

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, 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 relay 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 it's 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/enthalpy. Tstat 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



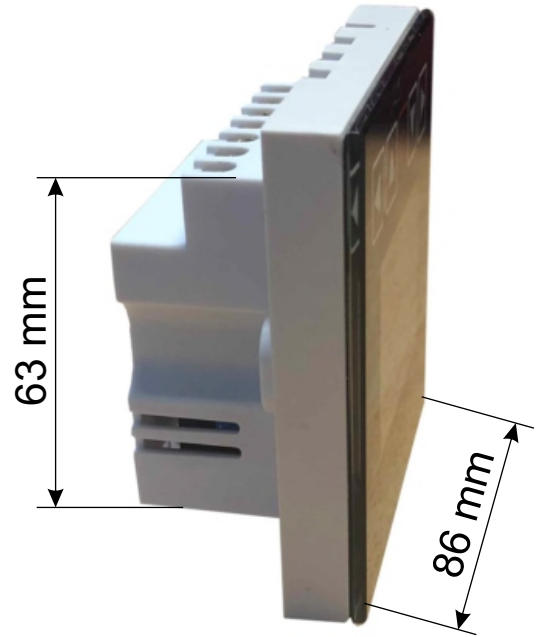
Typical Application



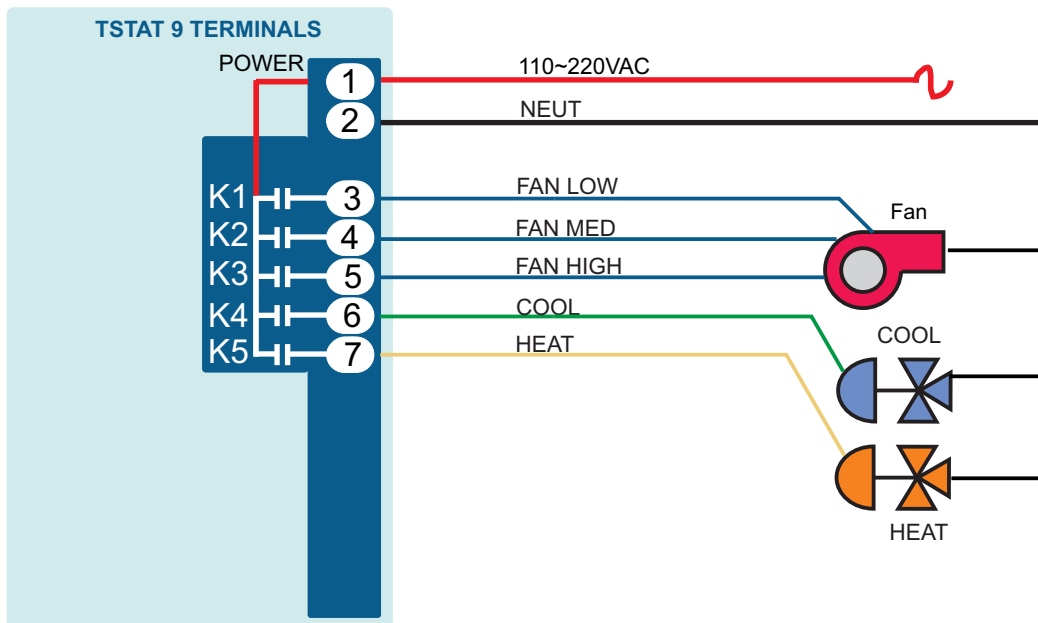
Specifications

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, 5A @ 220VAC
Plastic Housing	Flammability rating UL 94 file E56070
Enclosure rating	IP31
Protocols	Modbus TCP/IP
Temperature sensor	10K thermistor ±0.5°C
Setup Software	Free, no licensing, open source

Size



Wiring Diagram



Approvals

Plastic Enclosure	PA66 UL 94 V0 file E56070
PCB	FR-4 Epoxy Glass Cloth UL E479892
Terminal Block	PA66 UL 94V-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

Bacnet Objects

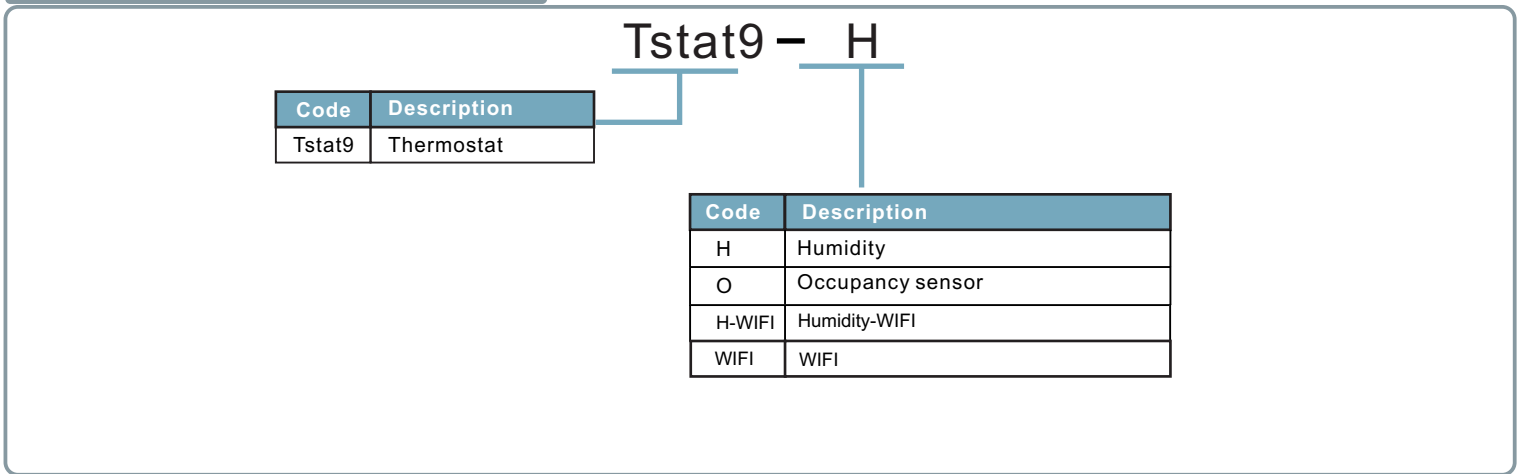
Variable	variable and Description
0	Baudrate 96 =9600 192=19200 384=38400 576=57600 1152=115200 unit:bps
1	Station Number
2	Protocol switch. 0 = MODBUS,1=MSTP.
3	Instance Number
4	Schedule enable/disable 1:enable 0:disable
5	Occupied/Home/Day setpoint
6	Unoccupied/Work/Night setpoint
7	Fan mode setting 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: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 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 output 0:auto 1>manual

AI	description	
AI1	Analog input 1	
AI2	Analog input 2	
AI3	Analog input 3	
AI4	Analog input 4	
AI5	Analog input 5	
AI6	Analog input 6	spare
AI7	Analog input 7	
AI8	Analog input 8	
AI9	Internal temperature value	
AI10	Humidity value	
AI11	CO2 value if it has CO2 sensor present	spare

BO	description
B01	Binary output1 state 1: on 0:off
B02	Binary output2 state 1: on 0:off
B03	Binary output3 state 1: on 0:off
B04	Binary output4 state 1: on 0:off
B05	Binary output5 state 1: on 0:off

AO	description
A01	Analog output1 value
A02	Analog output2 value

Part Number Scheme

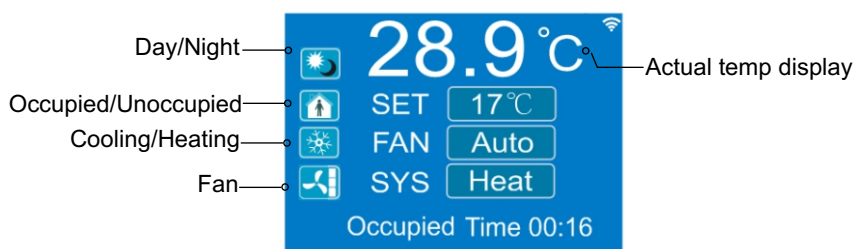


Advanced Menu Item Details



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.

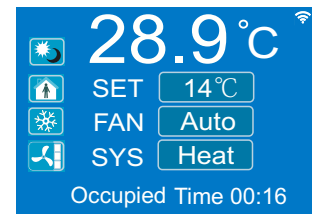
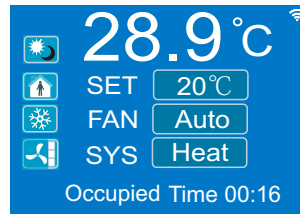
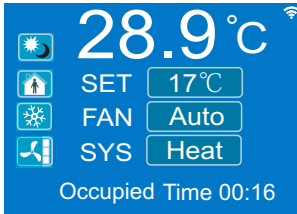










Last menu item Increase value Decrease value Next menu item

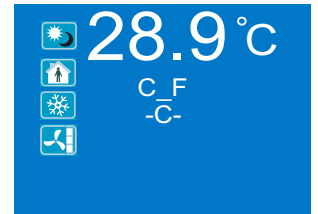
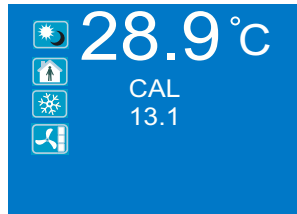
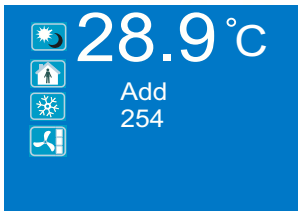


LCD Screen Display

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 automatically.

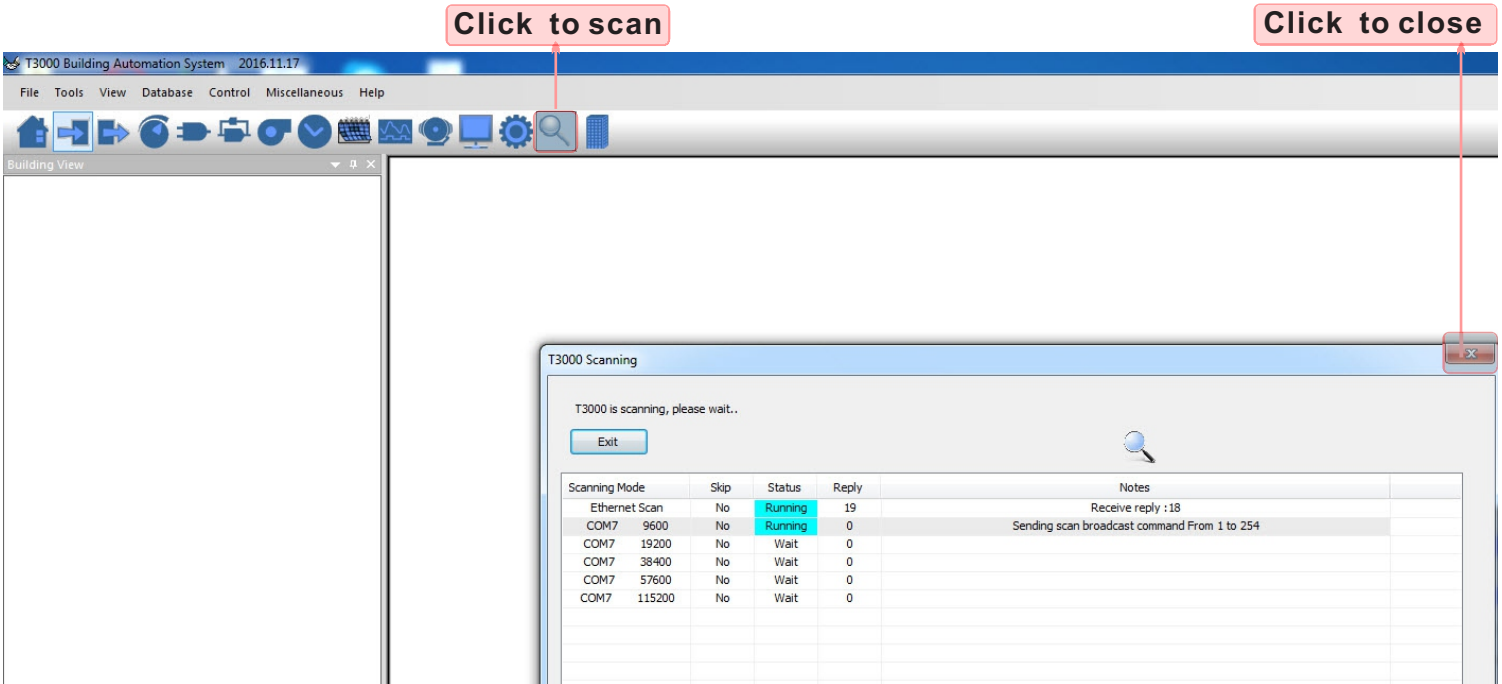



2. In the normal mode, press both  and  at the same time. Hold for several seconds, it will switch to the menu mode. Press  or  to scroll through the menu options such as 'Add', 'CAL', 'bAU', 'UNITS' and many others. To change the values at a particular menu, press  or , the chosen value will be stored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

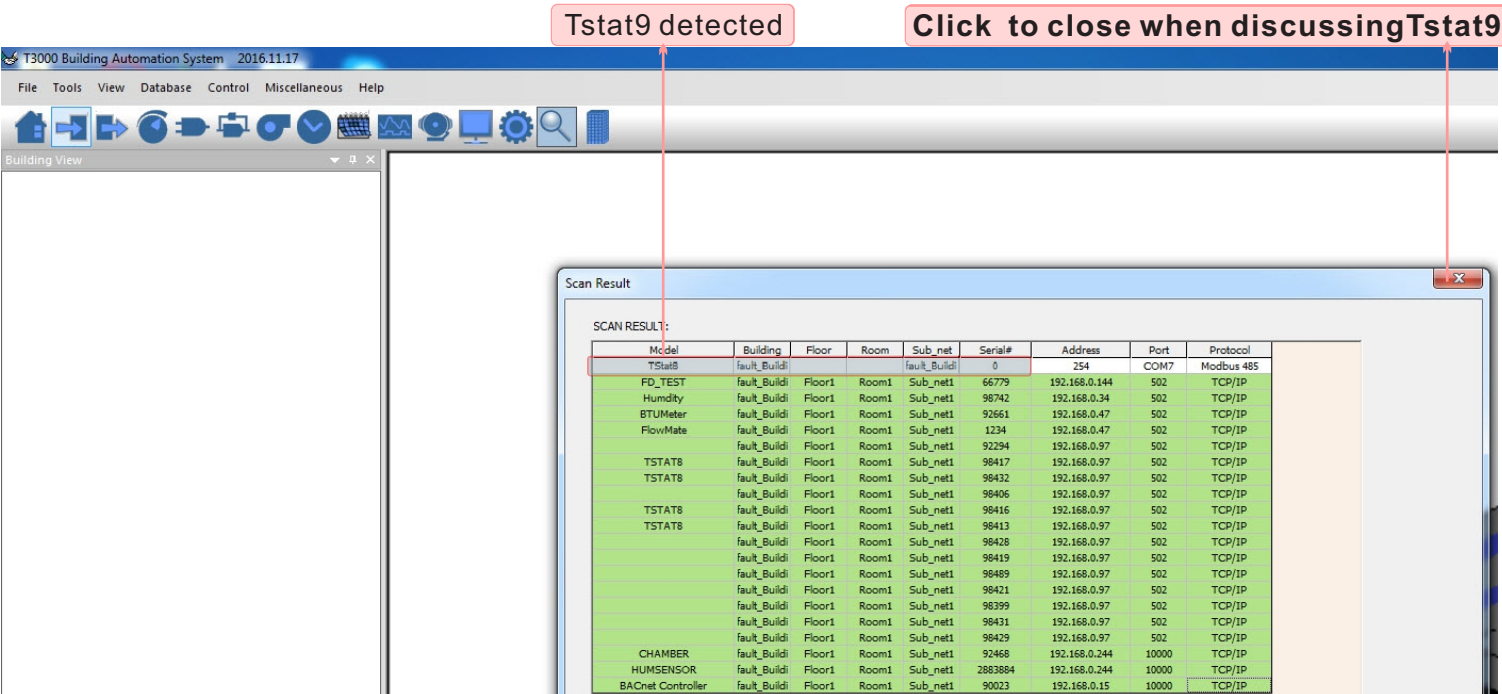


T3000 Operation


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.



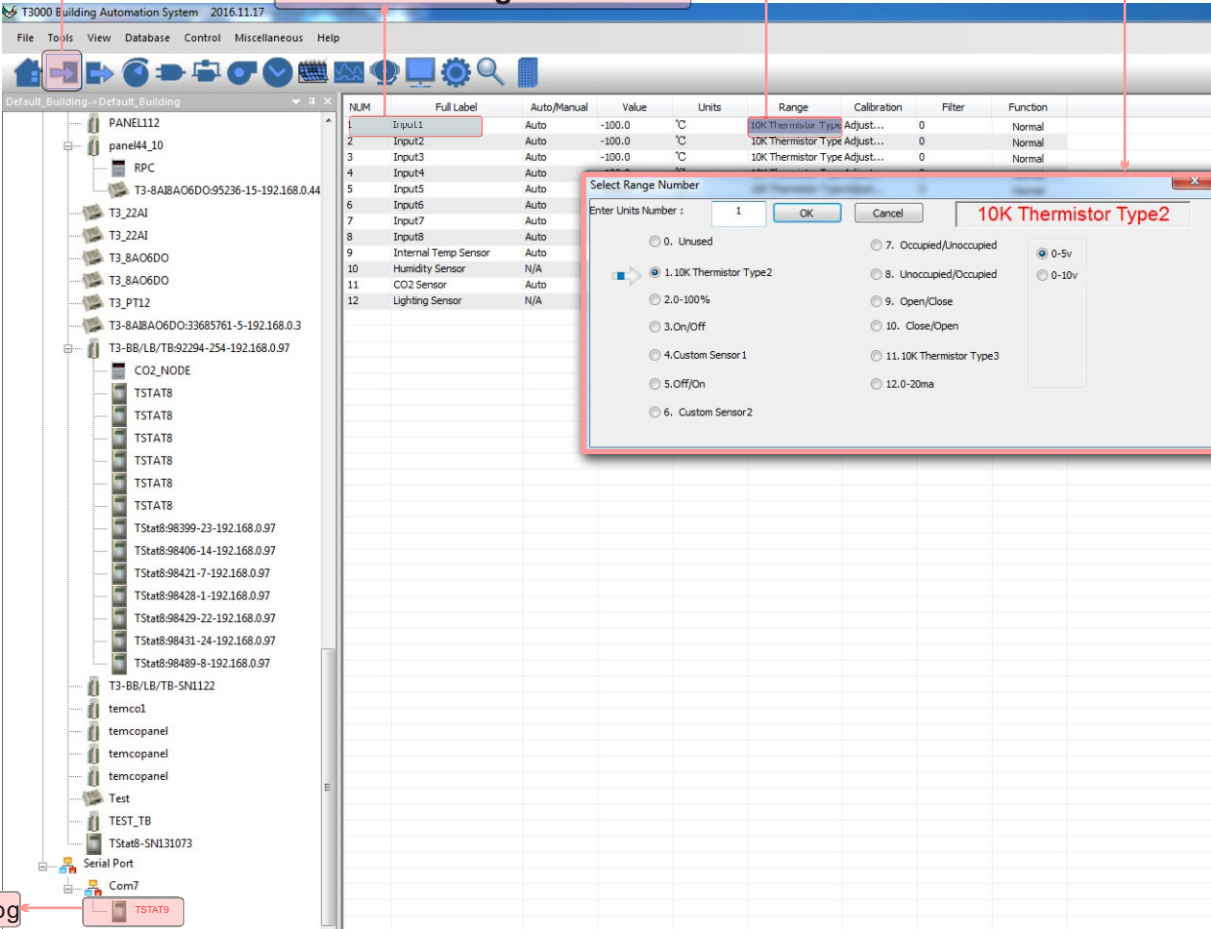
T3000 Operation

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

Click to show input information

Press range to different choices

Click to change the name



The screenshot shows the T3000 Building Automation System interface. On the left is a tree view of the building structure. The main window displays a table of inputs:

NUM	Full Label	Auto/Manual	Value	Units	Range	Calibration	Filter	Function
1	Input1	Auto	-100.0	°C	10K Thermistor Type	Adjust...	0	Normal
2	Input2	Auto	-100.0	°C	10K Thermistor Type	Adjust...	0	Normal
3	Input3	Auto	-100.0	°C	10K Thermistor Type	Adjust...	0	Normal
4	Input4	Auto						
5	Input5	Auto						
6	Input6	Auto						
7	Input7	Auto						
8	Input8	Auto						
9	Internal Temp Sensor	Auto						
10	Humidity Sensor	N/A						
11	CO2 Sensor	Auto						
12	Lighting Sensor	N/A						

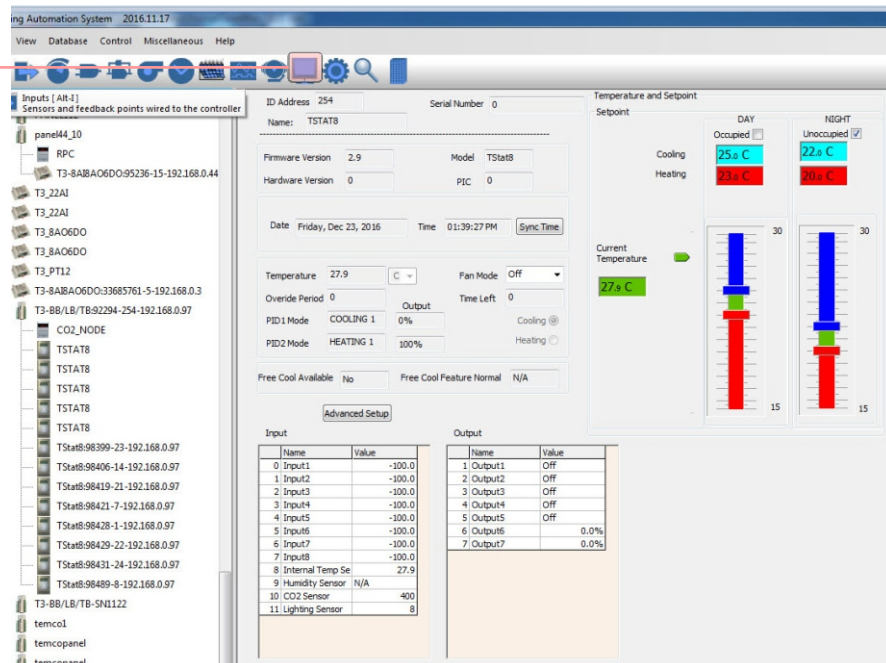
A dialog box titled "Select Range Number" is open, showing various sensor range options. The "10K Thermistor Type2" option is selected. The dialog also includes a "Enter Units Number" field set to 1 and radio buttons for "0-5v" and "0-10v".

Annotations with arrows point to the "Input" button in the top toolbar, the "TSTAT9" log in the tree view, and the "Range" column in the input table.

Tstst9 log

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

Click to do settings



The screenshot shows the configuration page for a thermostat (TSTAT8). The interface includes a tree view on the left, a central configuration panel, and a right-hand panel for temperature and setpoint control.

Configuration Panel:

- Name: TSTAT8
- ID Address: 254
- Serial Number: 0
- Firmware Version: 2.9
- Model: TStat8
- Hardware Version: 0
- PIC: 0
- Date: Friday, Dec 23, 2016
- Time: 01:39:27 PM
- Temperature: 27.9 °C
- Fan Mode: Off
- Override Period: 0
- Time Left: 0
- PID1 Mode: COOLING 1
- Output: 0%
- PID2 Mode: HEATING 1
- 100%
- Free Cool Available: No
- Free Cool Feature: Normal

Temperature and Setpoint Panel:


- Setpoint: DAY Occupied 25.0 C, NIGHT Unoccupied 22.0 C
- Heating: 23.0 C
- Current Temperature: 27.9 C
- Temperature scale: 15 to 30

Input and Output Tables:

Input	Name	Value	Output	Name	Value
0	Input1	-100.0	1	Output1	Off
1	Input2	-100.0	2	Output2	Off
2	Input3	-100.0	3	Output3	Off
3	Input4	-100.0	4	Output4	Off
4	Input5	-100.0	5	Output5	Off
5	Input6	-100.0	6	Output6	0.0%
6	Input7	-100.0	7	Output7	0.0%
7	Input8	-100.0			
8	Internal Temp Se	27.9			
9	Humidity Sensor	N/A			
10	CO2 Sensor	-400			
11	Lighting Sensor	8			

An annotation with an arrow points to the gear icon in the top toolbar.

T3000 Operation

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

Click to do settings

The screenshot shows the 'Parameter' dialog box for device 'TSTAT9'. The 'PID' section contains the following table:

Loop	Input select	Input value	Setpt value	Output	Pterm	Item
Loop1	Internal Sensor	28.1°C	24	0%	6.0	5.0
Loop2	Avg Temperat.	28.1°C	200.0	100%	100.0	1.0
Loop3		28.1	-0.1	48%	25.5	25.5

Below the table, there are fields for 'PID2 off Setpoint' (300.0°C) and 'PID3 off Setpoint' (-0.1).

The 'PIDs Set Dialog' window shows the following configuration:

- Fan Mode Name Configuration: Fan Off (Off), Model 1 (On), Fan Aut (Auto)
- #Modes/Speeds: 3, Mode: Off
- Heating Stages: 1, Cooling Stages: 1

PID1 Table:

Description	Control	InterLock	Heat1	Coast	Cool1
1 Output1	PID1	-	Off	Off	Off
2 Output2	PID1	-	Off	Off	Off
3 Output3	PID1	-	Off	Off	Off
4 Output4	PID1	-	Off	Off	Off
5 Output5	PID1	-	Off	Off	Off
6 Output6	PID1	-	Closed	Closed	Closed
7 Output7	PID1	-	Closed	Closed	Closed

PID2 Table:

Description	Control	Interlock	Heat1	Coast	Cool1	Cool2	Cool3
1 Output1	PID1	-					
2 Output2	PID1	-					
3 Output3	PID1	-					
4 Output4	PID1	-					
5 Output5	PID1	-					
6 Output6	PID1	-					
7 Output7	PID1	-					

PID3 Table:

Description	Control	Interlock	Heat3	Heat2	Heat1	Coast	Cool1	Cool2	Cool3
1 Output1	PID1	-							
2 Output2	PID1	-							
3 Output3	PID1	-							
4 Output4	PID1	-							
5 Output5	PID1	-							
6 Output6	PID1	-							
7 Output7	PID1	-							

Tstat9-OCC

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

Detecting Area View:

