# Tstat9 Bacnet Thermostat

## Description

This full-featured thermostat is designed for cooling and heating systems in residential and commercial buildings.The thermostat can be configured for or use with air handlers,fan coils,VAV,modulating valves and practically any HVAC application.All models support bacnet and modbus protocol which allows easy integration with the big name control systems like Niagara,Siemens,Honeywell.Johnson Controls ,Delta,Reliable and Kreuter to name a few.There are five relays outputs.These outputs can be configured using the free software.There are more than 300 settings with many options for each of the settings so its possible to configure these devices for most any application.Once the unit is configured,save the config file for copying to other controllers and backing up project settings. Options are available for occupancy sensor,wifi,and humidity/ enthalpyTstat 9 derivative products have light sensor function by default except for basic Tstat9


## Highlights

- Modbus TCP/IP protocols over WIFI.
- Well documented register list for easy integration with other systems.
- 5 relay outputs, each rated at 100~220V, 5 amps.
- Color LCD display
- Easily configure the thermostat for practically any application.
- Clock with infinite life supercap battery backup.
- Uses 32 bit Arm CPU with 12 bit analog readings.
- Fits in regular 3in*3in*1.4in(88mm*88mm*35mm) electrical box


## Typical Application

## Specifications

| | |
|---|---|
| Outputs | 5 relay outputs |
| Operating range | -30~70°C(-22~158°F) / 0 to 99% RH |
| Supply voltage | 100~220VAC, 50-60Hz |
| Power consumption | 200mA |
| Relay contacts | 5 relays, 2A @ 220VAC |
| Plastic Housing | Flammability rating UL 94 file E56070 |
| Enclosure rating | IP31 |
| Protocols | Bacnet MSTP and Modbus TCP/IP |
| Baudrate | 9600, 19200, 38400, 57600, 115200 |
| Temperature sensor | 10K thermistor ±0.5°C |
| Analog Input | 10K thermistor |
| AnalogOutput | 0-10VDC |
| Setup Software | Free, no licensing, open source |
| Occupany sensor | |
| Field of View | 138° Form center of element on Axis X |
| | 125° Form center of element on Axis Y |
| CO2 Measurement Accuracy | |
| Conditions | 400 ppm – 2'000 ppm |
| Value | ± (50 ppm + 5% of reading) |

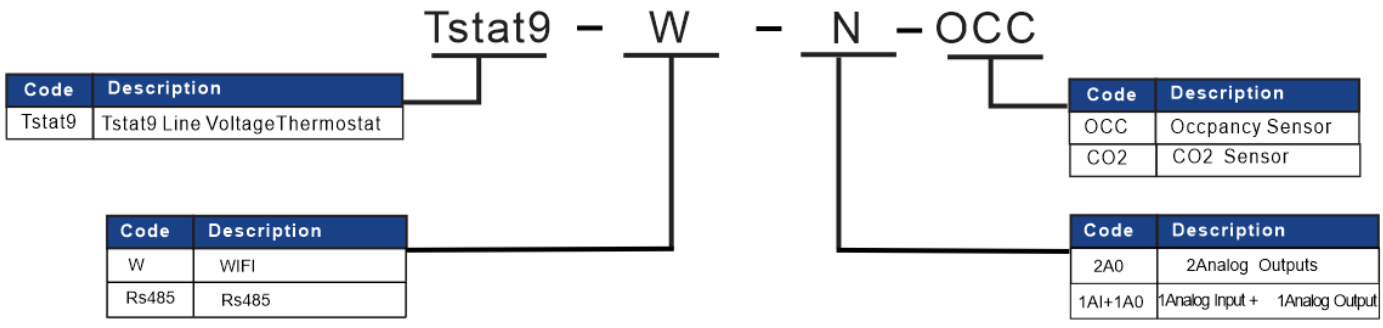
## Approvals

| | |
|---|---|
| Plastic Enclosure | PA66 UL94 V0 File E56070 |
| PCB | FR-4 Epoxy Glass Cloth UL E479892 |
| Terminal Block | PA66 UL94V-0 |

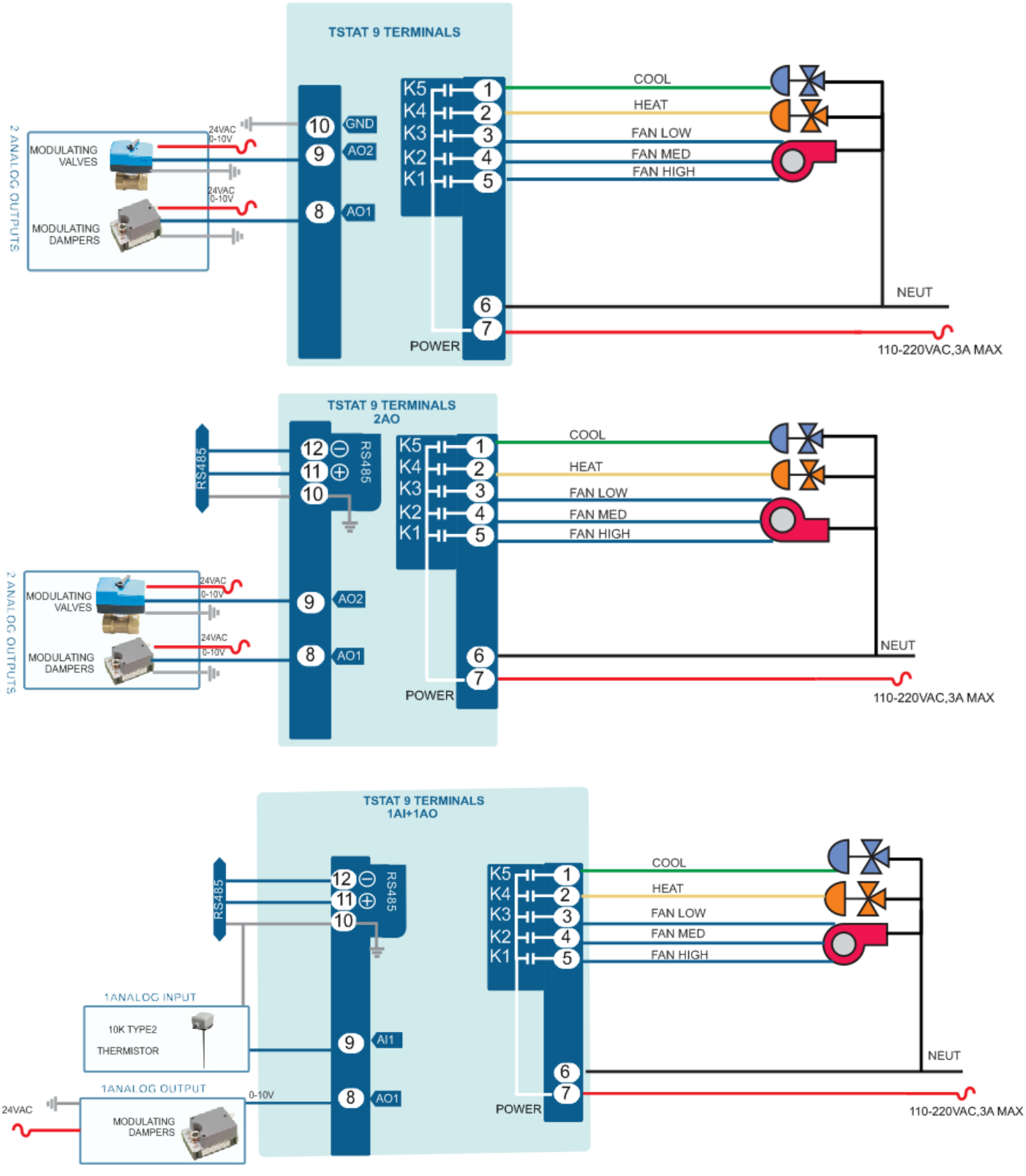
## Software

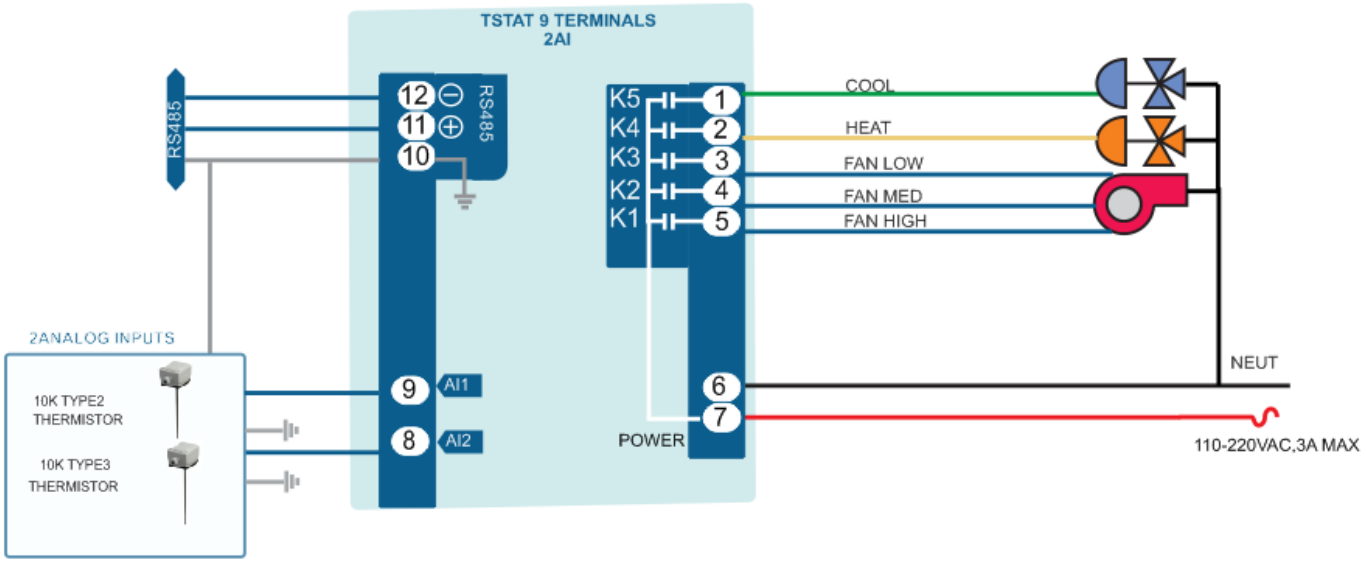
- 5 digital outputs
- Industry standard Modbus protocols
- User screen displays
- Day at home, work time, night at home, sleep, holiday
- 3 PID controllers

## Part Number Scheme



## Wiring Diagram






| Variable | Modbus Register and Description |
|---|---|
| 0 | Baudrate 96=9600 192=19200 384=38400 576=57600 1152=115200 unit:bps |
| 1 | Station Number |
| 2 | Protocol switch.0=MODBUS,1=MSTP |
| 3 | Instance Number |
| 4 | Schedule enable/disable 1:enable 0:disbale |
| 5 | Occupied/Home/Day setpoint |
| 6 | Unoccupied/Work/Night setpoint |
| 7 | Fan mode setting 0:unoccupied mode,1:user mode1 2: user mode2,3: user mode3 4:occupied mode |
| 8 | Firmware Version |
| 9 | Current Mode of Operation 0:coast mode 1 1:cool mode2 :heat mode |
| 10 | Temperature Unit 0:degreeC 1:degree F |
| 11 | Sytem Mode 0;auto 1:heat 2:cool,if set to0, sytem will control by PID,if set to1,stystem will be heat only mode and 2 will be cool only 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 output0:auto 1:manual |

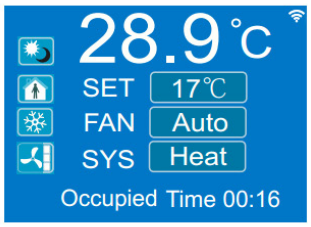
| AI | Bacnet Register and Description | |
|---|---|---|
| AI1 | Analog input1 | |
| AI2 | Analog input2 | |
| AI3 | Analog input3 | |
| AI4 | Analog input4 | spare |
| AI5 | Analog input5 | |
| AI6 | Analog input6 | |
| AI7 | Analog input7 | |
| AI8 | Analog input8 | |
| AI9 | Internal temperature value | |
| AI10 | Humidity value | |
| AI11 | CO2 value if it has CO2sensor present | spare |

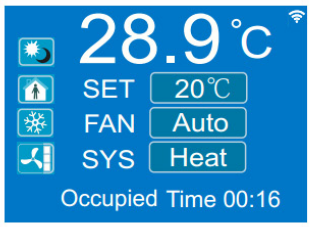
| BO | Bacnet Register and Description |
|---|---|
| BO1 | Binary output1 state 1:on 0:off |
| BO2 | Binary output1 state 2:on 0:off |
| BO3 | Binary output1 state 3:on 0:off |
| BO4 | Binary output1 state 4:on 0:off |
| BO5 | Binary output1 state 5:on 0:off |

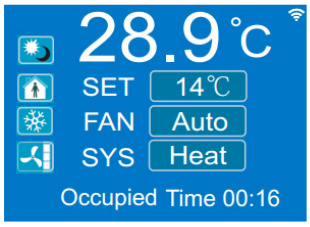
| AO | Bacnet Register and Description |
|---|---|
| AO1 | Analog output1 value |
| AO2 | Analog output2 value |

## LCD Screen Display

1.When you press ▼ or ▲ , it will decrease or increase the set point value. The value will flash two times, then it will confirm the setting automaticlly.

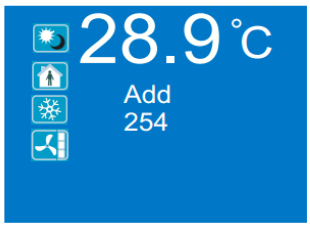


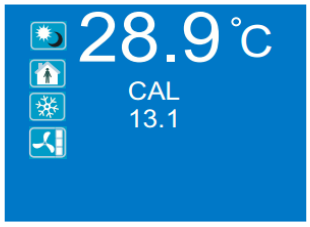



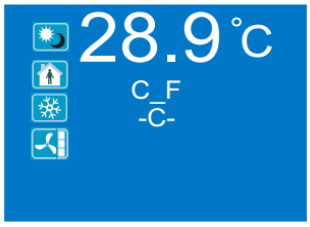




2.In the normal mode, press both ◀ and ▶ at the same time.Hold for several seconds,it will switch to the menu mode. Press ◀ or ▶ to scroll through the menu options such as 'Add', 'CAL', 'bAU', 'UNITS' and many others. To change the values at a particular menu, press ▲ or ▼ ,the chosen value will be stored automatically.

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

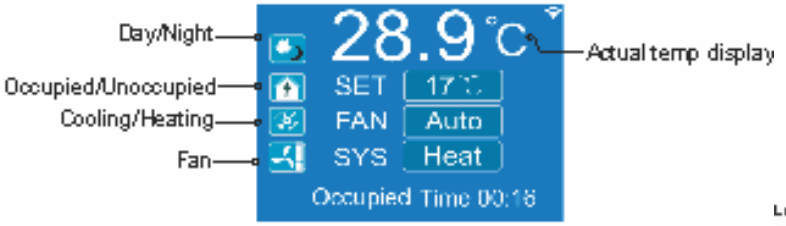


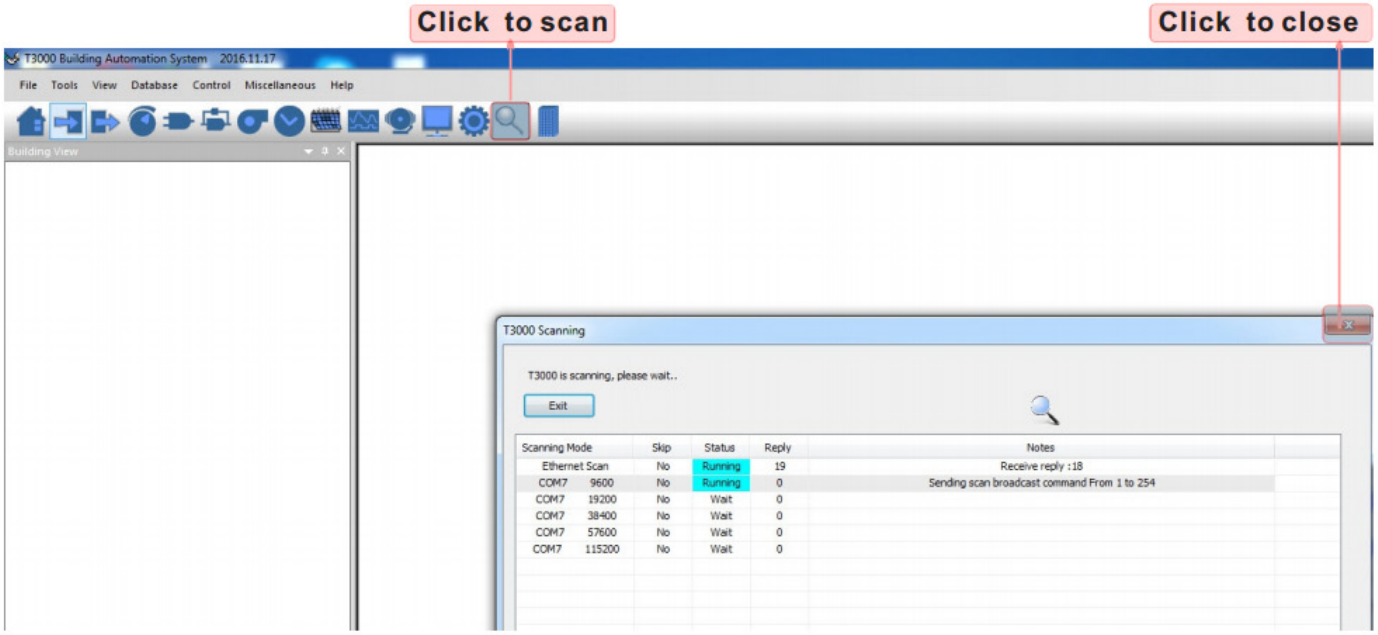

## Advanced Menu Item Details

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

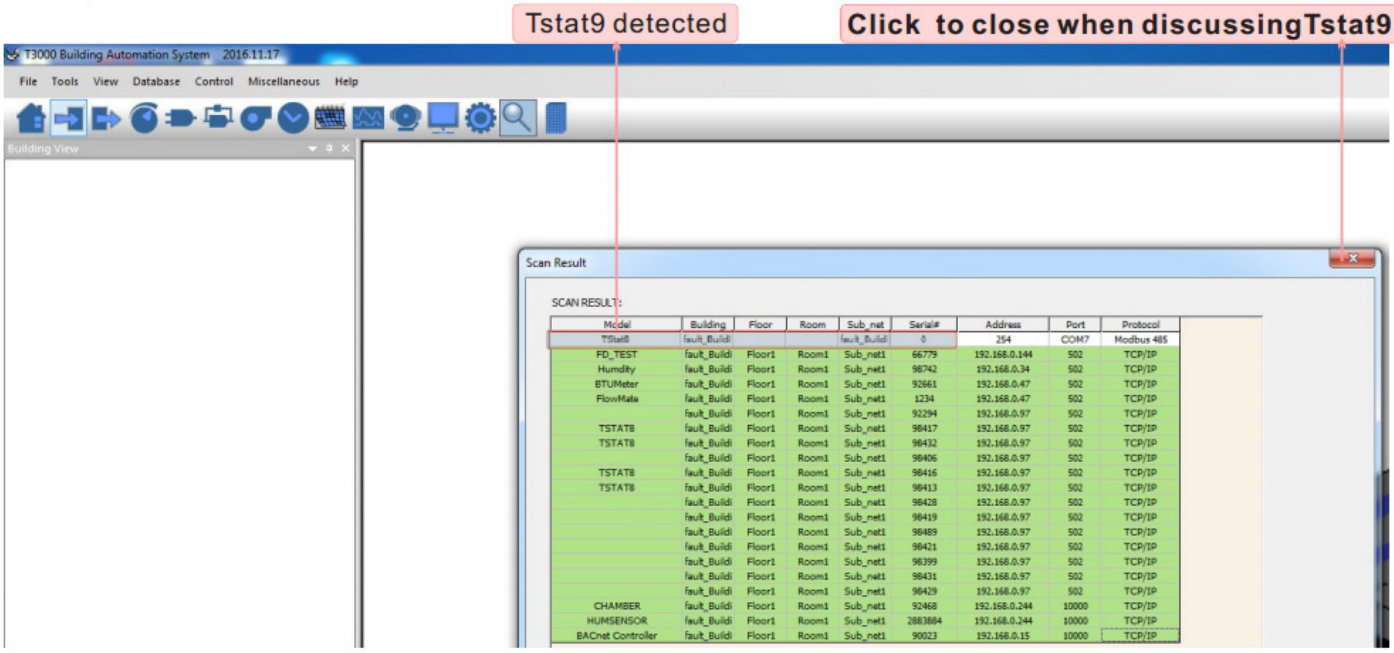



## T3000 Operation

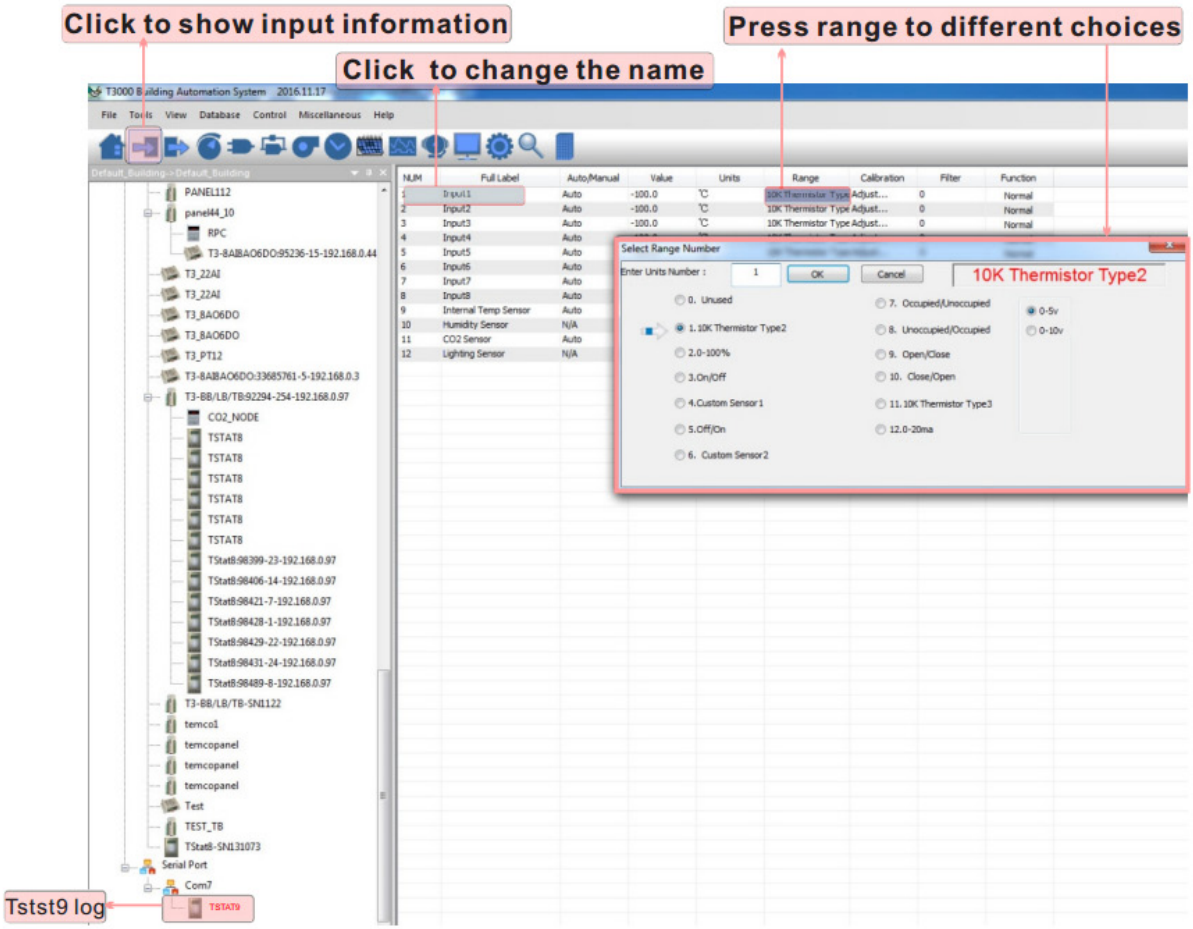
1.Connect Tstat9 to PC by RS485, start T3000 software



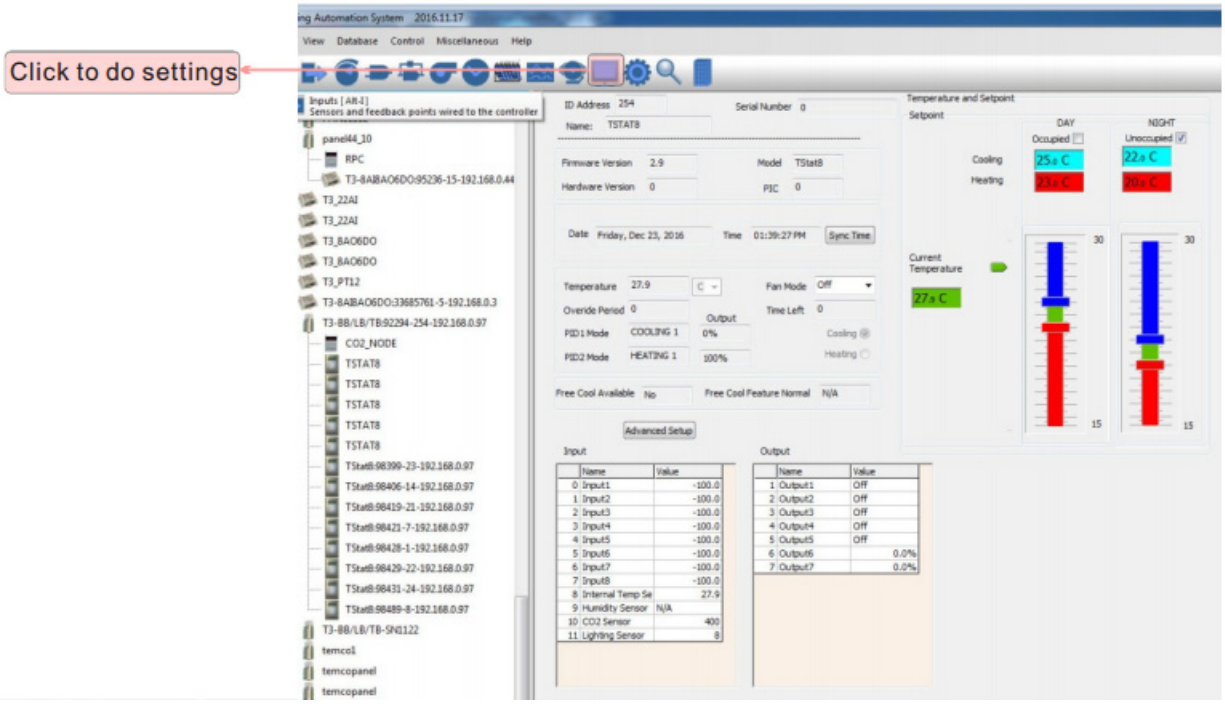

2.Click the button to scan, the following view will appear and close it as the picture indicates. When discussing Tstat9,close the view.



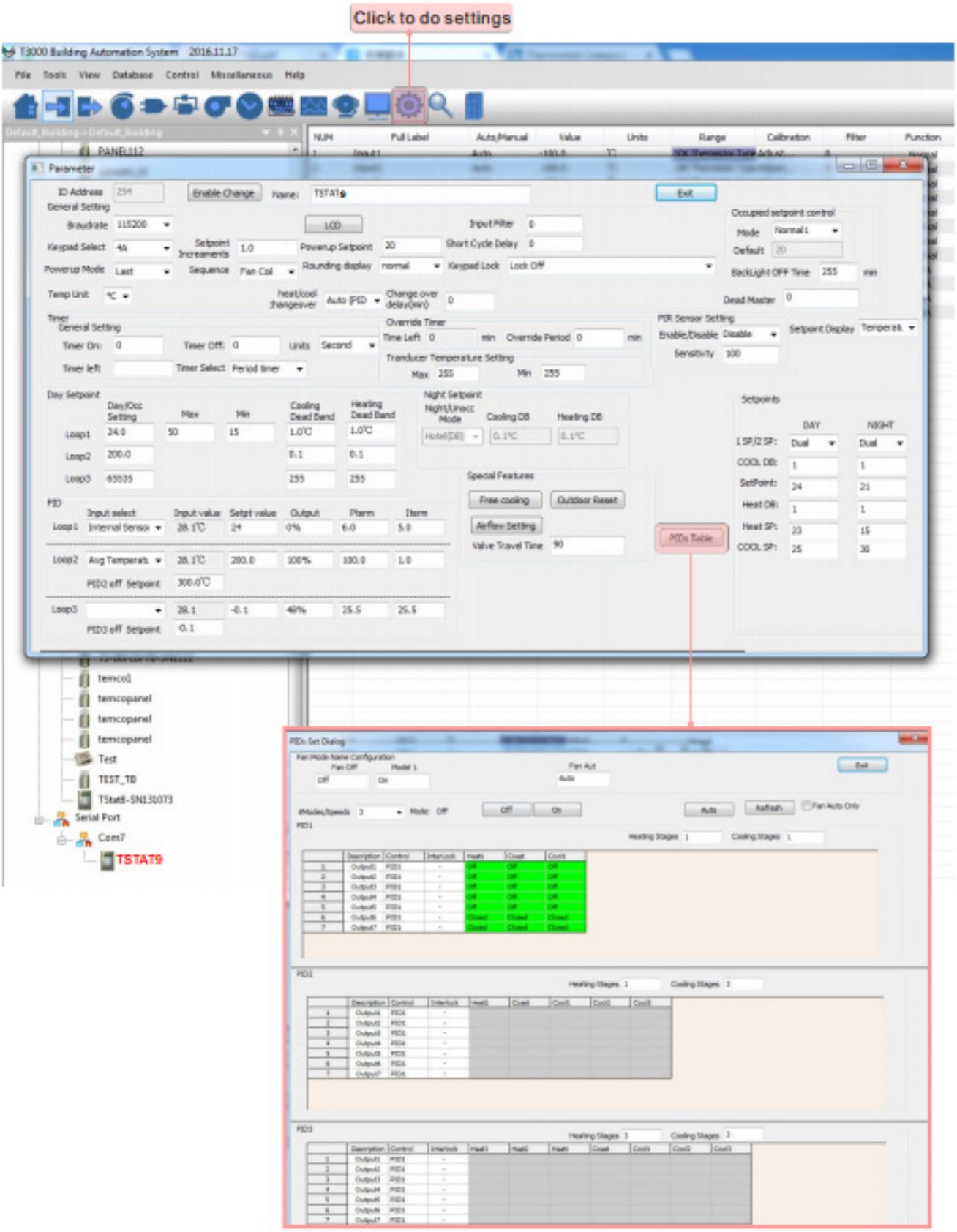
3.Click Tstat9 log,then click “input”  ,the T3000 will show all the information of it.To change name or choices,click as below.




4.Click  to do settings,you can see a tab below about setpoint and temperature.



5.Click  to do settings,you can see a tab below about parameter.Click PIDs tables,you can find PIDs set Dialog.



## WIFI configuration setting

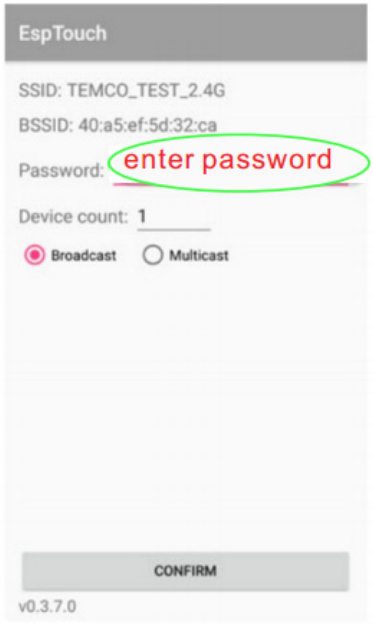
There are two methods which are EspTouch and T3000 to set IP adress

1.Set up via EspTouch

First click the link to download, install the app in Android phone, then connect the phone to WiFi router and turn on tstat 9.

https://temcocontrols.com/ftp/software/24esptouch.zip

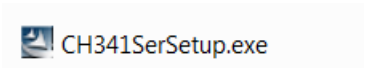
The app will get the SSID from your phone and you need enter the wifi password, click confirm button then app will send a broadcast message through wifi router to Tstat9

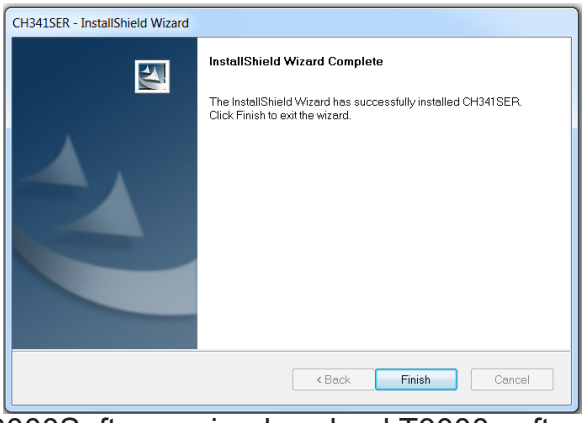



After about less than 20 seconds, Tstat9 will get the IP, and  can see the message from  phone.

2.Set up via T3000

(1)Visit https://temcocontrols.com/ftp/file/ CH340SerSetup.zip,download serial port drive software and install it.

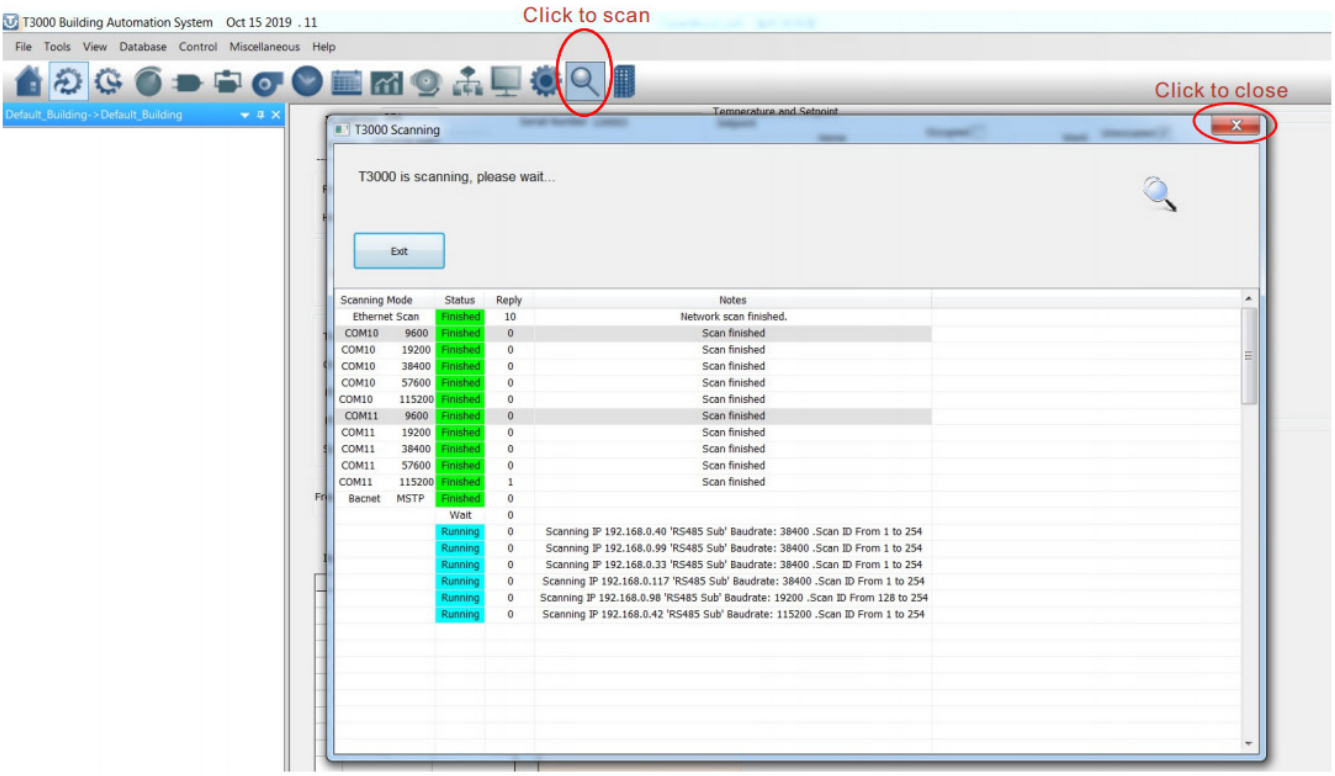


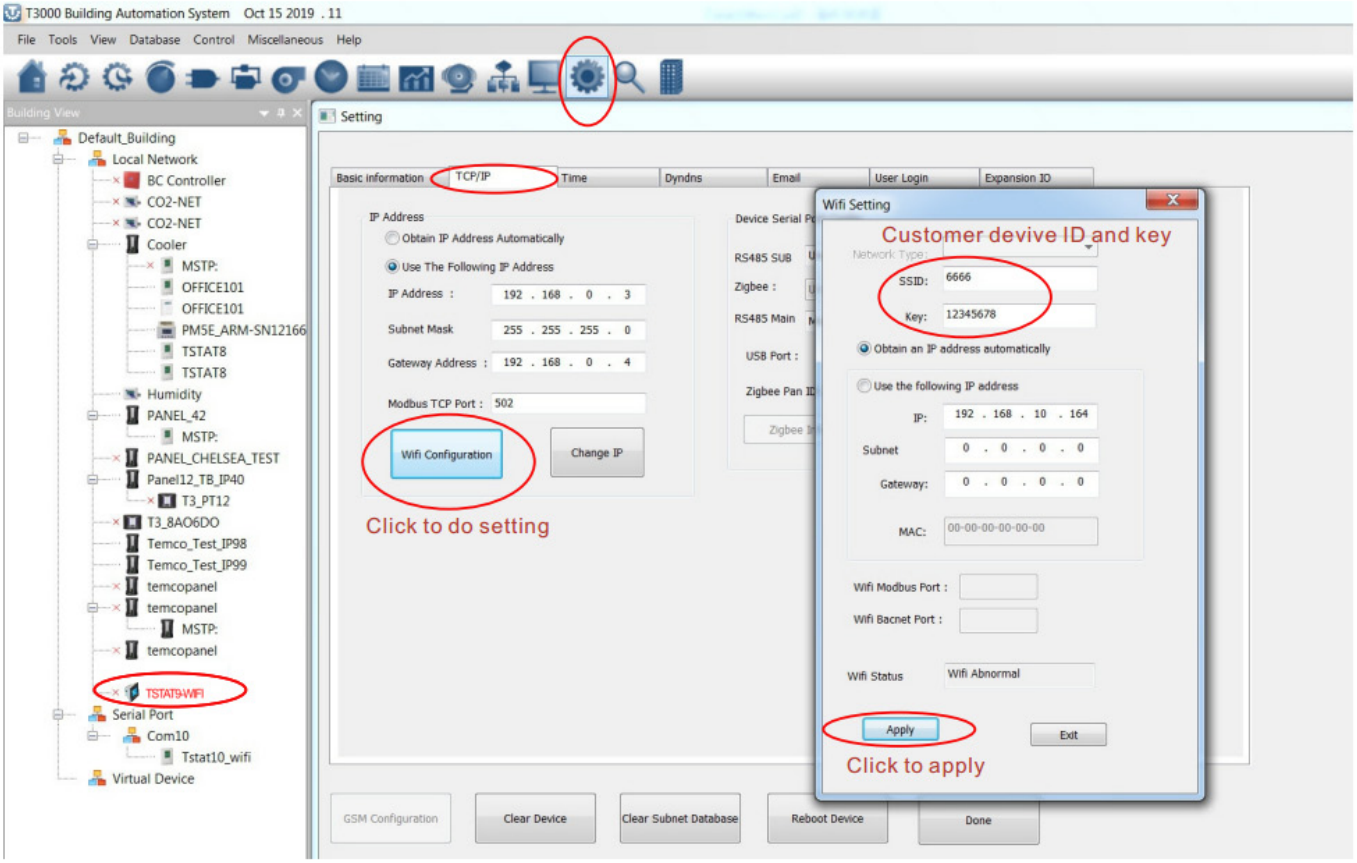

(2)Visit https://temcocontrols.com/ftp/software/09T3000Software.zip, download T3000 software and install it;

(3)Plug Tstat9-wifi in power,connect it to PC via USB cable;

(4)Start T3000 software,click  to scan.



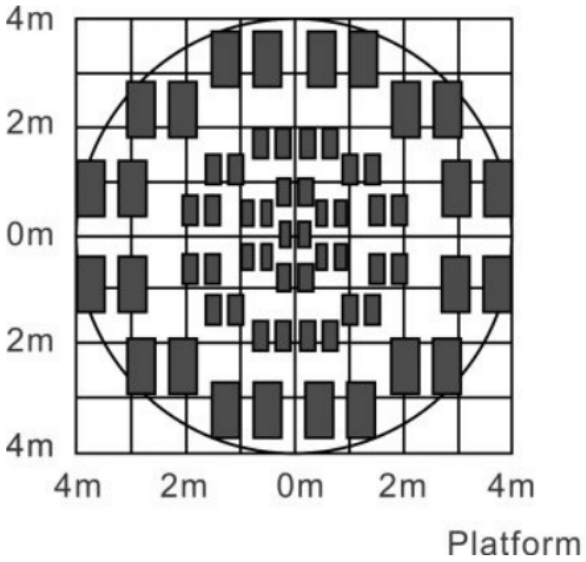

(5)click  to set,then you can find Tstat9-wifi as below



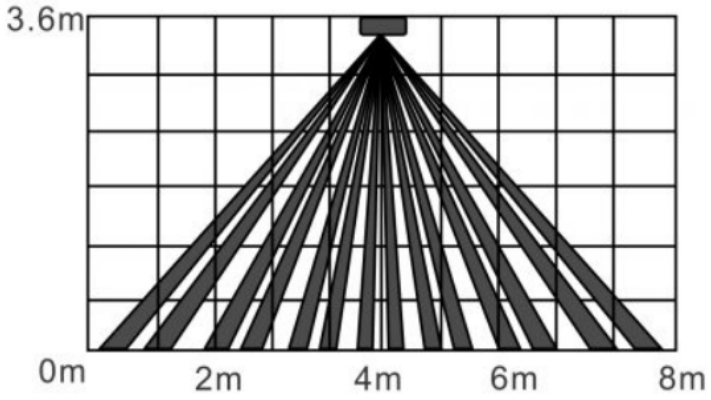
## Tstat9-OCC

The fan Angle is 60 degrees and the range is about 3 meters

Detecting Area View:




Platform




Side View