.00 | | | Trape days in | 1.000 | | | | | - 8 % | | | | | | | | |
| ID Address eneral Settin | | Enable | Change N | iame: TSTA | AT8 | | | | Exit | | | | | | | | | | | |
| | te 115200 | | | LC | TD OT | | Input Filter 0 | | | | tpoint control | | | | | | | | | |
| vpad Selec | | Setpoir | t 1.0 | | o Setpoint | 0 Sho | rt Cycle Delay 0 | | | 1-None | ormal1 • | | | | | | | | | |
| verup Mode | | Increament Sequence | 5 | | ng display n | | pad Lock Lock Off | | | Default 2 | | | | | | | | | | |
| | | Sequence | | • | | | | | | BackLight Of | FF Time 255 | min | | | | | | | | |
| mp Unit | °C 🕶 | | | heat/cool A | uto (PID 👻 | change over 0 selay(min) 0 | | | | Dead Master | 0 | | | | | | | | | |
| er Jeneral Se | tting | | | | | Override Timer | | | PIR Sensor Setti | | Setopint Displa | ay Temperat | | | | | | | | |
| Timer On: | 0 | Timer Off: | 0 | Units Se | cond 👻 | me Left 0 | min Override | Period 0 min | Enable/Disable | | | | 0 | s Set Dialo | | | | | | |
| Timer left | | Timer Select | Period time | | | Tranducer Tempera Max 255 | ature Setting Min | er. | Sensitivty | 100 | | | 1000 | | og ame Configu | ration | - | | | |
| Cabralat | | | | | | | | | | | | | | Fi | an Off | Model 1 | | | Fan Aut | t Exit |
| y Setpoint | Day/Occ | Max | Min | Cooling Dead Band | Heating Dead Ban | d Night Set Night/Un Mode | | | | Setpoints | | | | Off | | On | | | Auto | |
| Loop1 | Setting 24.0 | 50 | 15 | 1.0°C | 1.0°C | | 0.1°C | Heating DB | | | DAY | NIGHT | | | | | | Off | On | Auto Refresh Fan Auto Only |
| | 200.0 | | | 0.1 | 0.1 | Hotel/up |) • 0.1-0 | 0.14 | | 1 SP/2 SP: | | Dual 👻 | | #Modes/Spe ID1 | eeds 3 | - M | de: Off | Off | On | Auto Refresh Pari Auto Only |
| coope | 65535 | | | 255 | 255 | | Special Features | | | COOL DB: | | 1 | | 101 | | | | | | Heating Stages 1 Cooling Stages 1 |
| | 65535 | | | 255 | 255 | | | | | SetPoint: | 24 | 21 | | | Description | n Control | InterLock | Heat1 Coast | Cool1 | |
| Inp | ut select | Input value | Setot value | Output | Pterm | Iterm | Free cooling | Outdoor Reset | | Heat DB: | 1 | 1 | | 1 | Output1 | PID1 | | HO H | Off | Click to actillation Star |
| iop1 Int | ernal Sensor 👻 | 26.1°C | 24 | 0% | 6.0 | 5.0 | Airflow Setting | | | Heat SP: | 23 | 15 | | 2 | Output2 Output3 | | | OF OF | Off | Click to set"Heating Stag |
| | | | | | | | Valve Travel Time | 90 | PIDs Table | COOL SP: | 25 | 30 | | 4 | Output | PID1 | | HO HO | Off | value |
| opz Avy | Temperat. • | 20.10 | 200.0 | 100% | 100.0 | 1.0 | | | + | | | | | 6 | Outputs | | | Dissed Closed | Closed | |

7.Click the schedule icon \checkmark to go to schedule window, you can do schedule settings.

Each day we support 6 events, and you can select the mode for each event: For home mode, unit will use day setpoint to control the outputs; For work mode, it will use night setpoint to control the outputs; For sleep mode, it will use sleep setpoint to control the outputs.

| _ | Time | Monday | Tuesday | Wednesday | Thursday | Bridger | Seturday | Contau. | Holiday | - |
|-----|--------|--|---------|-----------|----------|----------|-----------|---------|---------|---|
| tem | | provide a second s | - | wearesoay | Inurspey | Friday | Secuciary | Sunday | PRINCEY | |
| | 06:00 | - | - | | | - | | | - | |
| | 18:00 | Hone | | - | | | | | | |
| | 22:00 | Work Sleep | | | | 7 | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | Insert | Copy To Monday F | riday D | eiete | | Elitrati | ke . | | | |

For example as below:

when time is between 6:00 to 9:00, unit will work on home mode;

when time is between 9:00 to 18:00, unit will work on work mode;

when time is between 18:00 to 22:00, unit will work on home mode;

when time is between 22:00 to Tuesday 6:00, unit will work on sleep mode.

| Veekly | Routine | |
|--------|---------|--------|
| Item | Time | Monday |
| 1 | 06:00 | Home |
| 2 | 09:00 | Work |
| 3 | 18:00 | Home |
| 4 | 22:00 | Sleep |

After you setup the Monday schedule, you can copy the Monday setting from Tuesday to Friday, then you can use the "Copy To Monday-Friday" function to copy the setting.



| ched | ules | | | | | | | | |
|-------|---------|--------|---------|-----------|----------|--------|----------|--------|---------|
| eekdy | Routine | | | | | | | | |
| Item | Time | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday | Holiday |
| 1 | 06:00 | Home | Home | Home | Home | Home | 27 | | |
| 2 | 09:00 | Work | Work | Work | Work | Work | | | |
| 1 | 18:00 | Home | Home | Home | Home | Home | | | |
| 4 | 22:00 | Sleep | Sleep | Sleep | Sleep | Sleep | - | | 1 |

If you need different setting for each day, you can use insert function to edit your schedule, for example, on Saturday, double click the window and it will show a small dialog to insert new event and you can set up the time.

| Item | Time | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday | Holiday | |
|--------|---------|---------------|---------|-----------|----------|------------|----------|--------|---------|------|
| 1 | 06:00 | Home | Home | Home | Home | Home | | | | |
| 2 | 09:00 | Work | Work | Work | Work | Work | | | | |
| 3 | 18:00 | Home | Home | Home | Home | Home | | | | 1 |
| 4 | 22:00 | Sieep | Sleep | Sleep | Sleep | Sleep | | | | 2 |
| | | | | | | | - 1 | | | |
| | | | | | | | | | | |
| | | | | | SetTime | | | | | |
| | | | | | 2:30:00 | | | | | |
| | | | | | ОК | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Schedu | ules | | | | | | | | | -× |
| Weekly | Routine | | | | | | | | | |
| Item | Time | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday | Holiday | |
| 1 | 06:00 | Home | Home | Home | Home | Home | | Home | | |
| 2 | 08:30 | | | | | | Home | | | |
| 3 | 09:00 | Work | Work | Work | Work | Work | | | | |
| 4 | 12:30 | | | | | | Work | | | |
| 5 | 18:00 | Home | Home | Home | Home | Home | | | | |
| 6 | 20:30 | | | | | | Home | | | |
| 7 | 22:00 | Sleep | Sleep | Sleep | Sleep | Sleep | | Sleep | | |
| 8 | 22:30 | | | | | | Sleep | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | Con Trained | | | | The second | | | | |
| | Insert | Copy To Monda | D D | elete | | V Enat | ae - | | | Exit |
| | Save | | | | | | | | | 200 |
| | | | | | | | | | | |

So on Saturday, when time is between 8:30 to 12:30, unit will work on home mode; when time is between 12:30 to 20:30, unit will work on work mode; when time is between 20:00 to 22:30, unit will work on home mode; when time is between 22:30 to Sunday 6:00, unit will work on sleep mode.

Note: Select "Enable" option to enable schedule function. After edit schedule, make sure click the save button to save the setting !

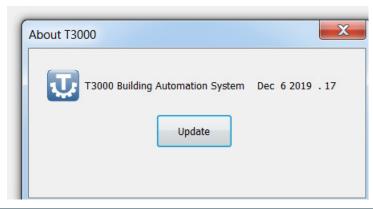
Update T3000

1.Visit <u>https://tinyurl.com/y7uyu9n3</u>, download T3000 software and install it;

2. Click" Help" and then click "Update T3000"

| Help | |
|------|-------------------|
| | Contents |
| | Version History |
| | Update T3000 |
| | Check For Updates |

3.Click"Update"



Download Firmware and Update

1.Plug Tstat8 in power, connect the Tstat8 to a PC via RS485 or Ethernet;

| | | | 1.0.1.00001 | A REPORT A ADDRESS OF A |
|--|--|----------|---------------------------|------------------------------|
| Download Firmware | | | | |
| Product ID : | 9 🗲 | | Update T3000 | Download Firmware Only |
| Product Name : | TStat8 | - | Open Firmware File Folder | Download Firmware And Update |
| modify negative icon for top fixed relay pwm output per rev 8_4 fix bacnet AV12 system mo fix input 4-20mA range whe rev8_3 fix when use register 101.8 rev8_2 fixed cycle delay and chang modify co2 fitter, before it modify compiler level to sol add new register 903 to cl Download finished. | erature input ; 803 to select delta temperatu p temperature displaying. ccentage 2 ode value and display bug. en current is over 17mA, dat & 691 to change the cool/hea ge over delay dose not work. Ive rev3 relays problem(relay ear all eeprom except serial : locally to C:\Program Files\ M7 0 14:1:49 | | | |
| Initializing device Erasing device ID 254: Programming line: | s 13952 to 14080.(5%) | <u> </u> | | • |

WIFI configuration setting

There are three methods which are EspTouch,T3000 to set IP adress and ADhoc setting 1.Set up via EspTouch

First install this app in a android phone and connect your phone with your wifi router, power on Tstat8.

The app will get the SSID from your phone and you need enter the wifi password, click confirm

| SSID: TEN | MCO_TEST_2.4G | |
|-----------|------------------|------|
| BSSID: 40 |):a5:ef:5d:32:ca | |
| Password | enter passw | vord |
| Device co | ount: 1 | |
| Broadd | ast O Multicast | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

After about less than 20 seconds, Tstat8 will get the IP, and can see the message from phone.

| SSID: TEMC0_TEST_2.4G | |
|--|----|
| BSSID: 40:a5:ef:5d:32:ca | |
| Password: password | |
| Device count: 1 | |
| Esptouch success, bssid = cc50e35ceef5, InetAddress = 192.168.10.240 | |
| | 确定 |
| | |
| | |
| | |
| CONFIRM | |
| v0.3.7.0 | |

2.Set up via T3000

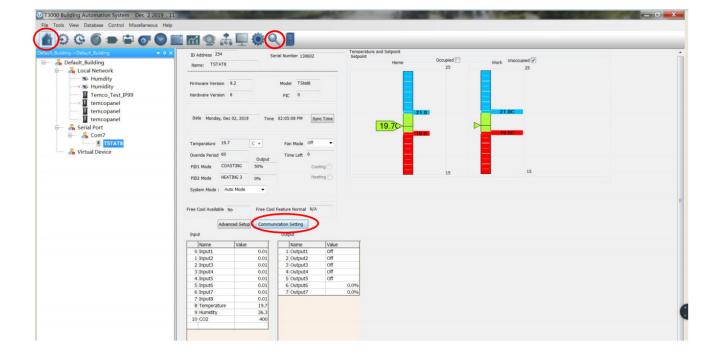
(1) Configure the wireless router and connect.

(2)Visit https://temcocontrols.com/ftp/software/09T3000Software.zip, download T3000 software and install it;

(3) Connect Tstat8 to PC via RS485

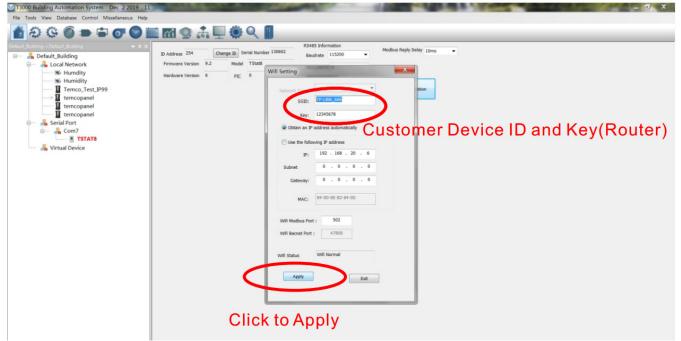
| (4)Start T3000 software, click | to scan |
|--------------------------------|---------|
| | |





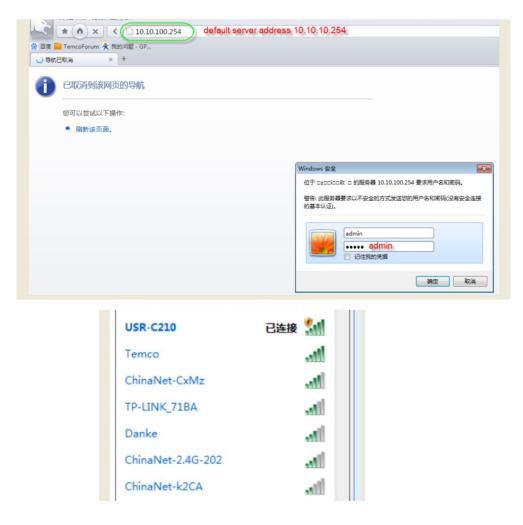
(6)Click" communication setting"

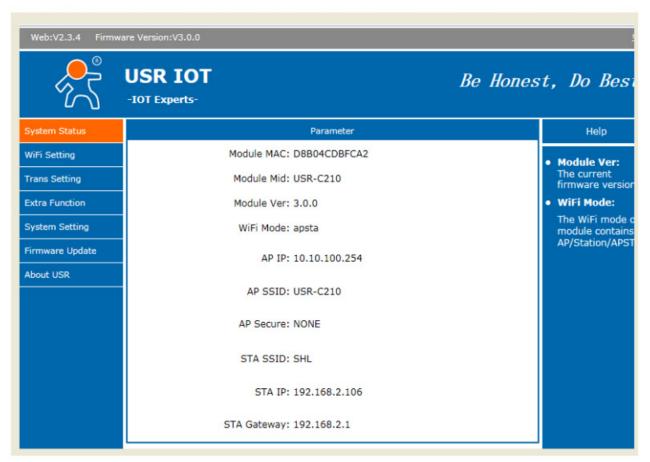
| U T3000 Building Automation System Dec 2 2019 . 11 | | | | _ 0 <mark></mark> X_ |
|---|--|--|---|----------------------|
| File Tools View Database Control Miscellaneous Help | | | | |
| 🖆 🕀 🕒 🖨 🐨 🕲 🗎 | i m 🤉 🚠 🖳 🍭 🔍 📘 | | | |
| Cold Caldrey - States Cold Network Cold Network | Image: State Image: State <td< th=""><th>R5483 Information Bacdrais 113200 MAC(MSTP) 0 MSTP/MOBUS Modius Bacnet Device ID : 136602</th><th>Woddus Reply Delay Ions With Configuration Click to do settings</th><th></th></td<> | R5483 Information Bacdrais 113200 MAC(MSTP) 0 MSTP/MOBUS Modius Bacnet Device ID : 136602 | Woddus Reply Delay Ions With Configuration Click to do settings | |
| | | | | |
| | | | | |



3. ADhoc setting

ADhoc is a singel hot model, which supports iphone, win7&8. The IP default address is10.10.10.254 (1). To set passwords and IP addresses in Adhoc mode, start the Tstat8 first, then scan for a wifi signal named 'USR-C210' from a computer with wifi, connect to the wifi.





(3)Enter the Module MAC. The Module MAC:D8B04CDBFCA2

| | kersion:V3.0.0 SR IOT)T Experts- | Be Honest | ±z t, Do Best! | Ŕ | USR IOT -10T Experts- | Be Honest, Do Best! |
|-----------------|---|-----------|---|-----------------|----------------------------------|--|
| | | | 10000 | System Status | Serial Port Setting | Help |
| System Status | WiFi Mode Select | | Help | Wifi Setting | | bps Baud Rate: |
| WIFi Setting | WiFi Work Mode: AP+STA mode 💌 | | Network Name | Trans Setting | | bit 1200460800bps |
| Trans Setting | AP mode | | (SSID): 1-32 characters: | Extra Function | Check Bit: None | CTSRTS/485: Default is NFC |
| Extra Function | Network Name(SSID): USR-C210 | | Case sensitive | System Setting | | bit Port: 1~65535 |
| System Setting | Password(8-63 bytes); NONE | | Password: The AP password | Firmware Update | Network Setting | Server IP |
| Firmware Update | Passion (0-03 Dytes). NONE | | is 8-63 bytes (STA password | About USR | | Address: When the module |
| | IP Address: 10.10.100.254 | | without this restriction), NONE | | SocketA Connect Setting | remote server |
| About USR | Mask: 255 255 255 0 | | said no encryption; Case | | Protocol: TCP-Server | address to be connected; When |
| | | | sensitive | | Port: 502 | it's TCP server, the parameter is |
| | STA Mode | | DHCP: Open this feature, | | Server IP Address: 10.10.100.254 | invalid; The parameter can be |
| | Router SSID: Temco | Search | will get IP by | | Socket8 Connect Setting | IP or domain name |
| | STA Password: | | dhcp; turn off, need to manually | | Protocol: UDP-Server | * |
| | STA Password: | | enter the IP | | Port: 1234 | |
| | DHCP: Enable | | | | Server IP Address: 10.10.100.254 | |
| L | Save | | | | Save | |

Zigbee Setup

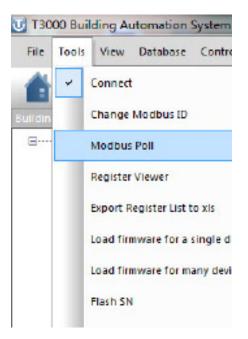
Click \bigcirc to scan, you can find the Zigbee BB.



Connect one tstat6 and two tstat8, then you can set the parameters of Zigbee BB.

| - TS | tat6:72794-6- | 192.1 | 168.0.97 | |
|---------------------------|-------------------------|--------|-----------------------|---|
| — 🗂 TS | TAT8 | | | |
| TS | TAT8 | | | |
| 4 | | | | |
| Device Carial De | 100 | | | |
| Device Serial Po | ort Config | | | |
| RS485 SUB : | Unused | Ŧ | 19200 | 1 |
| | | • | 19200 19200 | • |
| RS485 SUB : | Unused | · · | | |
| RS485 SUB : Zigbee : (| Unused Modbus Master | | 19200 | |

You can also get more information using Temco Modbus Poll tool.



As below,ID 255 means reading zigbee BB itself. Address 299 indicates how many units are connecting

For this test, there are 3 units connecting:

reg300: ID + 256 of unit 1, the highest bit set to 1 means that device is online, if it is off line, reg300 = ID = 18

It's the same for reg301 and 302 and so on.

| 7 | ModbusPoll1 | | | | | | Window Help |
|----|-------------|---------|------------|----------|-----------|------------|-----------------------|
| M | odel Name | : | Read/Write | e Defini | tion | J. | X |
| Co | onnected | | Slave ID: | 255 | | | OK |
| | Description | Address | Function: | 03 Read | d Holding | Registers(| (4x) - Cancel |
| 0 | | 0 | Address: | 299 | | | |
| 1 | | 1 | | _ | _ | | |
| 2 | | 2 | Quantity: | 10 | | | Αρρίγ |
| 3 | | 3 | Scan Rate: | 1000 | | | Read/Write Once |
| 4 | | 4 | View | | | | |
| 5 | | 5 | Rows | © 20 | @ 50 | 100 | Fit to Quantity |
| 6 | | 6 | Display | | | | |
| 7 | | 7 | Unsign | ed | | - | Hide Alias Columns |
| 8 | | 8 | | | | | PLC Addresses(Bace 1) |

| Description | Address | Value |
|-------------|---------|-------|
| TOTAL NO | 299 | 3 |
| SUBADDR F | 300 | 274 |
| SUBADDR L | 301 | 265 |
| SUBADOR L | 302 | 262 |
| SUBADOR L | 303 | 0 |
| SUBADOR L | 304 | 0 |
| SUBADOR L | 305 | 0 |
| SUBADOR L | 306 | 0 |
| SUBADOR L | 307 | 0 |
| SUBADDR L | 308 | 0 |

For debugging:

1. First make sure the zigbee unit is connected to the zigbee network, when it is connected you can see the red led keeps on, otherwise it will be flashing.

- 2. In these two situations you can try to re-power the zigbee BB
- A. If you wait for a long time the zigbee BB cannot find the units
- B. If you find the units by T3000,but when you click the unit icon you can not access them.
- 3. Using modbus poll to access each of the unit

| | ➡ 🖩 🔌 🍇 🖺 🖨 × 🔅 1x |
|-------|---|
| | dbusPoll 1 |
| | Name: Tx=15: Err=0: |
| Conne | |
| Des | Read/Write Definition |
| 0 | Slave ID: 255 OK |
| 1 | Function: 03 Read Holding Registers(4x) Cancel |
| 2 | Address: 0 |
| 3 | Quantities 100 Apply |
| 4 | Quantity: 100 Appry |
| 5 | Scan Rate: 1000 Read/Write On |
| 6 | View Rows |
| 7 | |
| | |
| 8 | Display: |

Schedules

The schedules of Tstat8 can be managed using T3000 software and Bacnet.Select Modbus protocol when you use T3000,and Bacnet protocol when you use Bacnet.

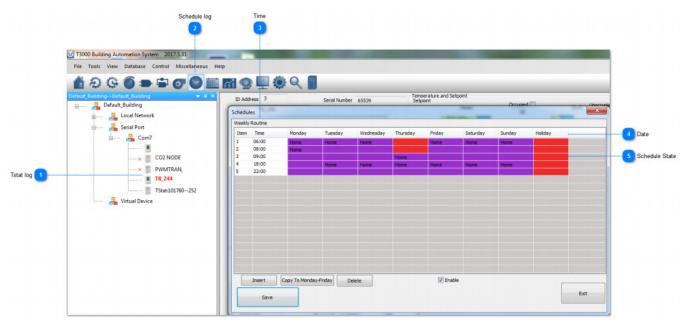
| T3000 Building Automation System 2017.5.31 | | | | | | | | | | |
|---|-----------------------------|----------------|-----------------------|--------------|--------------|------------------|------------|--------------|----------|------|
| File Tools View Database Control Miscellaneous Help | | * • • | | | | | | | | |
| Default_Building→Default_Building → P × | M 🔮 🖳 | | | | Temo | erature and Setp | oint | | | |
| Default_Building | ID Address 3 | | Serial Number | 65539 | Setp | pint | | Occupied | — | |
| e | Schedules Weekly Routine | | | | | - | - | | - | |
| 🖦 📲 Serial Port | Item Time | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday | Holiday | |
| Process 11.1 | 1 06:00 2 08:00 | Home | Home | Home | | Home | Home | Home | | |
| CO2 NODE | 3 09:00 4 18:00 | | Home | Home | Home Home | Home | Home | Home | | |
| T8_244 | 5 22:00 | | | | | | | | | |
| TStat:101760252 | | | | | | | | | | |
| Ritual Device | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | Insert | Copy To Monday | -Friday De | lete | | 🔽 Enable | | | | |
| | Save | | | | | | | | | Exit |
| | | | | | | | | | | |
| | | N.I. | | | | | | | | |
| Yet Another Bach | | | | | - | | | | | |
| File Functions | Options | Help | | | | | | | | |
| i 🗿 🗙 | | | | | | | | | | |
| Devices | | | | | | | scriptions | , Periodic P | olling. | |
| | | | | | | | evice | ObjectId | Nam | |
| | | Simple S | chedule E | ditor | | | | | | |
| Address Space | UE:8 | | | | | | | | | |
| ANALOG_VAL | | Validity St | art Date | | | Validity B | End Date | | | |
| ANALOG_VAL | | 2017/7/ | 27 | | | 2017/7 | /30 | | | |
| ANALOG_VAL | | | 125 202 | | | | | | | |
| ANALOG_VAL | UE:3 | Weekly S | | | | | | | | |
| ANALOG_VAL | | | [0] : Monda 22:00: | | | | | | | |
| ANALOG_VAL | | | 6:00:0 | | | | | | | |
| ANALOG_VAL | | | 8:00:0 | | | | | | | |
| ANALOG_VAL | | | 9:00:0 [1] : Tuesd | | | | | E | | |
| BINARY_OUT | | | 18:00: | | | | | | | |
| BINARY_OUT | | | 22:00: | | | | | | | |
| BINARY_OUT | PUT:4 | | 6:00:0 9:00:0 | | | | | | | |
| BINARY_OUT | PUT:5 | - R | [2] : Wedn | | | | | | | |
| WR1 | | | 18:00: | | | | | | | |
| Log | | | 22:00:0 | | | | | | | |
| Garbage | | | 9:00:0 | | | | | | | |
| Garbage Garbage | | ÷-@ | [3] : Thurso | | | | | - | | |
| Garbage | | | 18-00- | 00 - 1 | | | | | | |
| Garbage Garbage | | Objects p | roperties re | ferences | | | | | | |
| Garbage Garbage | | | | | | | | | | |
| Garbage | | | | | | | | | | |
| Garbage Garbage | | | | | | | | | | |
| Garbage | | | | | | | | | | |
| Garbage Garbage | | | | | | | | | | |
| Garbage Garbage | | | | | | Upda | ate & Rea | d back | | |
| Garbage | | Optional Exce | ption Sche | edule not in | plemented | 1 | | | | |
| Garbane | | | | | | | | | - | |

Managing schedules in T3000

The schedules can be managed using T3000 software.Below are the steps:

Step1.Visit 107.170.34.189/ftp/software/9TstatSoftware.zip ,download T3000 software and install it; Step2.Plug Tstat8 in power,connect Tstat8 to PC via RS485 or Ethernet;

Step3.Start T3000 software, click to scan, then you can find Tstat8 as below.



Tstat log

T8_244

Click to select the thermostat.



Click to show schedule details.

| Fime 6:00 8:00 | | | | | | | |
|----------------------|-----------|----|------------|----|----|----|----|
| | | | | | | | |
| 8:00 | | | | | | | |
| | | | | | | | |
| 9:00 | | | | | | | |
| 8:00 | | | | | | | |
| 2:00 | | | | | | | |
| he time list | ime list. | | y Thursday | | | | |
| 8: | 00 | 00 | 00 | 00 | 00 | 00 | 00 |



| Home | Home | Home | | Home | Home | Home | |
|------|------|------|------|------|------|------|--|
| Home | | | | | | | |
| | | | Home | | | | |
| | Home | Home | Home | Home | Home | Home | |
| | | | | | | | |

The tab shows the schedule state:Home/Work/Sleep.



21

Managing schedules using Bacnet

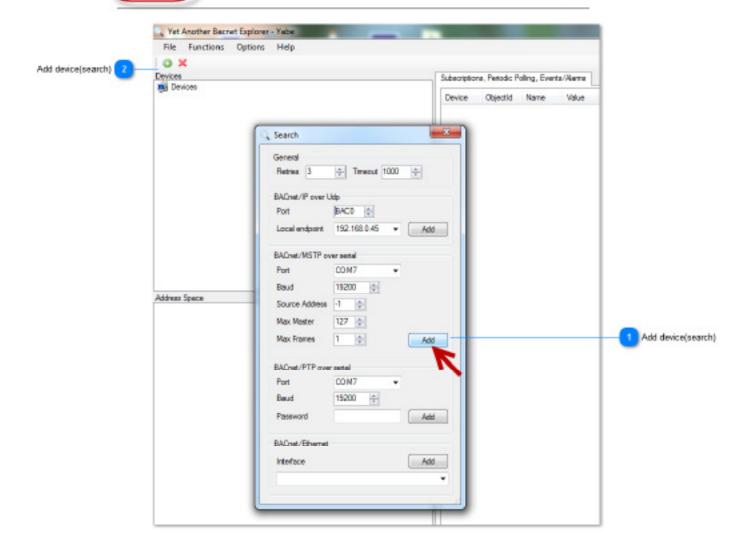
The schedules can be managed using Bacnet.Download Yabe software as the link:107.170.34.189/

ftp/software/yabe.zip and install it.Connect Tstat8 to the computer,select Bacnet protocol.Start the

Yabe software,add the device.

Index of /ftp/software/

| eef. | | |
|-----------------------------------|-------------|-----|
| 10SoftwareManualRev3.zip | 13-Apr-2016 | 06: |
| 12AccessDatabaseEngine.zip | 03-Mar-2015 | 02: |
| 13Zigbee_SupportDocs.zip | 27-Dec-2014 | 00: |
| 146K 7000 Linux.zip | 27-Dec-2014 | 00: |
| 1ModbusDll.zip | 27-Dec-2014 | 00: |
| 20SoftwareHanualRev2.0.chm | 29-Jun-2015 | 03: |
| 2HodbusD11.zip | 27-Dec-2014 | 00: |
| 5ModbusDllTestForVB.zip | 27-Dec-2014 | 00: |
| 6HodbusDllforVc.zip | 27-Dec-2014 | 08: |
| 7HodbusD11ForVC Example.zip | 27-Dec-2014 | 00: |
| 9TstatSoftware.zip | 15-May-2017 | 02: |
| Blank RMA.doc | 15-Feb-2017 | 08: |
| CC2531 Driver.zip | 09-Mar-2017 | 08: |
| ExamplePRGFiles.zip | 14-Jun-2017 | 03: |
| ISPTool_NoCheckingHex.zip | 19-Apr-2016 | 07: |
| ModbusBacnetRegistersListRev9.xls | 06-Jun-2017 | 05: |
| T3000.zip | 24-Ju1-2017 | 07: |
| T3000Update.zip | 07-Jul-2017 | 07: |
| (yabe.zip | 15-Mar-2017 | 09: |



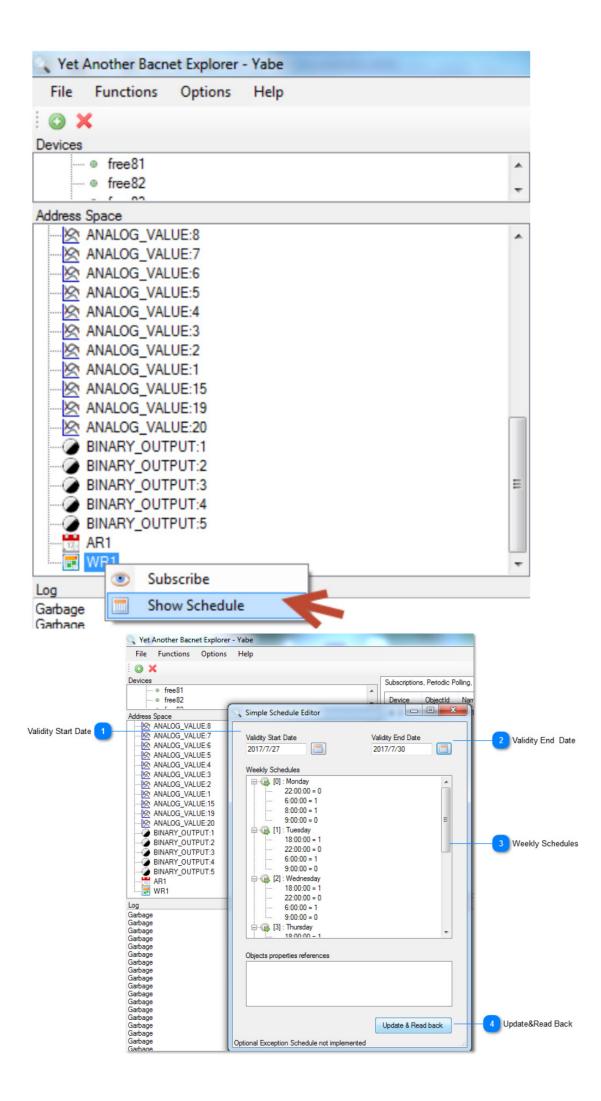


2 Add device(search)

Click to add device.

Weekly routines schedule

Right click "WR1" log (weekly routines) to set up the weekly schedule date. For the weekly routine, if status = 1, means unit will go to occupied and if status = 0, means unit will go to unoccupied. When the time is set up, click "Update & Read back" button to save and read the setting back.



| Validity Start Date Validity Start Date 2017/7/27 Click to set the start date. | |
|--|--|
| 2 Validity End Date Validity End Date 2017/7/30 Click to set the End date. | |
| 3 Weekly Schedules | |
| $\square \cdot (\square) = $ | |

Ε

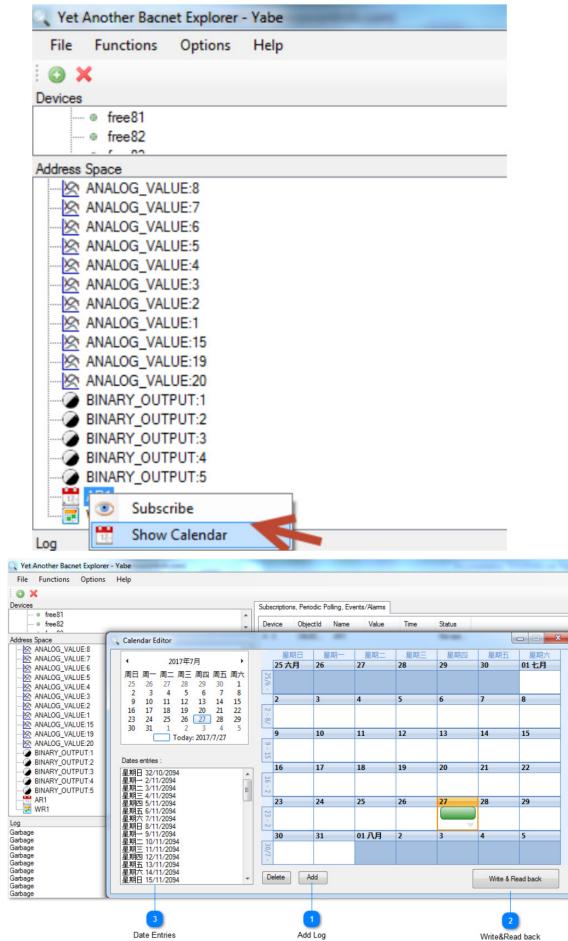
This tab shows the Weekly Schedules details.

| 4 | Update&Read Back |
|---|--------------------|
| - | Update & Read back |

Click the log to update &Read Back.

Annual routine schedule

Step4.Right click "AR1" log to set up annual routine date.You can set up the annual date from this tab.





3

Click to add the date.

| 2 | Write&Read back |
|---|-------------------|
| - | Write & Read back |

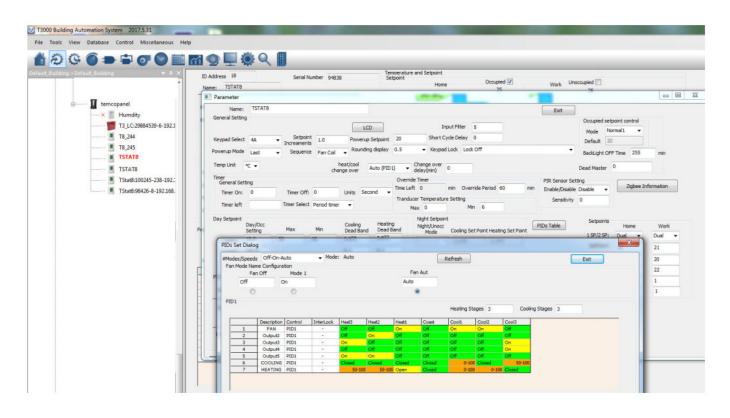
Click to write & read back.

| Date Entries | |
|--|--|
| Dates entries : | |
| 星期日 32/10/2094 星期→ 2/11/2094 星期二 3/11/2094 星期三 4/11/2094 星期四 5/11/2094 星期五 6/11/2094 星期日 8/11/2094 星期→ 9/11/2094 星期→ 9/11/2094 星期二 10/11/2094 星期三 11/11/2094 星期三 11/11/2094 | |
| 星期五 13/11/2094 | |
| 星期六 14/11/2094 星期日 15/11/2094 | |

Click to choose the date.

Heating/Cooling Configuration

About Heating Cooling Mode Configuration, here are two examples: one heat one cool setting and two heat two cool setting.



| | | Input Setting | |
|--|--|--|-------------------------|
| Input Icon Tstat Log | Variable Inputs | Range 4 | |
| T3000 Building Automation System 2017.5.31 | | | |
| T3000 Building Automation System 2017.5.31 File Toris View Database Control Miscellaneous Persue Rouseing - Orfaul Suddrog Tal. (C.2894539-6-192.1 Tal. (C.2894539-6-192.1 Tal. 24 Tal. 24 | Help M.M Ful Label Auto/Manual 1 Input1 Auto 3 Input3 Auto 4 Input5 Auto 5 Input5 Auto 6 Input6 Auto 9 Internal Temp Sensor N/A 10 Humidty Sensor N/A 11 CO2 Sensor N/A | 0.0 iPe Diston Sensor1 Adjust 5 Normal 0 - 0-20ma Adjust 5 Normal 0 - 0-20ma Adjust 5 Normal Select Range Number Enter Units Number 0. Unused 7. Occupied/Unoccupied 0. Unused 9. Open/Close 0. Unused 9. Open/Close 0. Just Thermister Type2 8. Unoccupied 0-10v 0. 2.0-100% 9. Open/Close 0. 3.0n/Off 10. Close/Open 0. 4.Cutton Sensor 1 0. Unutrs 1.10/ Thermister Type3 0. S.Off/On 12.0-20ma 0. Custom Sensor 2 13.Voltage UNITS 10.0 | - 3 Select Range Number |
| | | 4.5v 90 4.0v 80 3.5v 70 3.0v 60 2.5v 50 2.2v 40 1.5v 30 1.0v 20 0.5v 10 0v 0.5v 10 0v 0.5v 1.5v 2.0v 2.5v 3.0v 3.5v 4.0v 4.5v 5.0v | — 8 Build up a table |

As an example of a custom sensor, here we have built up a table for a custom sensor operating from 0 to 5V over

1 Tstat Log TSTAT8

Select the thermostat from the tree.

2 Input Icon

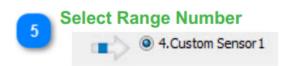
Click on the INPUTS icon.

| | Variat | Variable Inputs | | | | | | | | | | |
|---|--------|----------------------|--|--|--|--|--|--|--|--|--|--|
| 3 | NUM | Full Label | | | | | | | | | | |
| | 1 | Input1 | | | | | | | | | | |
| | 2 | Input2 | | | | | | | | | | |
| | 3 | Input3 | | | | | | | | | | |
| | 4 | Input4 | | | | | | | | | | |
| | 5 | Input5 | | | | | | | | | | |
| | 6 | Input6 | | | | | | | | | | |
| | 7 | Input7 | | | | | | | | | | |
| | 8 | Input8 | | | | | | | | | | |
| | 9 | Internal Temp Sensor | | | | | | | | | | |
| | 10 | Humidity Sensor | | | | | | | | | | |
| | 11 | CO2 Sensor | | | | | | | | | | |
| | 12 | Lighting Sensor | | | | | | | | | | |

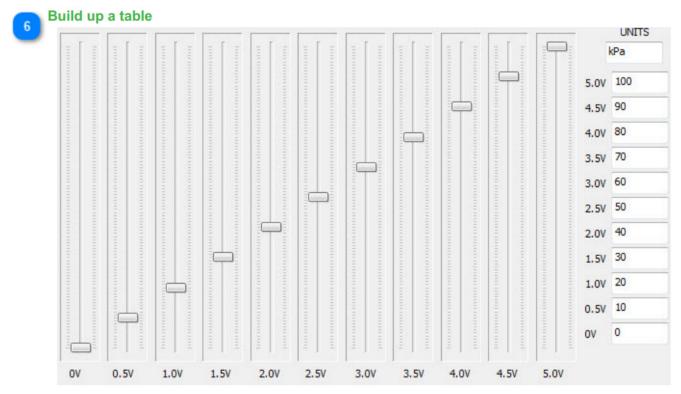
Give each input a name.



Set the range for the input by clicking on this column.



Select from the various ranges or build your own.



As an example of a custom sensor, here we have built up a table for a custom sensor operating from 0 to 5V over the range of 0-100psi.

Output Setting

| Image: Second state Image: Second state< | |
|--|-----------------------|
| Norri Pulicadel Automatical Value Units Range Pulicion Interiox OFF-201 Deay O | |
| immed a 1 FAN Auto Off N/A On/Off Normal ON 0 0 | ->OFF Delay Signal Ty |
| | N/A |
| | N/A |
| 3 Cooling Auto Off N/A On/Off Normal ON 0 0 | N/A |
| T3_LC-29884539-6-192.1 4 Spare Auto Off N/A On/Off Normal ON 0 0 | N/A |
| T8_244 5 Spare Auto Off N/A On/Off Normal ON 0 0 | N/A |
| 6 Spare Auto 0.0% % 0.10//100% Normal ON 0 0 | N/A |
| T8_245 7 Spare Auto 0.0% % 0-10/(100%) Normal ON 0 0 | N/A |
| | |



Scan the network and discover all devices.

2 Thermostat

Select the thermostat from the tree.

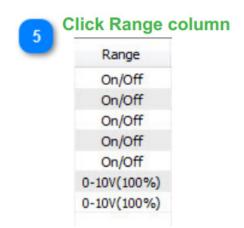
For a fast way to set up the stat you can just load the config file, attached. The steps I did to create this config file are explained below.



Select the outputs icon.

| ariab | le Outputs |
|-------|------------|
| NUM | Full Label |
| 1 | FAN |
| 2 | Heating |
| 3 | Cooling |
| 4 | Spare |
| 5 | Spare |
| 6 | Spare |
| 7 | Spare |

Click to give each output a name and a range, in the case of the fan the outputs are on-off and the valves are modulating 0-10V = 0-100% which are the default ranges already.



Click the Range column to see many options available for the range setting such as PWM and floating three wire control for modulating actuators using two relay outputs.

One heat one cool setting

| | Database Control Miscellaneous | Help | | | | | | | | - | _ | | | | | | | | |
|--------------------|--------------------------------|----------|-----|--------------|--------------------|---------------|--------------|-------------|--------------------|--------------------|-----------------------|--------------------|--------------|----------------------|----------------------|-------------|---------------------------|----------------|-----------|
| 904 | 6 = = 0 0 1 | i ni | 0 | | Ö Q | |] | | | | | | | | | | | | |
| ult_Building-> Def | | A 1 | - | Ful L | abel | Au | ito/Manual | Value | - | Inits | Range | Ca | libration | Filter | Function | | | | - 0 |
| | × 📕 Humdity | 2 | | | TSTAT8 | - | | | | - | illing . | - | | | - | Exit | | | |
| | T3_LC:29884539-6-192.1 | 4 | Ge | neral Settin | | | | | | | | | | | | Los | Occupied se | tpoint control | |
| | T8_244 | 5 | | | | | | | | | | | Input Filter | | | | Mode N | | |
| | TB_245 | 7 | Ke | pad Select | 4A | • | Setpoint | t 1.0 | Powe | rup Setpoint | 20 | Short | Cycle Delay | 0 | | | Default 2 | 0 | |
| | TSTAT8 | 8 | Pov | erup Mode | Last | | | Fan Col | Roun | ding display | 0.5 | • Кеур | ad Lock Lo | ick Off | | | BackLight O | FF Time 255 | min |
| | TStat8:100245-238-192. | 10 | Те | np Unit | °C • | | | | heat/cool | Auto (Data) | | Change over | | | | | Dead Master | 0 | |
| | TStat8:98426-8-192.168. | 11 12 | Tir | er | | | | đ | hange over | HULD (PID | | accel formy | U | | | | | | |
| | - 13tato.90420-0-192.108. | | | General Set | - | | | | | | Override Time Left | | min Ov | erride Period | 60 m | PIR Sensor | setting able Disable v | Zigbee In | formation |
| | | | | Timer On: | 0 | | Timer Off: | | | Second 🔹 | Tranduc | er Temperat | ure Setting | | | Sensitiv | | | |
| | | | | Timer left | | 1 | Timer Select | Period time | er 🔹 | | M | ax 0 | | Min 6 | | | 0.15 | | |
| | | | Da | Setpoint | | | | | | Heatin | | Night Setpo | | | | | Setpoints | | |
| | | | | | Day/Occ Setting | | Max | Min | Cooling Dead Ba | | and | Night/Unoc Mode | Cooling | Set Point He | ating Set Point | PIDs Table | 1 SP/2 SP: | Home | Work |
| | | | (| PIDs Set I | Dialog | - | | | 10 | 2.012 | _ | - | 1.00 | | - | | 1 SP/2 SP: | X | Dual 👻 |
| | | | | | peeds Off | Con A | -te | - Mod | e: Auto | | | C | | 7 | | | | - | 21 |
| | | | | | e Name Con | | | • • | C. HUID | | | _ | Refresh | | | | Exit | | 20 |
| | | | P | | Fan Off | | Mode 1 | | | | | an Aut | | | | | | | |
| | | | | 0 | | 0 | | | | | Auto | | | | | | | | 1 |
| | | | | PID1 | 0 | | 0 | | | | | • | | | | | | | 1 |
| | | | | FIDI | | | | | | | | | Heating | Stages 3 | Cool | ng Stages 3 | | | |
| | | | | | | niption AN | Control | InterLock | Heat3 | Heat2 | Heat1 | Coast | Cool1 | Cool2 | Cool3 | | | | |
| | | | | | | | PID1 PID1 | - | Off | On | off | off | Off | off | Off | | | | |
| | | | | | | oling | PID1 PID1 | | On | Off | Off Off | Off | Off | Off | On | | | | |
| | | | - | | Sp | are | PID1 | | On | On | Off | Off | Off | O# | Off | | | | |
| | | | | | | | PID1 PID1 | • | Closed 50-10 | Closed 0 50-100 | Closed Open | Closed Closed | | 100 Closed 100 0- | 50-100 100 Closed | | | | |
| | | = | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |



Select the thermostat from the tree.



Click on the gear icon to get to the advanced settings.



Click to get to the PID tables, this is where we assign outputs to act over each stage of heating and cooling.



| | | Off-On-A | | ✓ Mode | : Auto | | | | Refresh | | | | Exit |
|--------|------------------|------------------------------------|------------------------------|-----------|-------------------------|-------------------------|-------------------------|--------------------------|---|----------------------------------|---------------------------------|-------------|------|
| ran Mu | Fan (| | Mode 1 | | | | Fan | Aut | | | | | |
| (| Off | 0 | In | | | | Auto | | | | | | |
| | 0 | | 0 | | | | 0 | | | | | | |
| PID1 | | | | | | | | | Heating Sta | ges 3 | Cooli | ng Stages 3 | |
| | 1 | Description | Control | InterLock | Heat3 | Heat2 | Heat1 | Coast | Heating Sta | ges 3 Cool2 | Cool3 | ng Stages 3 | |
| | 1 | Description FAN | Control PID1 | InterLock | Heat3 Off | Heat2 | Heat1 On | Coast Off | | | | ng Stages 3 | |
| | 1 2 | | | | | | | | Cool1 | Cool2 | Cool3 | ng Stages 3 | |
| | 1 | FAN | PID1 | - | Off | Off | On | Off | Cool1 On | Cool2 On | Cool3 Off | ng Stages 3 | |
| | 1 2 | FAN Heating | PID1 PID1 | 1 | Off Off | Off On | On Off | Off Off | Cool1 On Off | Cool2 On Off | Cool3 Off Off | ng Stages 3 | |
| | 1 2 3 | FAN Heating Cooling | PID1 PID1 PID1 | 1 | Off Off On | Off On Off | On Off Off | Off Off Off | Cool1 On Off Off | Cool2 On Off Off | Cool3 Off Off On | ng Stages 3 | |
| | 1 2 3 4 | FAN Heating Cooling Spare | PID1 PID1 PID1 PID1 | | Off Off On Off | Off On Off Off | On Off Off Off | Off Off Off Off | Cool1 On Off Off Off Off | Cool2 On Off Off Off | Cool3 Off Off On On | ng Stages 3 | |

PIDs Set Dialog shows the details of the setting.

| | | | | | | OF | FM | ode | | | | | | | |
|--|---------------|------------------------|--------------|-----------|-----------|------------|------------|------------|---------|------------|-------------|----------------|------|---|---|
| | | | | | | | | | н | eating/Cod | ling Stages | | | | |
| | | | | | | | | | | | | | | | |
| Modes/Speeds 2 | PIDs Set Dial | og | | | | | - | | | | | | | × | ſ |
| | #Modes/Spee | | | 🕳 Mod | e: Off | | | | Refresh |] | | | Exit | | |
| ode Name Configuration 3 | Fan Mode N | ame Configur an Off | Mode 1 | | | | F | an Aut | | | | | | | |
| | Off | | On | | | | Auto | | | | | | | | |
| Off Mode | | | 0 | | | | | 0 | | | | | | | |
| - | PID1 | | | | | | | | Heating | Stages 3 | Co | oling Stages 3 | | | |
| Thermostat Outputs 5 | | Descriptio | | InterLock | Heat3 | Heat2 | Heat1 | Coast | Cool1 | Cool2 | Cool3 | | | _ | |
| | 2 | FAN Heating | PID1 PID1 | | Off | Off | Off | Off Off | Off | Off | Off Off | | | | _ |
| | 3 | Cooling | PID1 | | Off | Off | Off Off | Off Off | Off | Off Off | Off Off | | | | |
| | 4 | Spare | PID1 | | Off | Off | Off | Off | Off | Off | Off | | | | |
| | 5 | Spare | PID1 | - | Off | Off | Off | Off | Off | Off | Off Off | | | | |
| | 6 | Spare | PID1 | | Closed | Closed | Closed | Closed | Closed | Closed | Closed | | | | |
| | 7 | Spare | PID1 | | Closed | Closed | Closed | Closed | Closed | Closed | Closed | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | 8 | | 7 | | | | | | | |
| | | | | 1 | Various C | utputs Sta | te | Coast | | | | | | | |
| | 0 100 | 0.0 | | | | | | | | | | | | | |
| Heating/C | Cooli | ng S | Stag | es | | | | | | | | | | | |
| J. J | | | | | | | | | | _ | | | | | |
| Heating S | + | 2 | | 1 | - alie | na Sta | | - | | | | | | | |

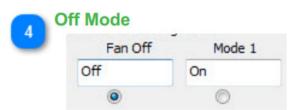
Here we set how many stages of heating and cooling the system will have. Since this is a three speed fan we can set three heating/cooling at this tab. If we set 2 or other number of heating and cooling stages, there will be corresponding quantity of tabs.

| 2 | Modes/Speed | s | | | |
|----------|---------------|-------------|---|-------|-----|
| <u> </u> | #Modes/Speeds | Off-On-Auto | • | Mode: | Off |
| | | | | | |

Select here from the available options, this establishes the various modes the thermostat will operate in and also whether the user will be able to set the stat in certain modes or not. For example if you select OFF-ON-AUTO the user will be able to select up to three modes from the keypad: OFF, ON and AUTO mode. If we had selected only OFF-AUTO, the user will only be able to see select from the OFF and AUTO modes. Keep in mind that the keypad can be locked as well, this is a separate setting, but this is where we set the number of modes the system will operate in.



Each of these modes we established in the tab at 2 can be renamed along the row here at tab 3.



Now we set up which of the outputs will do what in each of the various stages and modes. We have



| | Description |
|---|-------------|
| 1 | FAN |
| 2 | Heating |
| 3 | Cooling |
| 4 | Spare |
| 5 | Spare |
| 6 | Spare |
| 7 | Spare |

Each row represents one of the thermostat outputs.

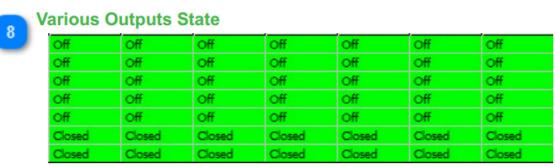
| 6 | 3 Heat 3 | 3 cool | | |
|---|----------|--------|--|---|
| | | | | 1 |

| | Heat3 | Heat2 | Heat1 | Coast | Cool1 | Cool2 | Cool3 |
|--|-------|-------|-------|-------|-------|-------|-------|
|--|-------|-------|-------|-------|-------|-------|-------|

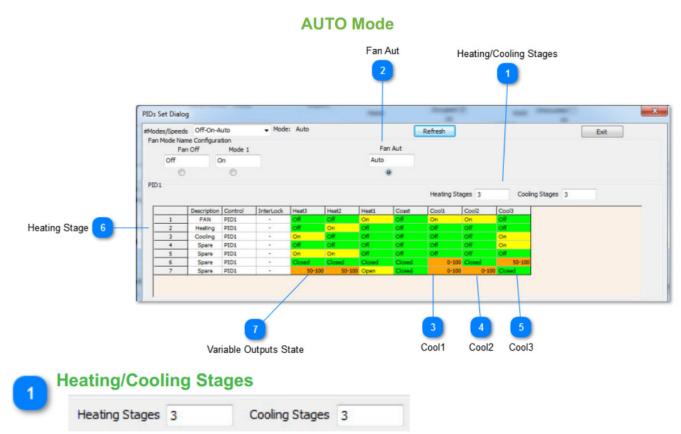
Each column represents a certain stage of heating or cooling. Heating is to the left and Cooling is to the right. The columns to the left represent increasing responses to the temperature being below setpoint. Moving to the right are increasing responses to the room temperature being over setpoint.



The center column represents the thermostat at rest, the setpoint is satisfied and the system is coasting.



Here are the states for the various outputs to each stage of cooling, heating and coasting. Since we have selected the OFF mode at tab18, all the outputs will be OFF with the system is set to OFF mode.



Here we set how many stages of heating and cooling the system will have. Since this is a three speed fan we can set three heating/cooling at this tab. If we set 2 or other number of heating and cooling stages, there will be corresponding quantity of tabs.



Now select the Auto mode. The state of each of the outputs has been set to on, off or modulating on all of the various states.



In the first stage of cooling, output1 is on for low speed fan operation and the cooling valve is modulating open from 0-50%.



In stage 2 of cooling, the medium fan speed is on and the valve is opening up from 50 to 100%.



In stage 3 cooling the high speed fan is on and the value is set once again to modulate from 50 to 100%.

| 6 | Hea | ting S | stage | | | | | | | | | | |
|---|-----|--------|---------|------|---|-----|----|-----|-----|-----|-----|-----|--|
| • | | 2 | Heating | PID1 | - | Off | On | Off | Off | Off | Off | Off | |

The same sequence is set up to the right of the table for the three stages of heating. The heating valve modulates open as shown and the cooling valve is closed for all stages of heating.

| Variable | Outpu | ts Stat | e | | | |
|----------|--------|---------|--------|-------|--------|--------|
| Off | Off | On | Off | On | On | Off |
| Off | On | Off | Off | Off | Off | Off |
| On | Off | Off | Off | Off | Off | On |
| Off | Off | Off | Off | Off | Off | On |
| On | On | Off | Off | Off | Off | Off |
| Closed | Closed | Closed | Closed | 0-100 | Closed | 50-1 |
| 50-100 | 50-100 | Open | Closed | 0-100 | 0-100 | Closed |

Each cell represents the state of a particular output at a certain stage of heating, cooling or coasting. In the coasting stage, all the outputs are off.

| | | | | | | 0 | | ue | | | | | |
|-------------------------------|--------------------|--------------|-----------|-------------|-------------|-------------|-------------|-------------|------------------|-------------|----------|------|---|
| | | ON Mode | e | | | | | Hea | ating/Coolin | ng Stage | | | |
| IDs Set Dialog | | | | | | - | | Traper | | - | - | | X |
| Modes/Speeds Fan Mode Name | e Configura | ation | ✓ Mode: | On | | | C | Refresh | | | (| Exit | |
| Fan | | Mode 1 | | | | | an Aut | | | | | | |
| Off | (| On | | | | Auto | | | | | | | |
| 0 | | ۲ | | | | | 0 | | | | | | |
| PID1 | | | | | | | | Heating Sta | | | Stages 3 | | |
| 1 | Description FAN | PID1 | InterLock | Heat3 On | Heat2 On | Heat1 On | Coast On | Cool1 On | Cool2 On | Cool3 On | | | |
| 2 | Heating | PID1 PID1 | | Off | Off | Off | Off | Off | Off | Off | | | |
| 3 | Cooling | PID1 | | Off | Off | Off | Off | Off | Off | Off | | | |
| 4 | Spare | PID1 | | Off | Off | Off | Off | Off | On | On | | | |
| 5 | Spare | PID1 | - | On | Off | Off | Off | Off | Off | Off | | | |
| 6 | Spare | PID1 | | Closed | Closed | Closed | Closed | | Closed | 50-100 | | | |
| 7 | Spare | PID1 | • | 50-100 | 50-100 | Open | Closed | 0-100 | 0-10 | 0 Closed | | | |
| He | atin | g/Cod | oling S | Stage | 2 | | 3 Coast | Variable | 4 e Outputs s | State | | | |
| 1 | | | | | | _ | | | | | | | |
| - | Hea | ting S | tages | 3 | | | Cooli | ng Sta | ges | 3 | | | |

ON Mode

Here we set how many stages of heating and cooling the system will have. Since this is a three speed fan we can set three heating/cooling at this tab. If we set 2 or other number of heating and cooling stages, there will be corresponding quantity of tabs.



Now select the ON mode, this is generally used if you would like to allow the user to manually turn on the fan to get some fresh air in the zone.



The stages of heating and cooling are set up exactly as everything was done in the Auto mode, the only difference is the Coast tab, you can see that the fan will be on in the coasting mode. This means even when the setpoint is satisfied at least the low speed fan will be on and the heating & cooling valves will be closed.



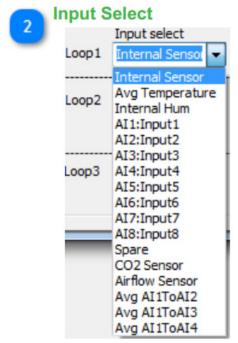
| On | Off | Off Closed | Off | Off | Off Closed | Off 50-10 |
|-----|-----|---------------|-----|-----|---------------|-----------|
| Off | Off | Off | Off | Off | On | On |
| Off | Off | Off | Off | Off | Off | Off |
| Off | Off | Off | Off | Off | Off | Off |
| On | On | On | On | On | On | On |

In all other stages of heating stage three on over to cooling stage3, the fan and valve are sequenced just like they were in the auto table.

PID Loop Setting

| | Keypad Seler Powerup Mod | | and calle | nts 1.0 nce Fan Coil | • | Setpoint display | 0.5 | ◄ Кеур | Cyde Delay 0 ad Lock Lock (| | • | Default 20 BackLight OF | F Time 255 | min | |
|---|-----------------------------|------------------------------|------------|-------------------------|------------------------|---------------------|------------|---------------------------|--------------------------------|-------------------------|--------------------|----------------------------|------------|-------------|------|
| | Temp Unit | | | ch | heat/cool ange over | uto (PID 1) | • | Change over delay(min) | 0 | | | Dead Master | 0 | | |
| | Timer General Se | etting | | | | | Overrid | | - | | PIR Sensor Set | | Zinhee 1 | information | |
| | Timer On | : 0 | Timer Of | ff: 0 | Units Seco | nd 🔻 | Time Lef | cer Temperat | | de Period 60 r | min Enable/Disable | | | | |
| | Timer left | t | Timer Sele | ct Period time | er 💌 | | | tax 0 | | 6 | Sensitivty | U | | | |
| | Day Setpoint | | | | | | | Night Setp | pint | | | Setpoints | | | |
| | | Day/Occ Setting | Max | Min | Cooling Dead Band | Heating Dead Ba | | Night/Unoo Mode | Cooling Set | Point Heating Set Point | PIDs Table | | Home | Work | |
| | Loop 1 | 19.0 | 50 | 15 | 5.0°C | 2.0°C | | | | 1.2°C | | 1 SP/2 SP: | | Dual 👻 | 5 Se |
| | Loop2 | 200.0 | | | 0.1 | 0.1 | | | | | | SetPoint: | 19 | 21 | |
| | Loop3 | 65535 | | | 255 | 255 | | | Special Features | | | Heat SP: | ** | 20 | |
| | PID | | | | | | | | Free cooling | Outdoor Reset | | COOL SP: COOL DB: | | 22 | |
| 1 | Ing | ternal Sensor | | e Setpt value 19 | | Pterm 6.0 | Ite 5.0 | rm | Airflow Setting | | | Heat DB: | - | 1 | |
| | Int | ternal Sensor | | | 010 | | 3.0 | | Valve Travel Tr | | | neat Do: | 2 | 1 | |
| | Int | g Temperature ternal Hum | 30.9 | 200.0 | 100% | 100.0 | 1.0 | | | | | | | | |
| | AL | 1:Input1 2:Input2 | 300.0 | | | | | | | | | | | | |
| | Loop3 AI | 3:Input3 4:Input4 | 30.9 | 0.0 | 50% | 25.5 | 25.5 | | Disels. Note | ork ID on Device LCD | Apply | | | | |
| | AIS | 5:Input5 5:Input6 | 0.0 | | | | | 1 | Display Netwo | ork ID on Device LCD | | | | | |
| Į | | 7:Input7 8:Input8 | | | | _ | | | | | | _ | | | |
| 1 | | are 2 Sensor | _ | _ | _ | _ | - | | _ | | | _ | _ | | |
| | Air | flow Sensor g AI 1ToAI 2 | | | | | | | | | | | | | |
| | Av | g AI 1ToAI 3 g AI 1ToAI 4 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | 7 | | | | | | | |
| | 2 | | | | | 3 | | 4 | | | | | | | |
| | Input Sele | ct | | | | Pterm | | Iterr | n | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | loc | р | | | | | |
| | | | | | | | | | | | | | | | |

Now we set up the PID loop, for the most part you can leave the settings at their default. You can select which of the inputs will provide feedback for the PID loop, the default is the internal temperature sensor.

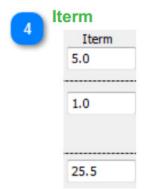


For the PID feedback you can select from many options such as the average of some sensors, any of the 8 external sensors or the internal humidity or C02 sensor if it has one.



| Pterm 6.0 | |
|--------------|--|
| 100.0 | |
| 25.5 | |

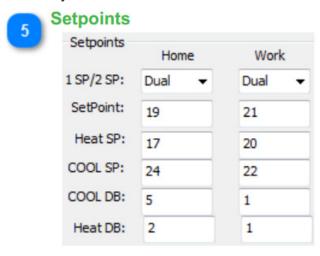
This is the PID proportional setting. The default value of 6 means that the PID loop will output a full response when the temperature error is 6 degrees, in this case celcius, away from setpoint. So if the setpoint were 20C, the maximum heating to the maximum cooling will occur over a span of 6 degrees. When we're three degrees below setpoint we'll be in stage 3 heating and when we're 3 degrees above setpoint the PID will be at stage 3 cooling.



This is the integral term. This is a nudge factor so that if the temperature is hovering a little ways below the setpoint for a long period eventually the integral term will accumulate some error over time and begin to bring on the next stage of heating. During commissioning this term can be set to zero because it can wind-up and cause confusion. For example the room is just below the setpoint by half a degree or so you would think the unit will be in stage1 heat yet it is running at high speed. It is the integral term which has wound up and is calling for stage three. When commissioning is done you can enter something for the I term to get better PID loop action, the default value of 5 is reasonable and means you can get an extra 5% of PID action for every degC – hour of accumulated error.

A small value for the P term means the PID loop will be more sensitive to a deviation from setpoint. A small term for the I term means the PID loop will be lazy over time. Small P = hyperactive

Small I = lazy, over time.



Finally set up the setpoints. Dual setpoints operate like a residential thermostat where you can set up a separate heating and cooling setpoint. Single setpoints are more for commercial settings where you would like to keep things simple and let the user adjust only a single setpoint up or down. The HOME and WORK columns show the heating and cooling setpoints for occupied (home) and unoccupied modes (work). There are other modes which we need to add to this dialog, SLEEP and AWAY which are common with residential thermostats. In single setpoint mode there is only one setpoint we talk about, so the heating setpoint is calculated from the

'setpoint' minus the heating deadband. Similarly, the cooling setpoint is equal to the 'setpoint' plus the cooling deadband.

Two heat two cool setting

| 🥹 🤄 🔿 🖨 🐨 🕙 🛄 Building -> Default, Building | M 💁 🖳 🏶 🔍 📕 | |
|--|--|-------------------------|
| | ID Address 18 Serial Number 94838 Setpoint | |
| ^ | Name: TSTAT8 Home Occupied V Work Unoccupie | £ |
| | Parameter | |
| e If temcopanel | Name: TSTAT8 Exit | |
| × Humdity | | cupied setpoint control |
| T3_LC:29884539-6-192.1 | LCD Input Filter 5 Mk | ode Normal1 - |
| T 8_244 | Keypad Select 4A Selpoint 1.0 Powerup Setpoint 20 Short Cycle Delay 0 | fault 20 |
| T8_245 | Devedee dealay 0.5 - Keynad Lack Off | kLight OFF Time 255 min |
| TSTAT8 | | |
| TSTAT8 | change over Hullo (r.br.) delay(min) b | Master 0 |
| TStat8:100245-238-192.: | Timer Override Timer PIR Sensor Setting General Setting Time Left 0 min Override Period 60 min Prable Disable Disable | Zigbee Information |
| TStat8:98426-8-192.168. | Timer On: 0 Timer Off: 0 Units Second V | le • |
| | Timer left Timer Select Period timer | |
| | Durchards Heldening | |
| | Day/Occ Cooling Heating Night/Unocc PIDs Table | Setpoints Home Work |
| | Fi Setting Max Min Dead Band Dead Band Mode Cooling Set Point Heating Set Point | SP/2 SP: Dual - Dual - |
| | PIDs Set Dialog | 21 |
| | #Modes/Speeds Off-On-Auto - Mode: Auto Refresh | 20 |
| | Fan Mode Name Configuration | 22 |
| | P Pan Off Mode 1 Fan Aut Off On Auto | 1 |
| | | 1 |
| | PID1 | |
| | Heating Stages 3 Cooling Stages 3 | |
| | Description Control InterLock Heat3 Heat2 Heat1 Coast Cool1 Cool2 Cool3 | |
| | 1 FAN PID1 - Off On Off On On Off 2 Output2 PID1 - Off On Off | |
| | 3 Output3 PID1 - On Off Off Off Off Off Off Off Of | |
| | 4 Outputs PID1 - Off Off Off Off Off Off Off Off Off | |
| | S OutputS PID1 - On On Off Off Off Off Off | |
| | 6 COOLING PID1 - Closed Closed Closed 0-100 Closed 50-100 | |
| | | |



Click on the gear icon to get to the advanced settings.



Click to get to the PID tables, this is where we assign outputs to act over each stage of heating and cooling.



<TODO>: Insert description text here...



| | ds Off-On-A | | Mode | : Auto | | | | Refresh | | | | Exit |
|-------|--------------------------------------|--|--------------------------|-------------------------|-------------------------------|-------------------------|--------------------------|---|----------------------------------|---------------------------------|-------------|------|
| | ame Configura an Off | tion Mode 1 | | | | Far | n Aut | | | | | |
| Off | 0 | n | | | | Auto | | | | | | |
| C |) | 0 | | | | (| • | | | | | |
| | | | | | | | | Heating Sta | ges 3 | Coolin | ng Stages 3 | |
| | Description | Control | InterLock | Heat3 | Heat2 | Heat1 | Coast | | | | ng Stages 3 | |
| 1 | Description | Control PID1 | InterLock | Heat3 | | Heat1 On | Coast Off | Heating Sta | ges 3 Cool2 On | Cool3 Off | ng Stages 3 | |
| 1 2 | | | | | | | _ | Cool1 | Cool2 | Cool3 | ng Stages 3 | |
| 1 | FAN | PID1 | - | Off | Off On | On | Off | Cool1 On | Cool2 On | Cool3 Off | ng Stages 3 | |
| 1 2 | FAN Output2 | PID1 PID1 | 1. | Off Off | Off On Off | On Off | Off Off | Cool1 On Off | Cool2 On Off | Cool3 Off Off | ng Stages 3 | |
| 1 | FAN Output2 Output3 | PID1 PID1 PID1 | • | Off Off On | Off On Off Off | On Off Off | Off Off Off | Cool1 On Off Off | Cool2 On Off Off | Cool3 Off Off On | ng Stages 3 | |
| 3 | FAN Output2 Output3 Output4 | PID1 PID1 PID1 PID1 PID1 PID1 | - - - | Off Off On Off | Off On Off Off On | On Off Off Off | Off Off Off Off | Cool1 On Off Off Off Off | Cool2 On Off Off Off | Cool3 Off Off On On | ng Stages 3 | |

PIDs Set Dialog shows the details of the setting.

| | OFF Mode |
|----------------|---|
| | Modes Setting Heating/Cooling Stage |
| | PIDs Set Dialog |
| OFFSelecting 3 | #Modes/Speeds Off-Auto Mode: Auto Refresh Exit Fan Mode Name Configuration Fan Aut Off Auto Ø Ø Ø |
| | PID1 Heating Stages 2 Cooling Stages 2 |
| | Description Control InterLock Heat2 Heat1 Coast Cool1 Cool2 1 FAN PID1 - Off Off </td |
| | 4 5 Heat2 Various Outputs State |
| Hea | ting/Cooling Stage |
| • | Heating Stages 2 Cooling Stages 2 |
| Set the nur | nber of stages of heating and cooling. |
| 2 Mo | des Setting |
| | Modes/Speeds Off-Auto - Mode: Auto |
| u can set | the number of modes at the tab. two modes have been selected here with the c |

You can set the number of modes at the tab, two modes have been selected here with the default names as Off and Auto.

| OFFSelecting | |
|--------------|---------|
| 3 Fan Off | Fan Aut |
| Off | Auto |
| ۲ | 0 |

You can rename them by editing the names at the tab.Next we'll edit the Off table by selecting the radio button. The grid shown represents the outputs when the stat is in the off mode.

| N H | leat2 |
|------------|--------|
| 4 | Heat2 |
| | Off |
| | Closed |
| | Closed |

The center column represents the coasting mode, everything is off there as well.



| Heat2 | Heat1 | Coast | Cool1 | Cool2 |
|--------|--------|--------|--------|--------|
| Off | Off | Off | Off | Off |
| Off | Off | Off | Off | Off |
| Off | Off | Off | Off | Off |
| Off | Off | Off | Off | Off |
| Off | Off | Off | Off | Off |
| Closed | Closed | Closed | Closed | Closed |
| Closed | Closed | Closed | Closed | Closed |

Each row is one output and the columns represent the outputs in each of the stages of heating and cooling. In this example, everything is off for all 2 stages of heat and two cool.



Set the number of stages of heating and cooling.



Fill in the grid for the Auto mode.



Heat2 will be on in the column called Heat2 and off for the other stages and so on. The fan is on all the time as shown by the FAN row with all yellow entries.



You could optionally turn the fan off during coasting by setting the cell to OFF.

Tstat8 Configuration Menu manual

Code and description

| Code | Description [Menu Display] (Range, Default) |
|-------------------|--|
| Modbus Address | [Add] Modbus Device Address (1-254, 254) This is the modbus address of the tstat. It is the address to which the stat will re- spond to when receiving serial communication. Each tstat must have a unique address on the network. |
| Tempera- | [CAL] Calibration of the on board Temperature Sensor (0-1000, 500) |
| ture Calibrate | To calibrate the temperature sensor on the tstat use a accurate hand held mercury or digital thermometer. Both the thermostat and the temperature meter need to be in equilibrium with the space before calibration can occur. Hold the meter close to the thermostat. Use the keypad to get into the menu mode until CAL is shown on the display. Adjust the reading using the up and down buttons till the temperature shown matches the handheld meter. This sequence can be repeated if necessary till the readings on the thermostat and meter are the same. The thermostat will store the calibration figures even through extended power outages and will not need to be adjusted. The thermostat should be powered up for 5 minutes prior to any calibration value is centered around 500 (50.0°) This means that anything above 500 will be added on to the raw temperature and anything below 500 will be subtracted from the raw temperature. Calibration units are in increments of 0.1° (i.e. 500 means 50.0°) and are in the same units (C or F) as the tstat. Some calibration tips: *The main error in calibration comes from not waiting long enough for the handheld thermometer to come to equilibrium. *Calibrate using the customer's thermometer, even if it is not an accurate one so that all subsequent measurements are compared to the same benchmark. *The sensor inside the thermostat is a digital chip capable of readings down to 0.06°C so the weak link in calibrating is usually the procedure used rather than the tstat accuracy. |
| Tompora | also affect readings. |
| Tempera- ture | [tSS] Temperature Sensor Select (0-3, 0) The tstat has an extra input which can be used as an external temperature sensor. |
| Select | Use this menu to select which sensor to use. tSS = 0: The tstat will use the internal IC temperature sensor for the display and |
| | PID calculations. |
| | tSS = 1: The tstat will use an external thermistor which is shown on the display and used for PID calculations. |
| | tSS = 2: The tstat will use an internal thermistor which is shown on the display and used for PID calculations. |
| | tSS = 3: The tstat will use an average of the internal thermistor and the external thermistor which is shown on the display and used for PID calculations. |

| Code | Description(Range, Default) |
|----------|---|
| Tempera- | [FIL] Temperature Sensor Filter (0-10, 5) |
| ture | Filter used for the raw temperature being read by the sensor. |
| Filter | This configures the weighted average used when filtering the raw temperature. 0 |
| | corresponds to no filter. 10 corresponds to a high level of filtering. Set this to a low |
| | value if you want the input to respond quickly, a high value will smooth the read- |
| | ings more but make them respond more slowly. This setting should not need to be |
| | adjusted for most applications. |
| Baudrate | [bAU] Baud Rate (1200-115200, 9600) |
| Select | This will adjust the speed (baud rate) of which the thermostat communicates. This |
| | value must match the device it is connected too. |
| Short | [dSC] Short Cycle Delay (0-20, 0) |
| Cycle | This parameter adjusts the delay between cycling between the modes of operation. |
| Delay | It is the number of minutes after entering the coasting mode until the tstat can re- |
| | enter the mode it came from. For example, if the tstat is in Cooling1 mode and then |
| | enters Coasting mode, it will take a delay of dSC minutes until it can re-enter into |
| | Cooling1 mode. This value is in increments of 1 minute. |
| Change- | [dCH] Changover Delay (0-200, 0) |
| Over | This parameter adjusts the delay between switching from a heating mode of opera- |
| Delay | tion to a cooling mode of operation or vice versa. It is the number of minutes after |
| | leaving cooling or heating mode before the tstat can enter the opposite mode. This |
| | value is in increments of 1 minute. |
| Propor- | [PPr] Proportional Term (10-255, 20) |
| tional | The proportional term is the 'P' term of the familiar PID control strategy and deter- |
| Term | mines how fast a valve will react to a deviation from setpoint at a particular instant |
| | in time. The default value of 2.0° (C or F) is fine for most applications where a 2.0° deviation is required to make the value respond to 100% . For example, with the DDr |
| | deviation is required to make the valve respond to 100%. For example, with the PPr term set to 2.0 (°C) and the cooling setpoint is set to 20°C the valve will be open |
| | 100% by the time the room hits 22°C. A larger PPr term will make the valve open |
| | less since the deviation from setpoint will have to be greater before it opens 100%. |
| | A smaller value makes the valve respond more quickly. The factory setting of 2.0° |
| | (Cor F) is fine where the thermostat is located out of the direct airflow in an office |
| | size room. For a smaller room or if the thermostat is located directly under the air |
| | vent, a slower acting valve is required to avoid short cycling, so set the value of PPr |
| | to 3.0° or 4.0°. The PPr term acts in cooperation with the PIn term which is de- |
| | scribed next. The P value is in increments of 0.1° (i.e. 20 means 2.0°) and is in the |
| | same units (Cor F) as the tstat. |
| | |

| Code | Description(Range, Default) |
|--------------------------|---|
| Code Integral Term | Description(Range, Default) [PIn] Integral Term (0-255, 50) The integral term is the 'I' term of the familiar PID control strategy and determines how fast a valve will react to a deviation from setpoint over time.For example, with the room slightly above setpoint the 'P' term may be basically satisfied but a small deviation still exists. This deviation is summed up or 'Integrated' over time and the Iterm will gradually open the valve to make up the final small deviation from set- point. The default value of 5.0(%/Deg per minute) is fine for most applications and will cause the valve to open 5% for one degree (Cor F) of error per minute. For ex- ample, when the PIn term set to the default of 5.0 (%/Deg per minute), the cooling setpoint is set to 20°C and the room temperature is 21°C, the valve will be open partially due to the "P" term described earlier but the condition continues and we would like the valve to be opening up slowly to make up the final temperature error. If this situation of 1.0°C error continues for one minute, the error accumulates and the Iterm nudges the valve open an additional 5%. If the previous explanation is not clear, a couple of helpful reminders are as follows: Think of the Iterm as the oppo- site of the Pterm, "a bigger I means faster valve, smaller I means slower valve". The default value of 5% will work fine for most applications. If the valve is short eveling. |
| Operation Sequence | default value of 5% will work fine for most applications. If the valve is short cycling, make the Iterm smaller. The I value is in increments of 0.1 %/°minute (i.e. 50 means 5.0%/°minute) and is in the same units (Cor F) as the tstat. [SOP] Sequence of Operations (0-2, 1) The Sequence of operation is normally set at the factory and does not need to be adjusted. The thermostat supports field adjustment of the operation to suit different variations of mechanical equipment. Setting this value to a different value will cause the thermostat to stop working properly so be careful not to adjust this value unless you are familiar with the various sequences. |
| | Standard Operation (1): When SOP is set to 1 the sequence of operations is stored in a table that allows for basically any arbitrary sequence of operation. For example, the tstat could be set up to control 5 stages of cooling and 5 stages of heating or anything in between. Each output is individually assigned to be active in any particular section of the cooling or heating cycle. There are 7 discreet steps: Heat3, Heat2, Heat1, Coast- ing, Cool1,Cool2 and Cool3. So the table is 5 outputs x 7 steps via a spread sheet arrangement and you fill in the blanks to suit the application. The settings can be stored in an external text file that is easily read and modified in a text editor. The "TstatFactory" software utility on our website(http://www.tem- cocontrols.com/ftp/tstat5software.zip) allows you to send your favorite sequence of operations table to a new tstat speeding up the configuration process. Transducer Mode (2): |
| | Setting SOP to 2 puts the Tstat into transducer mode. In this mode the cooling ana- log output corresponds directly to the room temperature in degrees C (i.e. at 25°C, the output would be 2.5V). The heating analog output corresponds directly to the setpoint in degrees C. and relay1 corresponds to the occupied/unoccupied mode (occupied= relay1 ON, unoccupied= relay1 OFF). Test Mode (0): A special sequence of operations is embedded in the tstat that assists in the com- missioning and testing of the installation. When SOP is set to '0' this will start the testing sequence and the unit will cycle the relay outputs on and off in a slow rota- tion. The analog outputs are also cycled in a slow ramp. The cooling goes from 0 |

| Code | Description(Range, Default) |
|--------------------|--|
| | to 10 Volts while the heating goes in reverse from 10 to 0 Volts. The duty cycle of this rotation is approximately 20 seconds. Be sure the mechanical system is able to handle this sort of cycling before using this feature. Damage may occur if used improperly. |
| HeatCool | [HC] Heating Cooling Mode Configuration (0-5, 0) |
| Config | This item configures the method by which the tstat determines the heating or cool- |
| | ing mode. HC = 0: mode is controlled automatically by the on board PID control. PID > 52 is heating mode, PID < 48 is cooling mode. PID between 48 and 52 is Coasting. This is used for most applications. HC = 1: mode is controlled by the keypad or serial communication. This is for key- pad configurations in which the user or serial comminication can manually set heat- |
| | ing or cooling mode. |
| | HC = 2: mode is controlled by the active high digital input. High is heating, low is cooling. |
| | HC = 3: mode is controlled by the active low digital input. High is cooling, low is heating. |
| | HC = 4: mode is controlled by difference in temperature of setpoint and analog input 1 temperature sensor. If the temperature of the sensor is greater than the setpoint, the tstat will be in cooling mode and if the temperature of the sensor is less than the setpoint the tstat will be in heating mode. This is primarily used for 2-pipe systems. Analog input 1 would be a well or strap on temperature sensor located in the sup- ply piping of a 2-pipe system to detect if heating or cooling is being supplied to the |
| | equipment. HC = 5: same as mode 4 but using the analog input 2 sensor instead of analog input 1 |
| Heating | [Cdb] [Hdb] Heating & Cooling Deadbands (1-200, 10) |
| Deadband | If there is one setpoint then heating setpoint follows the cooling setpoint and is cal- |
| Cooling | culated by: |
| Deadband | Heating Setpoint = Setpoint - Heating Deadband. Cooling Setpoint = Setpoint + Cooling Deadband. |
| | If there are two setpoints heating and cooling are separately adjusted. The set- |
| | points are calculated as follows: |
| | Heating Setpoint = Max(Cooling Setpoint + Cooling Deadband , Heating Setpoint) Cooling Setpoint = Min(Cooling Setpoint, Heating Setpoint - Cooling Deadband) The minimum value for Cdb and Hdb is 1.0° (C or F) to ensure that simultaneous heating and cooling is never allowed. The maximum value is arbitrarily set to 20.0°. The deadband values are in increments of 0.1° (i.e. 20 means 2.0°) and are in the |
| | same units (C or F) as the tstat. |
| Degree C/F | [C_F] Degrees C/Degrees F (0-1, 0) The display can be switched to show Degrees C or Degrees F. 0 = C, 1 = F. |
| FanSpeed Select | [FAn] Number of Fan Speeds to show on the display (0-3, 3) The number of fan speeds allowed. FAn = 3, the user will see "Off/On/Med/Hi/Auto"; FAn = 2, the user will see "Off/On/Med/Auto"FAn = 1, the user will see "Off/On/ Auto";Fan = 0 then the user will see "Off/Auto" |
| NightHeat | [nCd] [nHd] Night Cooling Deadband (0-99, 10) for deg C and F / Night Heating |
| Deadband | Deadband (0-35, 10) for deg C, (0-95, 10) for deg F. |
| NightCool | When the tstat is in unoccupied mode and APP is set to 0 then the heating setpoint |
| Deadband | is adjusted downwards by the amount of the nHd. The cooling setpoint is adjusted |

Istat8 Bacnet Thermostat

| Code | Description(Range, Default) |
|-----------------------|--|
| | upwards by the amount of nCd. The night deadband values are in increments of 1° (i.e. 10 means 10°) and are in the same units (C or F) as the tstat. |
| | Note: The night heating setpoint is prevented through an internal software interlock |
| | from being set below 5°C, regardless of the user heating setpoint and the value stored in NHS. |
| NightHeat | Set night heating setpoint and night cooling setpoint, in degree C or degree F |
| Setpoint NightCool | |
| Setpoint | |
| Applica- tion | [APP] Application (0-1, 0) 0 - OFFICE applications mode |
| Mode | The night time setpoints are specified value |
| | Night Heating Setpoint = nHS value. |
| | Night Cooling Setpoint = nCS value. 1 - HOTEL or RESIDENTIAL applications mode |
| | The night time setpoints are a specified deadband in relation with the day time set- |
| | points |
| | Night Heating Setpoint = Cooling Setpoint - nHd value. |
| PowerUp | Night Cooling Setpoint = Cooling Setpoint + nCd value. [POS] Power on setpoint (0-255, 20) for deg C, (0-255, 68) for deg F |
| Setpoint | Certain applications require the thermostat to power up with a known setpoint that |
| | is stored through a power outage. This feature is useful in some of the transducer |
| | modes where the central DDC controller can cycle the power to the thermostats to reset the room setpoints to a known value everyday. The power on setpoint value is |
| | in increments of 1° (i.e. 20 means 20°) and is in the same units (C or F) as the tstat. |
| PowerUp | [POn] Power on Mode (0-3, 3) |
| On/Off | This setting allows the thermostat to power up in one of three modes: 0 = power off,1 = power up in on mode, 2 = last value(default),3 =auto mode. The on and off |
| | settings are self explanatory and are useful in certain DDC applications where the |
| | central controller can cycle the power to each thermostat to sweep them off each |
| | evening for example. The default value is "last value" and will cause the thermostat |
| Analog- | to power up in whatever state it was in before the power outage. [Ou1] [Ou2] Output settings (0-4, 0) |
| Out1 | Sets the full-scale voltage of the analog outputs. Ou1 sets analog out 1 (Cooling). |
| Setting | Ou2 sets analog out 2 (Heating). This setting is used to match the analog outputs to |
| Analog- | various types of actuators, transducers or other controllers. For example, by set- |
| Out2 Setting | ting the output range to act over a 5VDC scale can be used to set the tstat up as a transducer to interface into a master DDC controller. This also works with a valve |
| octing | that operates over the 2-10VDC range, this 'output' type setting lets you tailor the |
| | tstat to the particular application. Setting OuX to 0 will set the output to act in ON/ |
| | OFF mode. There are 4 types of tstats. Only the Tstat5A and Tstat5CM have analog output |
| | capability. |
| | For Tstat5B and Tstat5C, the firmware recognizes the relays and this will be perma- |
| | nently set to 0 and is not adjustable. |
| | For Tstat5A and Tstat5CM with analog outputs, the output will be 0V when OFF and 10V when ON. This is useful when using a Tstat5A or Tstat5CM and need extra ON/ |
| | OFF outputs. |
| L | |

| Code | Description(Range, Default) |
|-------------------------------|---|
| | OuX = 1, the outputs will modulate from 0V to 10V over the 0-100% range of any particular stage of heating or cooling. OuX = 2, same as the '1' setting but the output modulates over the 0-5V scale OuX = 3, same as the '1' setting but the output modulates over the 2-10V full scale OuX = 4, same as the '1' setting but the output modulates in reverse i.e. 10V-0V Note: For a 4-20ma actuator it is simple to convert the 2-10VDC signal to a 4-20ma signal by installing a 250 ohm, 1/2 watt resistor in series with the output and making |
| | sure the grounds of the actuator and tstat are common to each other. |
| Max Set- point Min Set- | [SLO] Setpoint Minimum (0-255, 15) for deg C, (0-255, 55) for deg F [SHI] Setpoint Maximum (0-255, 50) for deg C, (0-255, 99) for deg F The maximum and minimum allow able user setpoint settings. The occupants can- |
| point | not adjust the setpoint above or below these settings. The min and max setpoint values are in increments of 1° (i.e. 20 means 20°) and are in the same units (C or F) as the tstat. Note: the heating and cooling deadbands act in a way that reduces these settings by the amount of the deadband. For example, if the highest setpoint allowed is 'SHI' = 30°C and the heating deadband 'Hdb' = 2°C, heating will actually only be active up to 28°C. Similarly, if the 'Cdb' cooling deadband parameter is at 2°C and the minimum setpoint is at 20°C, then cooling takes place only as low as 22°C. |
| MenuLock mode | [LOC] Keypad lockout (0-3, 0) Rev25 only: This setting is useful to keep the building occupants from experiment- ing in the menu system. When the LOC parameter is set to '1' the keypad will be locked out from all menu operations. The normal operation of the keypad is not affected; the fan and setpoint buttons work as usual. When the LOC parameter is set to '2' the keypad will be locked out from partial menu operations allowing maintenance personnel to access some of the less critical menu parameters while maintaining a LOC on functions reserved for the primary administrator. This option allows access to calibration of the internal and external temperature sensor (CAL and CAE) and the override time parameter(ORT). LOC= 3, The user cannot do any- thing from keypad except enter the menu mode. In the menu mode, the user can set the setpoint, fan speed, calibration and override timer. When the menu system is locked out, the only way to adjust the tstat parameters is through the network port or through the communications jack at the bottom of the tstat. The parameter can be set back to '0' only though the communications ports as well. |
| ValveTrav- | [Vtt] Valve Transient Time (10-255, 0) |
| le Time | This setting allows the user to adjust the valve transient time from fully open to fully closed. Value ranges from 10 to 255 seconds. |
| RS485/ ZGB Select | Selet RS485 or ZIGBEE communication mode. This is only for Tstats with wireless ZIGBEE |
| MODBUS BACNET | Switch between Modbus protocol or BACnet protocol |
| WIFI Mode | Select ADHOC mode or Infra mode network. This is only for Tstat wifi product. |
| Factory Default | [FAC] Factory Default Setting (0-1, 0) This returns the Tstat back to factory default settings. "YES" will reset the Tstat back to original settings. "NO" will keep the changes made. |

Modbus register list

| Tstat8 | Count | Register and Description |
|--------|-------|---|
| 0 to 3 | | Serial Number - 4 byte value. Read-only |
| 4 to 5 | | Software Version- 2 byte value. Read-only |
| 6 | | ADDRESS. Modbus device address |
| 7 | | Product Model. This is a read-only register that is used by the microcon- |
| | | troller to determine the product model. |
| 8 | | Hardware Revision. This is a read-only register that is used by |
| | | the microcontroller to determine the hardware revision. |
| 9 | | PIC firmware version |
| 10 | | PIC version of Humidity module |
| 11 | | PLUG_N_PLAY_ADDRESS, 'plug n play' address, used by the network master to resolve address conflicts. See VC code for algorithms |
| 12~14 | | Spare |
| 15 | | Bau - Baudrate, 0=9.6kbaud, 1=19.2kbaud 2=38.4kbaud 3=57.6kbaud 4=115.2kbaud 5=76.8kbaud 6=1.2kbaud 1=4.8kbaud 1=14.4kbaud |
| 16 | | Update Register, used to show the status of firmware updates. Writing 143 sets the config back to out of the box except for Modbus ID and baud rate. Write 159 to fix the current config as the user defaults, this is done automatically by T3000 any time a config file is loaded. Writing 175 resets the unit back to the user defaults. |
| 17~19 | | Spare |
| 20 | | Hardware Options Register, starting with LSB: Bit0=Clock present or not, Bit1 = Humidity present or not, Bit2 = C02 Sensor, Bit3=CO sensor, Bit4 = Motion Sensor |
| 21 | | PANID for zigbee devices |
| 22 | | Device type of zigbee. 0 means coordinator, 1 means router |
| 23~24 | | Channel of Zigbee, default channel is channel 13, 0x00002000 |
| 25 | | Zigbee module software revision |
| 26~33 | | Zigbee extented address(MAC address) |
| 34 | | Set 1 to reboot zigbee module |
| 35~50 | | Security key |
| 51 | | The number of zigbee neighbors around |
| 52 | | The modbus ID of the 1st zigbee neighbor |
| 53 | | The signal strength of the 1st zigbee neighbor |
| 54 | | The modbus ID of the 2nd zigbee neighbor |
| | | |

*The register list is very long ,it can be downloaded as an excel spreadsheet (03ModbusBacnetRegisterList.xls) at the following link:<u>http://tinyurl.com/ybaj9d3u</u>

Bacnet object list

Supported BACnet Object Types

analog-input, analog-output, analog-value, binary-input, binary-output, device

Supported BACnet Services

who-is, i-am

object-identifier, object-name, object-type, present-value, units, object-list, vendor-id, vendor-name, system-status, confirmed-service, unconfirmed-service

| AV | AV and Description |
|----|---|
| 0 | Buadrate 96=9600 192=19200 384=38400 1152=115200 unit:bps |
| 1 | Station Number |
| 2 | Protocol swith 0=MODBUS,1=MSTP |
| 3 | Instance Number |
| 4 | Schedule enable/disable 1:enable 0:disable |
| 5 | Occupied/Home/Day setpoint |
| 6 | Unoccupied/Work/Night setpoint |
| 7 | Fan mode setting 0:unoccupied mode,1:user mode1,2:user mode 2 3:user mode3,4:usermode4 |
| 8 | Firmware Version |
| 9 | Current Mode of operation 0:coast mode 1:cool mode 2:heat mode |
| 10 | Temperature Unit 0:degree C 1:degree F |
| 11 | System Mode 0:auto 1:heat 2:cool,if set to 0, system will control by PID,if set to 1,system will be in heat only mode,and 2 will be cool mode |
| 12 | spare |
| 13 | Override Timer Unit:minute |
| 14 | Pid loop2 occupied setpoint |
| 15 | Pid loop2 unoccupied setpoint |
| 16 | Output Manual/Auto,each bit indicate each output 0:auto 1:manual |

| AI | Description |
|------|--|
| Al1 | Analog input1 |
| Al2 | Analog input2 |
| AI3 | Analog input3 |
| Al4 | Analog input4 |
| AI5 | Analog input5 |
| Al6 | Analog input6 |
| AI7 | Analog input7 |
| Al8 | Analog input8 |
| Al9 | Internal temperature value |
| AI10 | Humidity value |
| AI11 | CO2 value if it has CO2 sensor present |

| BO | Description |
|-----|---------------------------------|
| BO1 | Binary output1 state 1:on 0:off |
| BO2 | Binary output2 state 1on 0:off |
| BO3 | Binary output3 state 1:on 0:off |
| BO4 | Binary output4 state 1:on 0:off |
| BO5 | Binary output5 state 1:on 0:off |
| AO | Description |
| AU | Description |
| AO1 | Analog output 1 value |
| AO2 | Analog output2 value |