PM-5E

Descriptions

This full-featured CPU based thermostat with clock is designed for small cooling and heating air handling systems in residential and commercial facilities. The unit provides features which eclipse standard mechanical thermostats at a price that fits conventional HVAC projects.

The PM5 is very similar to the Tstat5 and Tstat6 series thermostats but note that there is no internal temperature sensor inside the PM5, you will need to connect an external sensor such as a temperature, humidity, or pressure sensor for feedback.

Highlights:
 -Tight control of 0.5°C provides comfortable indoor environment.
 -High impact plastic enclosure provides durability in commercial environments.
 -Customizable sequence of operation table (FCU with modulating or on/off valve, single or 3-speed fan, pressure independent VAV, stage sequencer…)

## Technical Data

PM-5E…....................... 5 relays x 1amps @24VAC /110VAC / 220VAC, ±10% 8 universal inputs, 2 universal outputs (10V @100ma), with clock.

Operating temperature…...…. -30~70°C (-22~158°F)

Supply voltage…….....................................   15~24VAC/DC ±10%, 50-60Hz

Power consumption….. 100mA at 12VDC

Relay contacts rating..….............… max 6A

Ambient humidity……...…....….. 10-90 %Rh

Operating Environment................................ 0 ~ 99% humidity non condensing

Plastic Housing .... Flammability rating UL 94V0 file E194560

Enclosure rating….. IP31

Temperature sensor.. 10K thermistor ±0.5°C

Colour……...….. White/Off-white

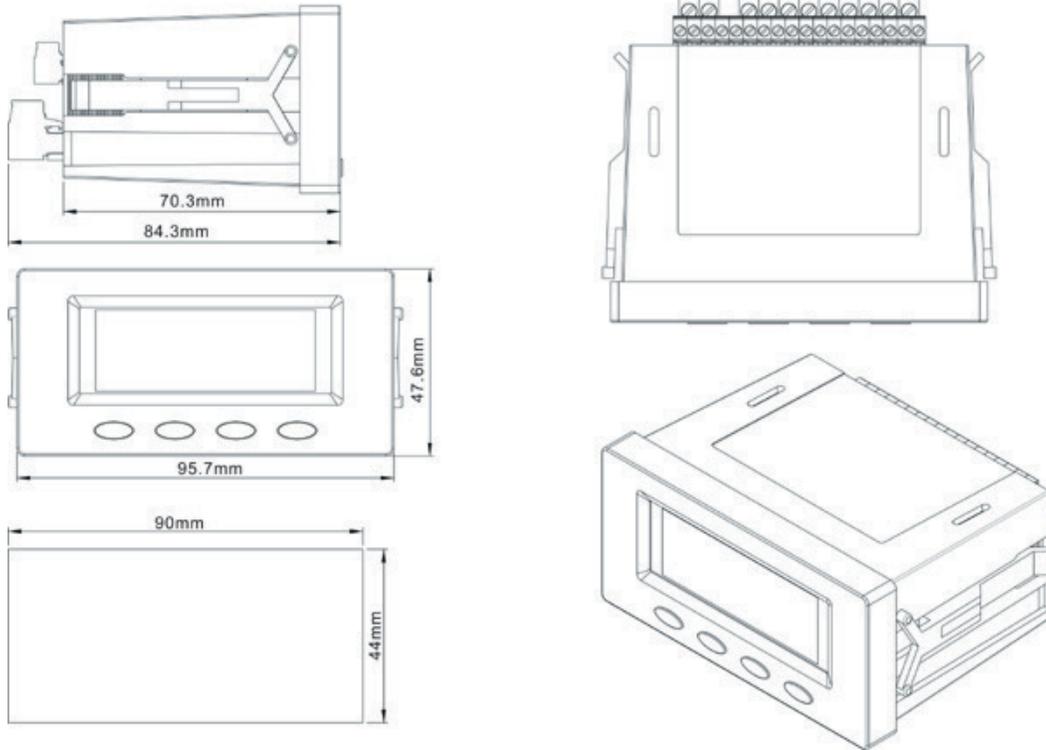Weight ………….....................…….. 200g
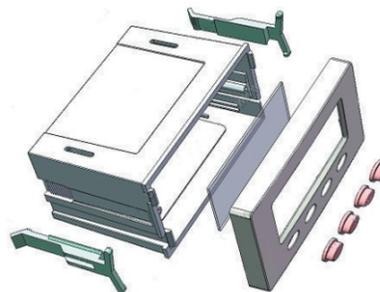
Snap Slider: Slide tab into slot to secure device in the panel. No screws or other hardware required.
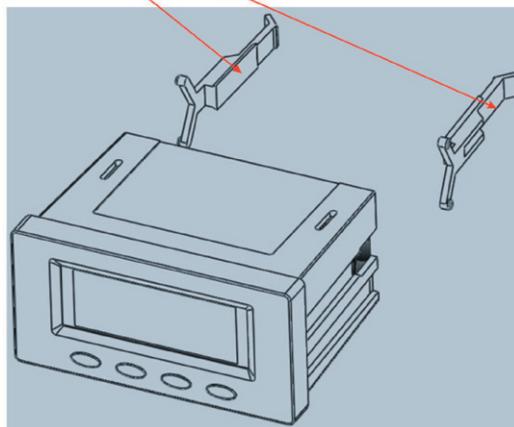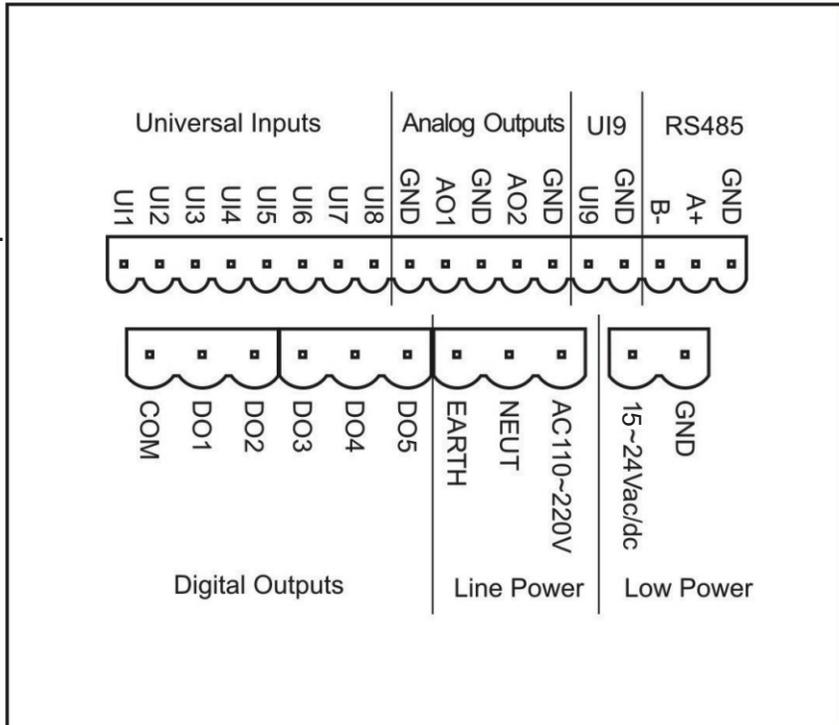
Dimensions:

Terminal Block Diagrams:

The low power terminals can take anything from 15 to 24V AC/DC.

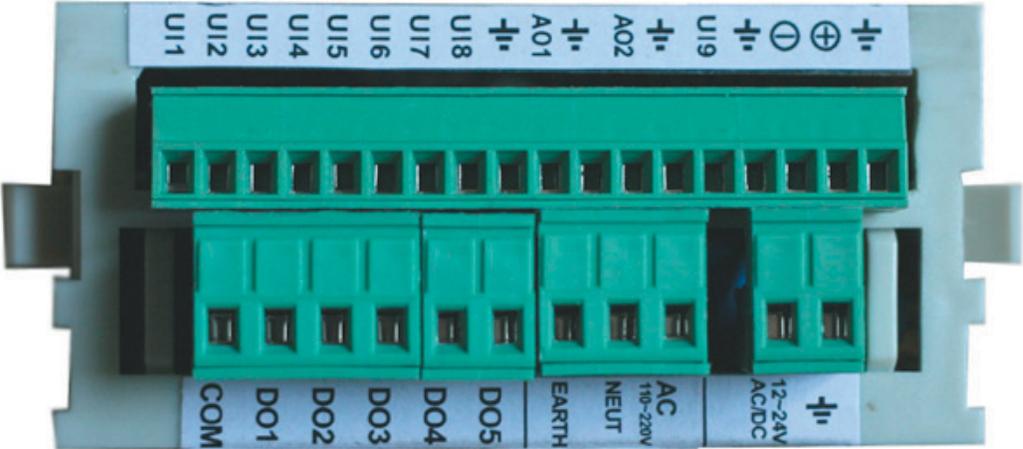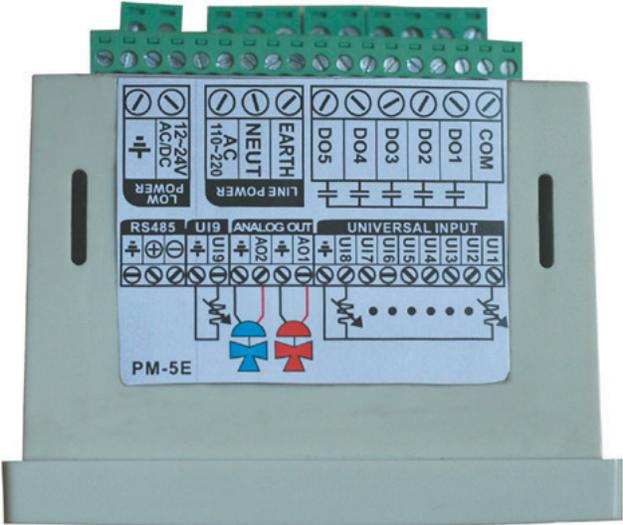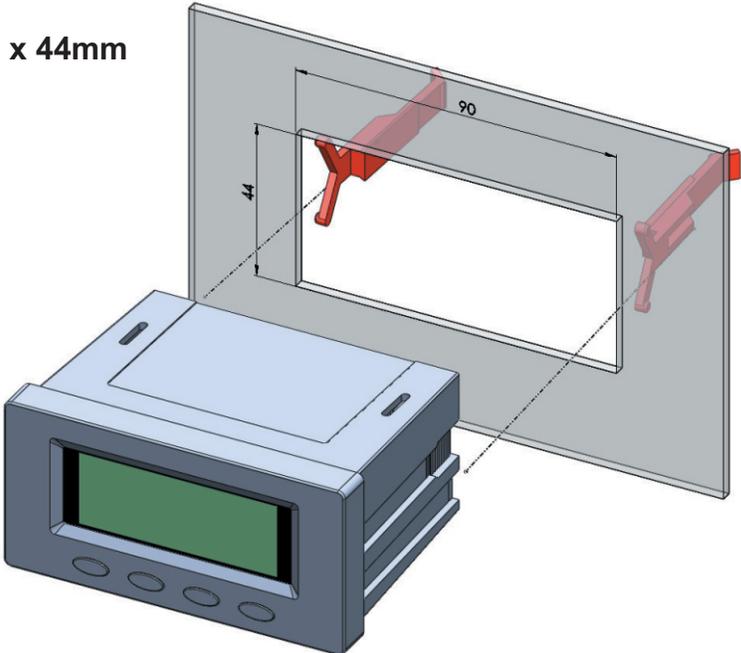The high power terminals can take from 110 to 220V AC.

This two power supply cannot be used at the same time.
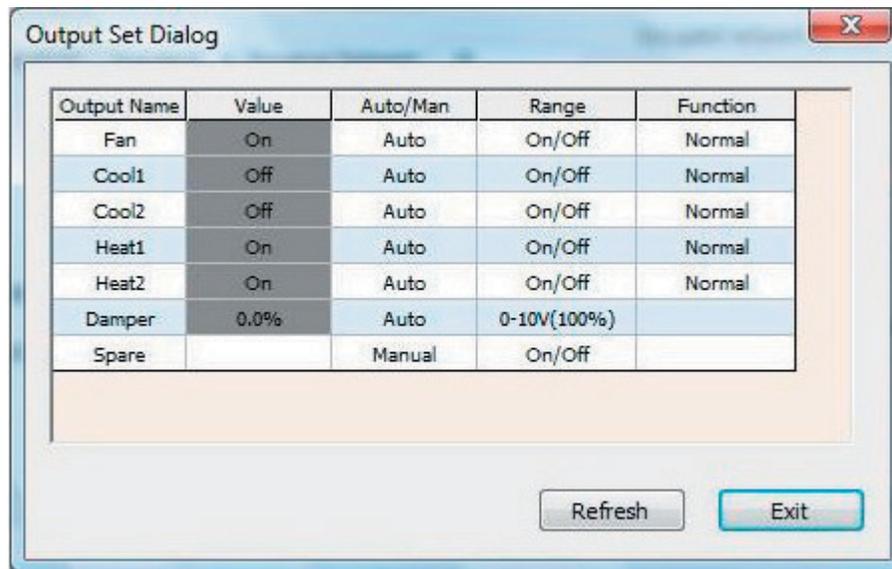
Panel Cutout Size: 90 x 44mm
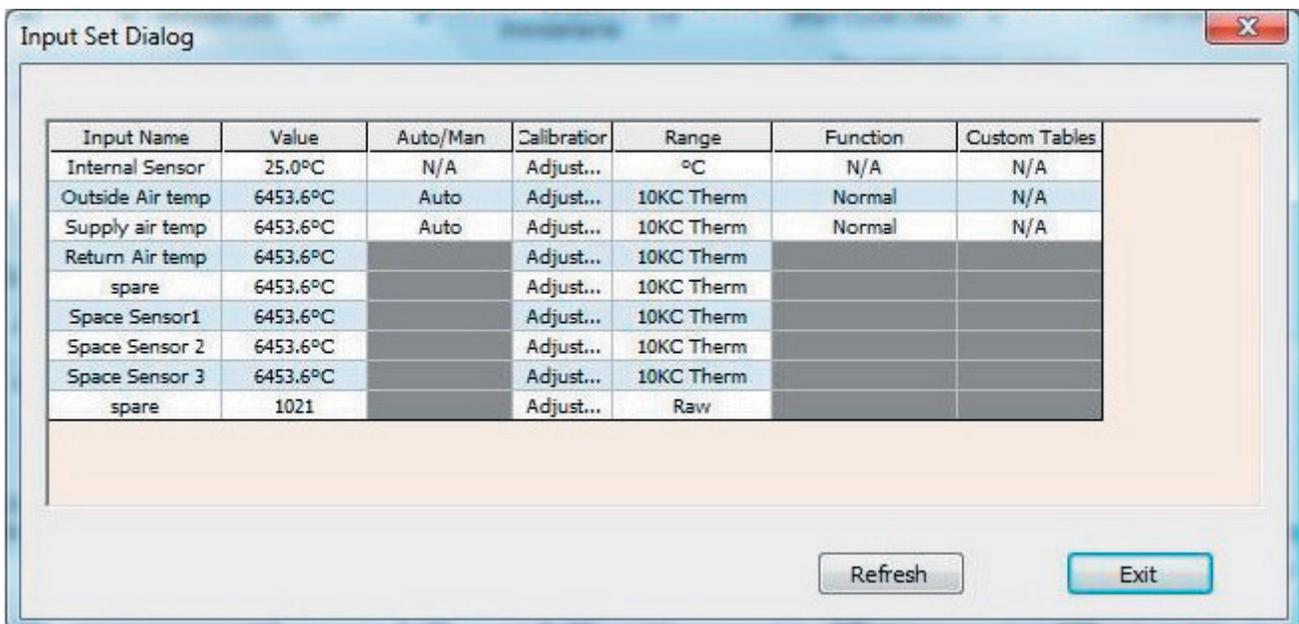
Two Heat Two Cool example

gure as

First go to the advanced -> outputs grid and type in the names of the outputs and confi
any output for any function.
Output 6 and 7 are the analog outputs, you can set the damper up on output6
Output 7 is spare.

Output Name	Value	Auto/Man	Range	Function
Fan	On	Auto	On/Off	Normal
Cool1	Off	Auto	On/Off	Normal
Cool2	Off	Auto	On/Off	Normal
Heat1	On	Auto	On/Off	Normal
Heat2	On	Auto	On/Off	Normal
Damper	0.0%	Auto	0-10V(100%)	
Spare		Manual	On/Off	

Output Set Dialog — Refresh — Exit

Configure the inputs, the only thing to watch out for is inputs 1 and 2 are the only ones with special features attached to them, the 'Function' column.

Input Set Dialog

Input Name	Value	Auto/Man	Calibration	Range	Function	Custom Tables
Internal Sensor	25.0°C	N/A	Adjust...	°C	N/A	N/A
Outside Air temp	6453.6°C	Auto	Adjust...	10KC Therm	Normal	N/A
Supply air temp	6453.6°C	Auto	Adjust...	10KC Therm	Normal	N/A
Return Air temp	6453.6°C		Adjust...	10KC Therm		
spare	6453.6°C		Adjust...	10KC Therm		
Space Sensor1	6453.6°C		Adjust...	10KC Therm		
Space Sensor 2	6453.6°C		Adjust...	10KC Therm		
Space Sensor 3	6453.6°C		Adjust...	10KC Therm		
spare	1021		Adjust...	Raw		

Refresh — Exit

Here's the outputs grid where you set up each output (row) for each stage of heating and cooling (the columns).
Check auto only for now, skip the setup of the manual modes to keep thigns simple.

The economizer is on output 6 and I've arbitrarily set it to open up 0-50 on stage 1 and 50 - 100% on stage 2 cool.

Output Grid Dialog

PID1

Mode [Fan Off ▼]   #Modes/Speeds [1 ▼]   ☑ Fan Auto Only   Heating Stages [2]   Cooling Stages [2]

	Description	Function	Rotation	Control	InterLock	Heat2	Heat1	Coast	Cool1	Cool2
1	Fan			PID1	-	On	On	Off	On	On
2	Cool1	Normal	0	PID1	-	Off	Off	Off	On	On
3	Cool2	Normal	0	PID1	-	Off	Off	Off	Off	On
4	Heat1	Normal	0	PID1	-	On	On	Off	Off	Off
5	Heat2	Normal	0	PID1	-	On	Off	Off	Off	Off
6	Damper			PID1	-	Close	Close	Close	0-50	50-100 ▼
7	Spare			PID1	-	Close	Close	Close	Close	Close

PID2

Heating Stages [1]   Cooling Stages [1]

	Description	Function	Rotation	Control	Interlock	Heat1	Coast	Cool1
1	Fan			PID1	-	Off	Off	On
2	Cool1	Normal	0	PID1	-	On	Off	Off
3	Cool2	Normal	0	PID1	-	Off	Off	Off
4	Heat1	Normal	0	PID1	-	On	Off	Off
5	Heat2	Normal	0	PID1	-	Off	Off	Off
6	Damper			PID1	-	0-50	Close	0-100
7	Spare			PID1	-	Close	Close	Close

[Exit]

Next select the 'mode' box at the top left and choose the Auto table, copy all the settings for the grid.
This feature lets you set up a particular output to be on or off in each of the various modes.
For example you could lock out the cooling completley at night by putting the Cool1 and Cool2 outputs (rows) to be off for all the columns (heat1,2,cool1,2 and so on).

Output Grid Dialog

PID1

Mode [Fan Aut ▼] #Modes/Speeds [1 ▼] ☑ Fan Auto Only Heating Stages [2] Cooling Stages [2]

Fan Off
Fan Aut

	Description	Function	Rotation	Control	InterLock	Heat2	Heat1	Coast	Cool1	Cool2
1	Fan			PID1	-	On	On	Off	On	On
2	Cool1	Normal	0	PID1	-	Off	Off	Off	On	On
3	Cool2	Normal	0	PID1	-	Off	Off	Off	Off	On
4	Heat1	Normal	0	PID1	-	On	On	Off	Off	Off
5	Heat2	Normal	0	PID1	-	On	Off	Off	Off	Off
6	Damper			PID1	-	Close	Close	Close	0-50	50-100
7	Spare			PID1	-	Open	Close	Close	Close	Close

PID2

Heating Stages [1] Cooling Stages [1]

	Description	Function	Rotation	Control	Interlock	Heat1	Coast	Cool1
1	Fan			PID1	-	Off	Off	On
2	Cool1	Normal	0	PID1	-	On	Off	Off
3	Cool2	Normal	0	PID1	-	Off	Off	Off
4	Heat1	Normal	0	PID1	-	On	Off	Off
5	Heat2	Normal	0	PID1	-	Off	Off	Off
6	Damper			PID1	-	0-50	Close	0-100
7	Spare			PID1	-	Close	Close	Close

[Exit]

Once you have the config all set up you can save it and quickly copy it to other stats using the File-Save and File ->Load commands in the menu system.
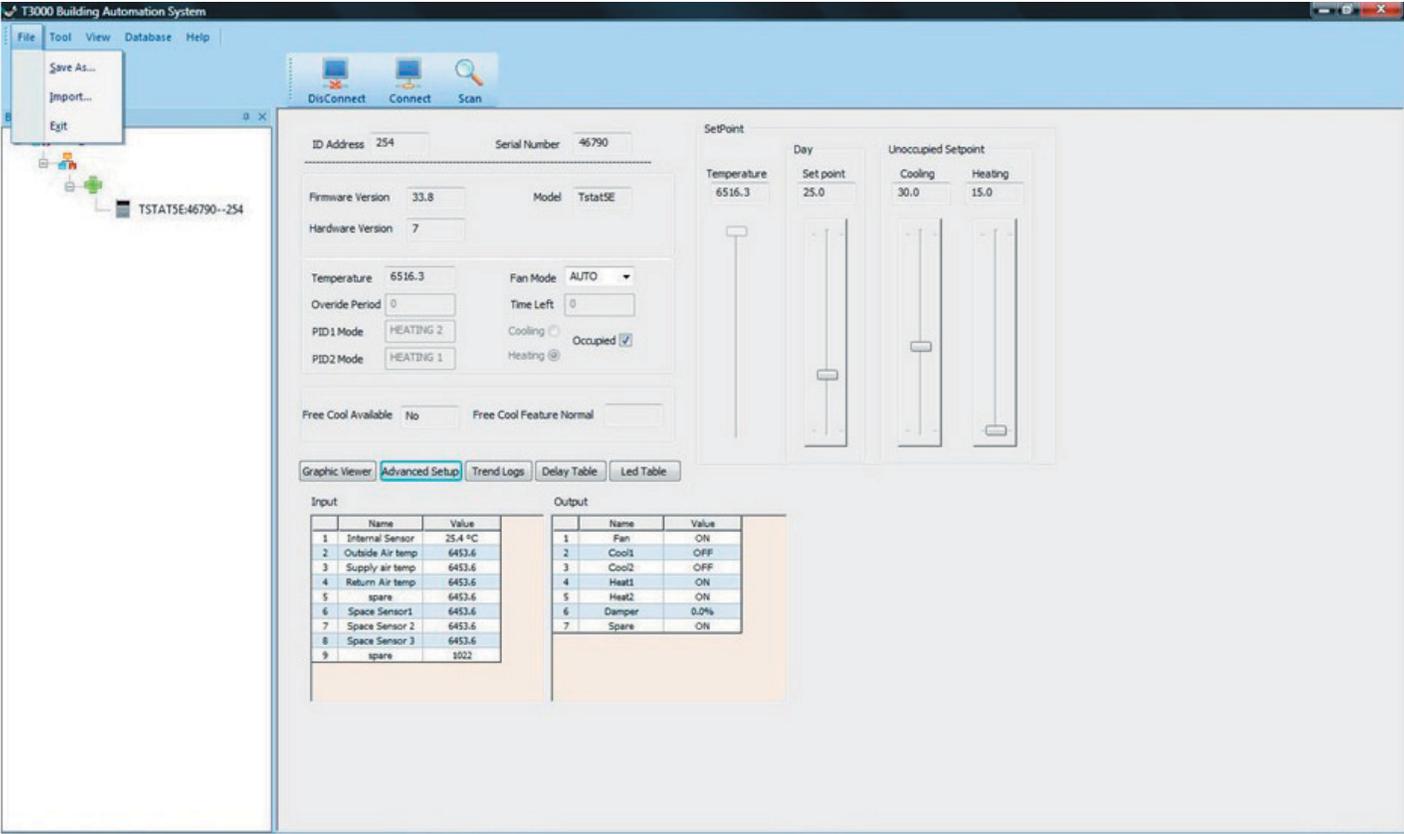
Register List

All of the registers of the tstat are accessible using the serial interface via the read and/or write commands.
is a detailed list of all of the tstat registers.
Note: When using the Modbus Poll software, addressing should be set to "Protocol Addresses (Base 0)" under the "Display" menu.

Address	Bytes	Range	Defaults		Register and Description
			°C	°F	
0 to 3	4	-	-	-	Serial Number - 4 byte value. Read-only
4 to 5	2	-	-	-	Software Version – 2 byte value. Read-only
6	1	0-255	254	254	ADDRESS. Modbus device address
7	1	0-255	-	-	Product Model. This is a read-only register that is used by the microcontroller to determine the product
8	1	0-255	-	-	Hardware Revision. This is a read-only register that is used by the microcontroller to determine the hardware rev
9	1	0-255	-	-	PIC firmware version
10	1	0-255	-	-	PLUG_N_PLAY_ADDRESS, 'plug n play' address, used by the network master to resolve address conflicts. See VC code for algorithms
15	1	0-1	0	0	Base address selection. 0 = Protocol address, 1 = PLC address.
16	1	0-255	-	-	Update Register. Look below in ISP section
11 to 100					Blank, for future use
101	2	0-3000	-	-	ROOM TEMPERATURE reading in Deg from the sensor selected by TSS. Writing a temperature value to this register will calibrate the tstat by automatically adjusting the calibration register
102	2	0-1000	-	-	COOLING_VALVE, a number from 0-1000 representing 0% (closed) to 100% (open)
103	2	0-1000	-	-	HEATING_VALVE, a number from 0-1000 representing 0% (closed) to 100% (open)
104	2	0-100	-	-	PID, current PI calculation for cooling term
105					NOT USED FOR REV 25
106	1	0-3	-	-	COOL_HEAT_MODE, heating or cooling mode. 0=none, 1=cooling, 2=heating.
107	1	0-3	-	-	MODE_OPERATION, heating or cooling state: 0-7 = coasting, cooling 1,2,3, heating 1,2,3
108	1	0-255	-	-	DIGITAL_OUTPUT_STATE, bit 0 thru 4 = relay 1 thru 5.
109	2	0-1000	500	500	CALIBRATION, this is the calibration factor for the internal sensor, normally maintained by the tstat,
110	2	0-1000	500	500	CALIBRATION_EXTERNAL , this is the calibration factor for the external sensor, normally maintained by the tstat,
111	1	0-3	0	0	TEMP_SELECT, Sensor to be used for the PID calculations, 0 = internal sensor IC, 1= external sensor, 2 = internal thermistor, 3 = average the internal thermistor and external sensor
112	1	0-255	100	100	DAC_OFFSET , Calibration data for the 0-10VDC signal, internal variable maintained by tstat
113	1				NOT USED FOR REV 25
114	1	10-255	60	60	PTERM , proportional term for PI calculation
115	1	0-255	50	50	ITERM , integral term for PI calculation
116	1				NOT USED FOR REV 25
117	1				NOT USED FOR REV 25
118	1	0-2	1	1	SEQUENCE , control sequence ie fancoil, heatpump etc.
119	1	1-200	10	10	COOLING_DEADBAND , offset from setpoint for cooling to begin. Units of 0.1 deg.
120	1	1-200	10	10	HEATING_DEADBAND , offset from setpoint for heating to begin. Units of 0.1 deg
121	1	0-1	0	1	DEGC_OR_F , engineering units, Deg C = 0, DegF = 1
122	1	0-3	3	3	FAN , number of fan speeds. Single speed = 1 up to three speed fan = 3
123	1	0-35 (C) 0-95 (F)	10	10	NIGHT_HEATING_DEADBAND , heating deadband in the night time or OFF mode. Units of 1 deg.
124	1	0-99	10	10	NIGHT_COOLING_DEADBAND , cooling deadband for the night (OFF) mode. Units of 1 deg.
125	1	0-1	0	0	APPLICATION , application: 0 = office, 1 = Hotel or Residential
126	1	0-255	20	68	POWERUP_SETPOINT , setpoint on power up

| Address | Bytes | Range | Defaults | | Register and Description |
			°C	°F	
127	1	0-3	2	2	POWERUP_MODE, mode of operation on power up. 0 = power off, 1 = power up in on mode, 2 = last value (default), 3 = auto mode.
128	1	0-5	1	1	KEYPAD_SELECT , variable to select various keypad arrangements. Refer to PAd description in Table 1: Advanced Menu ItemsNumber of buttons on the keypad The keypad can have up to six buttons. The setting is not normally adjusted in the field. Care should be taken to coordinate with the settings in register 106, the Heat / Cool changeover parameter128=0 , two buttons, for adjusting the setpoint.128=1 , 4 buttons, lower pair for the mode and upper pair for the setpoint. 128=2 , 6 button keypad, with heat cool manual selection. Lower pair for the mode, next pair for the setpoint and upper pair for the heat or cool mode. 128=3 , 6 button keypad, with separate heating and cooling setpoints. Lower pair for the mode, next pair for the cooling setpoint and uppermost pair for the heating setpoint.
129	1	0-2	0	0	AUTO_ONLY , enables or disables manual mode. 0 = Manual Fan Modes 1-x Allowed (depending on R122 value, 1 = Auto Mode Only, 2 = DDC mode, the user can not change setpoint and fan speed from keypad.
130	1				NOT USED FOR REV 25
131	1	0-255	50	99	MAX_SETPOINT, Setpoint high, the highest setpoint a user will be able to set from the keypad.
132	1	0-255	15	55	MIN_SETPOINT, Setpoint Low, the lowest setpoint a user will be able to set from the keypad.
133	1	0-3	0	0	SPECIAL_MENU_LOCK, Special menu lockout via keypad, serial port only, 0=Full Menu, 1=Menu Disabled, 2=User Menu, 3 = The user need adjust setpoint in menu mode
134	1	0-1	0	0	FACTORY_DEFAULTS, Reset all parameters to the factory settings
135	1	MIN-MAX	20	68	COOLING_SETPOINT , current cooling setpoint - limits are set by the max and min setpoints
136	1				NOT USED FOR REV26
137	1	0-4	0	0	FAN_SPEED, current operating fan speed
Relay Output Tables (bit0 = relay1, bit1 = relay2, bit2 = relay3, bit3 = relay4, bit4 = relay5)Fan0 table is for the off state. Fan1, Fan2, and Fan3 are for the manual states. Fan4 is for the Auto state. These states are controlled by the user.The mode of operation (coasting, cooling, heating) is determined by the PID parameter.					
138	1	0-255	0	0	FAN0_OPERATION_TABLE_COAST
139	1	0-255	65	65	FAN0_OPERATION_TABLE_COOL1
140	1	0-255	202	202	FAN0_OPERATION_TABLE_COOL2
141	1	0-255	204	204	FAN0_OPERATION_TABLE_COOL3
142	1	0-255	65	65	FAN0_OPERATION_TABLE_HEAT1
143	1	0-255	210	210	FAN0_OPERATION_TABLE_HEAT2
144	1	0-255	212	212	FAN0_OPERATION_TABLE_HEAT3
145	1	0-255	1	1	FAN1_OPERATION_TABLE_COAST
146	1	0-255	65	65	FAN1_OPERATION_TABLE_COOL1
147	1	0-255	201	201	FAN1_OPERATION_TABLE_COOL2
148	1	0-255	201	201	FAN1_OPERATION_TABLE_COOL3
149	1	0-255	65	65	FAN1_OPERATION_TABLE_HEAT1
150	1	0-255	209	209	FAN1_OPERATION_TABLE_HEAT2
151	1	0-255	209	209	FAN1_OPERATION_TABLE_HEAT3
152	1	0-255	2	2	FAN2_OPERATION_TABLE_COAST
153	1	0-255	66	66	FAN2_OPERATION_TABLE_COOL1
154	1	0-255	202	202	FAN2_OPERATION_TABLE_COOL2
155	1	0-255	202	202	FAN2_OPERATION_TABLE_COOL3
156	1	0-255	66	66	FAN2_OPERATION_TABLE_HEAT1
157	1	0-255	210	210	FAN2_OPERATION_TABLE_HEAT2
158	1	0-255	210	210	FAN2_OPERATION_TABLE_HEAT3
159	1	0-255	4	4	FAN3_OPERATION_TABLE_COAST
160	1	0-255	68	68	FAN3_OPERATION_TABLE_COOL1
161	1	0-255	204	204	FAN3_OPERATION_TABLE_COOL2

Address	Bytes	Range	Defaults		Register and Description
			°C	°F	
162	1	0-255	204	204	FAN3_OPERATION_TABLE_COOL3
163	1	0-255	68	68	FAN3_OPERATION_TABLE_HEAT1
164	1	0-255	212	212	FAN3_OPERATION_TABLE_HEAT2
165	1	0-255	212	212	FAN3_OPERATION_TABLE_HEAT3
166	1	0-255	0	0	FANAUT_OPERATION_TABLE_COAST
167	1	0-255	65	65	FANAUT_OPERATION_TABLE_COOL1
168	1	0-255	202	202	FANAUT_OPERATION_TABLE_COOL2
169	1	0-255	204	204	FANAUT_OPERATION_TABLE_COOL3
170	1	0-255	65	65	FANAUT_OPERATION_TABLE_HEAT1
171	1	0-255	210	210	FANAUT_OPERATION_TABLE_HEAT2
172	1	0-255	212	212	FANAUT_OPERATION_TABLE_HEAT3
					Analog Output Tables (bit0,1 = analog out1, bit2, 3 = analog out2, 00 = 0%, 01 = 0-100%, 11 = 100%)
173	1	0-255	0	0	VALVE_OPER_TABLE_COAST, Analog output state for each of the 8 modes of operation
174	1	0-255	1	1	VALVE_OPER_TABLE_COOLING1
175	1	0-255	3	3	VALVE_OPER_TABLE_COOLING2
176	1	0-255	3	3	VALVE_OPER_TABLE_COOLING3
177	1	0-255	4	4	VALVE_OPER_TABLE_HEATING1
178	1	0-255	4	4	VALVE_OPER_TABLE_HEATING2
179	1	0-255	12	12	VALVE_OPER_TABLE_HEATING3
180	2	0-65535	-	-	External Sensor 1 - Filtered, calibrated value for analog in 1
181	2	0-65535	-	-	External Sensor 2 - Filtered, calibrated value for analog in 2
182	1	0-255	15	65	Night heating setpoint
183	1	0-255	30	80	Night cooling setpoint
184	1	0-255	1	1	Bit 0 is read/write and shows the occupancy mode. Bit 0 = 0 means unoccupied. Bit 0 = 1 means occupied. Bit 1 is read only and shows the reset state. Bit 1 = 0 means hardware restart. Bit 1 = 1 means software restart. Bit 2 is read/write and is the reset prevention bit. Bit 2 = 0 means the tstat will automatically reset after certain registers are changed. Bit 2 = 1 prevents this reset. Changing this bit from 1 to 0 will trigger a reset. Bit 3 is the state of the digital input. Bit 3 = 1 means logic high. Bit 3 = 0 means logic low. Bit 4,5: Reserved, used for some non standard occupancy sensor logic. Bit6 0=no delay on modbus reply, 1= 10ms delay before send for slower PLC's to switch from TX to RX. Bit7, RS485/wireless communications mode: The normal communications method is a bus topology using RS485 which uses a 'transmit enable' or TX_EN line on the RS485 hardware whenever transmission from the thermostat to the bus takes place. For wireless devices this is typically taken care of by the radio module itself so it is not needed. Default = 0, When bit7 is 0, the RS485 chip, TX_EN line is used for normal RS485 bus communications. When bit7 is 1, the TX_EN line is not used, allowing the radio module to communicate one-to-one with the Tstat
185	1	0-1	1	1	BAu - Baudrate
186	1	0-4	0	0	Ou1 - Output1 Scale - 0=On/Off, 1=0-10V, 2=0-5V, 3=2-10V, 4= 10-0V
187	1	0-4	0	0	Ou2 - Output2 Scale - 0=On/Off, 1=0-10V, 2=0-5V, 3=2-10V, 4= 10-0V
188	1	0-4	1	1	AI1 – Analog input 1 range 0=10-bit raw data, 1=10K thermistor, 2=0-100%, 3 = on/off, 4= custom
189	1	0-4	0	0	AI2 – Analog input 2 range 0=10-bit raw data, 1=10K thermistor, 2=0-100%, 3 = on/off, 4= custom
190	1	0-0	0	0	dI1 – Digital input 1 range 0 = ON/OFF.
191	1	0-255	0	0	OUTPUT1_DELAY_OFF_TO_ON – delay time for output1 going from OFF to ON (sec)
192	1	0-255	0	0	OUTPUT2_DELAY_OFF_TO_ON – delay time for output2 going from OFF to ON (sec)
193	1	0-255	0	0	OUTPUT3_DELAY_OFF_TO_ON – delay time for output3 going from OFF to ON (sec)
194	1	0-255	0	0	OUTPUT4_DELAY_OFF_TO_ON – delay time for output4 going from OFF to ON (sec)
195	1	0-255	0	0	OUTPUT5_DELAY_OFF_TO_ON – delay time for output5 going from OFF to ON (sec)
196	1	0-255	0	0	OUTPUT1_DELAY_ON_TO_OFF – delay time for output1 going from OFF to ON (sec)
197	1	0-255	0	0	OUTPUT2_DELAY_ON_TO_OFF – delay time for output2 going from OFF to ON (sec)

198	1	0-255	0	0	
199	1	0-255	0	0	
200	1	0-255	0	0	
201	1	0-20	0	0	MODBUS_CYCLING_DELAY – delay time (in minutes) for switching out of heating or cooling and then back in.
202	1	0-200	0	0	MODBUS_CHANGEOVER_DELAY – delay time (in minutes) for switching from cooling into heating or vice versa.
203	1	0-6	0	0	dIS – Display. This sets the display to either room temperature or setpoint. 0 = room temp, 1 = setpoint, 2 = Blank Display, 3 = PID2 value, 4 = PID2 setpoint, 5 = set segment code by manually, 6 = Display sleep

LED TABLE
Determines what activates
the LEDs

					LED
204	1	0-24	3	3	LED1 (top left to bottom right)
205	1	0-24	2	2	LED2
206	1	0-24	1	1	LED3
207	1	0-24	15	15	LED4
208	1	0-24	13	13	LED5
209	1	0-24	14	14	LED6
210	1	0-24	19	19	LED7

0 = NONE	14 = HEATING MODE
1 = RELAY1	15 = FAN OFF
2 = RELAY2	16 = FAN LOW
3 = RELAY3	17 = FAN MED
4 = RELAY4	18 = FAN HI
5 = RELAY5	19 = FAN AUTO
6 = COASTING STAGE	20 = HEAT1 OR COOL1
7 = COOLING1 STAGE	21 = HEAT2 OR COOL2
8 = COOLING2 STAGE	22 = HEAT3 OR COOL3
9 = COOLING3 STAGE	23 = COOL1,2, OR 3
10 = HEATING1 STAGE	24 = HEAT1, 2, OR 3
11 = HEATING2 STAGE	25 = OCCUPANCY
12 = HEATING3 STAGE	26 = STAGE 1,2 OR 3
13 = COOLING MODE	27 = STAGE 2 OR 3

211	1	0-255	0	0	Unoccupied Override Timer, Ort. 0=disabled, not 0=number of minutes manual override is allowed
212	1	0-255	-	-	OVERRIDE_TIMER_DOWN_COUNT - Number of minutes remaining on the timer when unoccupied override timer is in effect.
213	1	0-100	20	20	Temperature sensor filter, FIL, weighted average of stored value to new raw value
214	1	0-5	0	0	Heating cooling mode configuration, HC, 0=PID, 1=Keypad, 2=Digital_in1, 3=!Digital_in1, 4=Analog_in1, 5=Analog_in2
215	2	0-3000	-	-	Internal Temperature Sensor IC - Shows the filtered, calibrated value of the internal temperature sensor IC
216	2	0-3000	-	-	Internal Thermistor Sensor - Shows the filtered, calibrated value of the internal thermistor sensor
217	2	0-1000	500	500	Calibration Internal Thermistor - Calibration value used on the internal thermistor
218	2	0-1000	500	500	Calibration Analog Input2 - Calibration value used on the analog input 2
219	2	0-65535	-	-	Lookup Table 1 - 0.0V value Sensor value that corresponds to 0.0V
220	2	0-65535	-	-	Lookup Table 1 - 0.5V value Sensor value that corresponds to 0.5V
221	2	0-65535	-	-	Lookup Table 1 - 1.0V value Sensor value that corresponds to 1.0V
222	2	0-65535	-	-	Lookup Table 1 - 1.5V value Sensor value that corresponds to 1.5V
223	2	0-65535	-	-	Lookup Table 1 - 2.0V value Sensor value that corresponds to 2.0V
224	2	0-65535	-	-	Lookup Table 1 - 2.5V value Sensor value that corresponds to 2.5V
225	2	0-65535	-	-	Lookup Table 1 - 3.0V value Sensor value that corresponds to 3.0V
226	2	0-65535	-	-	Lookup Table 1 - 3.5V value Sensor value that corresponds to 3.5V
227	2	0-65535	-	-	Lookup Table 1 - 4.0V value Sensor value that corresponds to 4.0V
228	2	0-65535	-	-	Lookup Table 1 - 4.5V value Sensor value that corresponds to 4.5V
229	2	0-65535	-	-	Lookup Table 1 - 5.0V value Sensor value that corresponds to 5.0V
230	2	0-65535	-	-	Lookup Table 2 - 0.0V value Sensor value that corresponds to 0.0V
231	2	0-65535	-	-	Lookup Table 2 - 0.5V value Sensor value that corresponds to 0.5V
232	2	0-65535	-	-	Lookup Table 2 - 1.0V value Sensor value that corresponds to 1.0V
233	2	0-65535	-	-	Lookup Table 2 - 1.5V value Sensor value that corresponds to 1.5V
234	2	0-65535	-	-	Lookup Table 2 - 2.0V value Sensor value that corresponds to 2.0V
235	2	0-65535	-	-	Lookup Table 2 - 2.5V value Sensor value that corresponds to 2.5V
236	2	0-65535	-	-	Lookup Table 2 - 3.0V value Sensor value that corresponds to 3.0V
237	2	0-65535	-	-	Lookup Table 2 - 3.5V value Sensor value that corresponds to 3.5V
238	2	0-65535	-	-	Lookup Table 2 - 4.0V value Sensor value that corresponds to 4.0V
239	2	0-65535	-	-	Lookup Table 2 - 4.5V value Sensor value that corresponds to 4.5V
240	2	0-65535	-	-	Lookup Table 2 - 5.0V value Sensor value that corresponds to 5.0V
241	2	0-2	-	-	Universal PID input select, 0=none, 1=analog_in1, 2=analog_in2
242	2	0-65535	-	-	Universal PID upper deadband
243	2	0-65535	-	-	Universal PID lower deadband
244	2	0-65535	-	-	Universal PID pterm
245	2	0-65535	-	-	Universal PID iterm
246	2	0-65535	-	-	Universal PID setpoint
247	1	0-3	-	-	Output 1 PID Control 0 = PID1
248	1	0-3	-	-	Output 2 PID Control 1 = PID2
249	1	0-3	-	-	Output 3 PID Control 2 = Maximum of PID1 and PID2

250	1	0-3	-	-	Output 4 PID Control 3 = Minimum of PID1 and PID2
251	1	0-3	-	-	Output 5 PID Control
252	1	0-3	-	-	Output 6 PID Control
253	1	0-3	-	-	Output 7 PID Control
254	1	0-255	-	-	Universal PID Output - Coasting
255	1	0-255	-	-	Universal PID Output - Cooling1
256	1	0-255	-	-	Universal PID Output - Cooling2
257	1	0-255	-	-	Universal PID Output - Cooling3
258	1	0-255	-	-	Universal PID Output - Heating1
259	1	0-255	-	-	Universal PID Output - Heating2
260	1	0-255	-	-	Universal PID Output - Heating3
			Analog Output Tables (bit0, 1 = analog out1, bit2, 3 = analog out2, 00 = 0%, 01 = 0-100%, 11 = 100%)		
261	1	0-255	-	-	Universal PID Valve Output - Coasting
262	1	0-255	-	-	Universal PID Valve Output - Cooling1
263	1	0-255	-	-	Universal PID Valve Output - Cooling2
264	1	0-255	-	-	Universal PID Valve Output - Cooling3
265	1	0-255	-	-	Universal PID Valve Output - Heating1
266	1	0-255	-	-	Universal PID Valve Output - Heating2
267	1	0-255	-	-	Universal PID Valve Output - Heating3
268	1	0-6	3	3	Number of Heating Stages in Universal Table-(Maximum # of total heating and cooling states is 6)
269	1	0-6	3	3	Number of Cooling Stages in Universal Table-(Maximum) # of total heating and cooling states is 6)
270	1	0-100	-	-	Universal PID
271	2	0-65535	-	-	PID1 Units High byte - Upper 2 bytes of the PID1 units in ASCII
272	2	0-65535	-	-	PID1 Units Low byte - Lower 2 bytes of the PID1 units in ASCII
273	2	0-65535	-	-	PID2 Units High byte - Upper 2 bytes of the PID2 units in ASCII
274	2	0-65535	-	-	PID2 Units Low byte - Lower 2 bytes of the PID2 units in ASCII
275	2	0-65535	-	-	Universal Night Setpoint
276	1	0-6	3	3	Number of Heating Stages in Original Table - (Maximum # of total heating and cooling states is 6)
277	1	0-6	3	3	Number of Cooling Stages in Original Table - (Maximum # of total heating and cooling states is 6)
278	1	0-19	-	-	PID2 heating or cooling state. 0=coasting, 1=cooling1, 2=cooling2, 3=cooling3, 4=heating1, 5=heating2, 6=heating3, 14=cooling4, 15=cooling5, 16=cooling6, 17=heating4, 18=heating5, 19=heating6.
279	1	10-255	-	-	Valve travel time. The time of the valve travel from one end to another end. The units is sencond.
280	1	0	0	0	Determine the output1 mode. Output1 always is ON/OFF mode
281	1	0	0	0	Determine the output2 mode. Output2 always is ON/OFF mode
282	1	0	0	0	Determine the output3 mode. Output3 always is ON/OFF mode
283	1	0-1	0	0	Determine the output4 mode. 0, ON/OFF mode; 1, floating valve for cooling; 2, lighting control; 3, PWM
284	1	0-1	0	0	Determine the output5 mode. 0, ON/OFF mode; 1, floating valve for heating; 2, lighting control; 3, PWM
285	1	0-100	-	-	Valve percent. Show the valve opened how much percent. READ ONLY
Interlock for each output, analog and digital output. 0, interlock always ON; 1, DI1 determine the interlock status; 2, AI1 determine the interlock status, the range of AI1 must be ON/OFF; 3, AI2 determine the interlock status, the range of AI2 must be ON/OFF; 4, TIMER OR, the output OR with the period timer; 5, TIMER AND, the output AND with the period timer.					
286	1	0-5	0	0	Interlock for output1
287	1	0-5	0	0	Interlock for output2
288	1	0-5	0	0	Interlock for output3
289	1	0-5	0	0	Interlock for output4
290	1	0-5	0	0	Interlock for output5
291	1	0-5	0	0	Interlock for output6
292	1	0-5	0	0	Interlock for output7
293	1	1-10	10	10	Setpoint increment. The value is expanded 10 times, the increment is from 0.1 to 1.
294	2	0-65535	0	0	Last key pressed counter. Hong long time past since the last key pressed. Reset if any key is pressed. The units is minute.
295	1	0-255	5	40	Freeze protect setpoint. If the ambient temperature less than the setpoint, the heating valve will open some time the Delay to off register set .
296	1	5-255	10	10	Delay to open. The heating valve will open if the ambient temp less than the Freeze temp setpoint last the time this register set .The units is second.
297	1	5-255	30	30	Delay to close. The duration the heating valve open. The units is minute.
298	1	0-5	0	0	Analog input1 function selection. 0, normal; 1, freeze protect sensor input; 2, occupancy sensor input; 3, sweep off mode; 4, clock mode; 5, change over mode. Refer to dl1 on page13.

299	1	0-5	0	0	Analog input2 function selection. 0, normal; 1, freeze protect sensor input; 2, occupancy sensor input; 3, sweep off mode; 4, clock mode; 5, change over mode. Refer to dI1 on page13.
300	1	0-5	0	0	dI1 – Digital input 1 function. Refer to dI1 description in Table 1: Advanced Menu Items
301	2	0-65535	0	0	Period timer ON time.
302	2	0-65535	0	0	Period timer OFF time.
303	1	0-2	1	1	Period timer units. 0, second; 1, minute; 2, hour.
304	1	0-255	-	-	Keypad encode value. The reverse value read from P0 port when some key is pressed. READ ONLY
305	1	0-255	-	-	LED hundred's segment code. Drive the LEDs by manually, the register 203 (display) must be set 5.
306	1	0-255	-	-	LED ten's segment code. Drive the LEDs by manually, the register 203 (display) must be set 5.
307	1	0-255	-	-	LED digital's segment code. Drive the LEDs by manually, the register 203 (display) must be set 5.
308	1	0-255	-	-	LED status's segment code. Drive the LEDs by manually, the register 203 (display) must be set 5.
309	1	0-255	0	0	Input auto/ manual enable. Bit0 correspond to analog input1 (register 180); bit1 to analog input2 (register 181); bit2 to digital input1 (register 311). 0, auto mode, the corresponding input value from sensor; 1, manual mode, the corresponding value from serial port.
310	1	0-255	0	0	Output auto/manual enable. Bit 0 to 4 correspond to output1 to output5, bit 5 correspond to output6 (register 102), bit 6 correspond to output7 (register 103). 0, auto mode; 1, manual mode.
311	1	0-1	1	1	Digital manual input. Write the manual value for digital input when digital input in manual mode.
312	1	0-1	0	0	Output1 manual input.
313	1	0-1	0	0	Output2 manual input.
314	1	0-1	0	0	Output3 manual input.
315	1	0-1	0	0	Output4 manual input.
316	1	0-1	0	0	Output5 manual input.
317	1	0-255	0	0	Dead master. The Tstat will go to occupied mode automatically after the time set in the register no serial communication since power on. 0, disable the function. the units is minute.
318	1	0-5	1	1	Rouding display. 0, round the display to digit; 1, round the display to the nearest 1/10 unit; 5, round the display to the nearest 1/2 unit. 2, 3, 4 reserved.
319	1	0-1	0	0	Timer selection. 0. Period timer; 1, Rotation timer.
320	1	0-255	0	0	Rotation flag group. Put the corresponding output into rotation group by setting the corresponding bit. bit 0 correspond to output2; bit1 correspond to output3; bit2 correspond to output4; bit3 correspond to output5. 0, not put into rotation group; 1, put into rotation group. The rotation group at least has two items and they must be consecutive.
321	1	1-4	-	-	The output 2 is controlled by which output table in the rotation group. READ ONLY.
322	1	1-4	-	-	The output 3 is controlled by which output table in the rotation group. READ ONLY.
323	1	1-4	-	-	The output 4 is controlled by which output table in the rotation group. READ ONLY.
324	1	1-4	-	-	The output 5 is controlled by which output table in the rotation group. READ ONLY.
325	1	0-65535	-	-	Rotation time left. Hong long time left the rotation will happen. READ ONLY.
326	1	0-1	-	-	Show the size of E2 chip. 0 = 24c02, 1 = 24c08/24c16.
327	1	0-3	0	0	Assign the timer be used for which feature. 0 = period timer, 1 = rotation timer, 2 = interlock, 3 = PWM timer.
328	1	0-2	0	0	The output1 function, there are three functions for the output1. 0 = normal ON/OFF output, 1 = rotation , 2 = lighting control.
329	1	2-5	-	-	Show which output table is using for this output when this output function be set rotation
330	1	2-5	-	-	Show which output table is using for this output when this output function be set rotation
331	1	2-5	-	-	Show which output table is using for this output when this output function be set rotation
332	1	2-5	-	-	Show which output table is using for this output when this output function be set rotation
333	2	0-65535	-	-	How much time left before rotation action.
334	1	0-2	0	0	The output2 function, there are three functions for the output2 .0 = normal ON/OFF output, 1 = rotation , 2 = lighting control.
335	1	0-2	0	0	The output3 function, there are three functions for the output3. 0 = normal ON/OFF output, 1 = rotation , 2 = lighting control.
336	1	0-2	0	0	The output4 function, there are three functions for the output4. 0 = normal ON/OFF output, 1 = rotation , 2 = lighting control.
337	1	0-2	0	0	The output5 function, there are three functions for the output5. 0 = normal ON/OFF output, 1 = rotation , 2 = lighting control.
338	1	0-255	20	68	Default occupied setpoint. Works in concert with the "occupied setpoint control register", register 339
339	1	0-2	0	0	Occupied Setpoint Control Register: 0 = normal, setpoint is managed by the serial port and keypad, the stat will remember the last occupied setpoint and use that during the next occupied period. 1 = Default mode, the last occupied setpoint if forgotten and the occupied setpoint gets reset to the default. 2 = trigger an event, when a master controller writes 2 to this register, the default setpoint will be copied to the occupied setpoint after which the Tstat will set the value back to 1 to show the event has been serviced.

340	1	0-1	0	0	Enable/disable PIR correspond 1/0 respectively.
341	1	0-255	0	0	PWM output range in COAST mode. 0 = CLOSE, 1 = OPEN, 2 = 0-100%,3 = 50-100%,4 = 0-50%. MSb 4 bits correspond to output4 and LSB 4 bits correspond to output5
342	1	0-255	64	64	PWM output range in COOLING2 mode. 0 = CLOSE, 1 = OPEN, 2 = 0-100%,3 = 50-100%,4 = 0-50%. MSb 4 bits correspond to output4 and LSB 4 bits correspond to output5
343	1	0-255	38	38	PWM output range in COOLING3 mode. 0 = CLOSE, 1 = OPEN, 2 = 0-100%,3 = 50-100%,4 = 0-50%. MSb 4 bits correspond to output4 and LSB 4 bits correspond to output5
344	1	0-255	16	16	PWM output range in COOLING1 mode. 0 = CLOSE, 1 = OPEN, 2 = 0-100%,3 = 50-100%,4 = 0-50%. MSb 4 bits correspond to output4 and LSB 4 bits correspond to output5
345	1	0-255	4	4	PWM output range in HEATING1 mode. 0 = CLOSE, 1 = OPEN, 2 = 0-100%,3 = 50-100%,4 = 0-50%. MSb 4 bits correspond to output4 and LSB 4 bits correspond to output5
346	1	0-255	3	3	PWM output range in HEATING2 mode. 0 = CLOSE, 1 = OPEN, 2 = 0-100%,3 = 50-100%,4 = 0-50%. MSb 4 bits correspond to output4 and LSB 4 bits correspond to output5
347	1	0-255	1	1	PWM output range in HEATING3 mode. 0 = CLOSE, 1 = OPEN, 2 = 0-100%,3 = 50-100%,4 = 0-50%. MSb 4 bits correspond to output4 and LSB 4 bits correspond to output5
348	1	0-100	-	-	The ON period take how many percentage for output4
349	1	0-100	-	-	The ON period take how many percentage for output5
350	1	0-255	0	0	Free cooling configuration. bit0, free cool enable/disable, 0 = disable, 1= enable. bit1, free cool available decided by local or external master. 0 = local, 1 = NC. bit2, free cool available status, 0 = npt available, 1= available. bit4, show the status if NC is OK when the free cool decided by NC.
					Analog Output Tables (bit0, 1 =analog out1, bit2, 3=analog out2, 00=0%, 01=0-100%, 11=100%)
351	1	0-255	0	0	Analog output OFF table, coasting mode
352	1	0-255	0	0	Analog output OFF table, cooling1 mode
353	1	0-255	0	0	Analog output OFF table, cooling2 mode
354	1	0-255	0	0	Analog output OFF table, cooling3 mode
355	1	0-255	0	0	Analog output OFF table, heating1 mode
356	1	0-255	0	0	Analog output OFF table, heating2 mode
357	1	0-255	0	0	Analog output OFF table, heating3 mode
358	1	0-255	0	0	Register lock.All registers except fan speed and manual inputs/outputs register are not writable. 0 = lock,1 = no lock.
359	1	0-255	0	0	Outside temperature for free cooling,from external sensor or NC.
360	2	0-255	0	0	If outside temp be set from NC.The communication with NC must be set in this time,otherwise will set error status and use external sensor.
361	1	0-255	0	0	If the outside air temp is lower than the room tempetrature by this amount, then the free cooling is worthwhile, 350 bit2 = 1.If the OAT is greater than the room temp, then free cooling mode is not worhtwhile. , 350 bit2 = 0
					Output table in free cooling mode,0 = 0%, 1 = 100%,2 = MIN->100%,3 = MIN|100%,4 = MIN.Bit7 through 4 correspond to OFF table,bit 3 through 0 correspond to ON table.
362	1	0-255	0	0	Free cooling output configuration.Coasting mode
363	1	0-255	0	0	Free cooling output configuration.Cooling1 mode

Address	Bytes	Range	Default		Register and Description
364	1	0-255	0	0	Free cooling output configuration.Cooling2 mode
365	1	0-255	0	0	Free cooling output configuration.Cooling3 mode
366	1	0-255	0	0	Free cooling output configuration.Heating1 mode
367	1	0-255	0	0	Free cooling output configuration.Heating2 mode
368	1	0-255	0	0	Free cooling output configuration.heating3 mode
369	1	0-255	0	0	Min Air,the units is percent.Set the minimum output for free cooling,the default is 15%
370	1	0-255	0	0	Outside air temperature in hottest day
371	1	0-255	0	0	Outside air temperature in coldest day
372	1	0-255	0	0	Offset in hottest day
373	1	0-255	0	0	Offset in coldest day
374	2	0-65535	0	0	Store setpoint in two bytes ,the resolution is 0.1
375	1	0-255	0	0	Crrent setpoint = user setpoint + offset setpoint
376	1	0-255	0	0	Setpoint offset
377	1	0-255	0	0	Change over sensor mode,1 = cooling mode,0 = heating mode.

The following register is for Tstat 5E.

Address	Bytes	Range	Default		Register and Description
359	1	0-255	0	0	ANALOG INPUT RANGE. 0 = raw data, 1 = thermistor, 2 = %, 3 = ON/OFF, 4 = CUSTOMER, 5 = OFF/ON
360	1	0-255	0	0	ANALOG INPUT RANGE. 0 = raw data, 1 = thermistor, 2 = %, 3 = ON/OFF, 4 = CUSTOMER, 5 = OFF/ON
361	1	0-255	0	0	ANALOG INPUT RANGE. 0 = raw data, 1 = thermistor, 2 = %, 3 = ON/OFF, 4 = N/A, 5 = OFF/ON
362	1	0-255	0	0	ANALOG INPUT RANGE. 0 = raw data, 1 = thermistor, 2 = %, 3 = ON/OFF, 4 = N/A, 5 = OFF/ON
363	1	0-255	0	0	ANALOG INPUT RANGE. 0 = raw data, 1 = thermistor, 2 = %, 3 = ON/OFF, 4 = N/A, 5 = OFF/ON
364	1	0-255	0	0	ANALOG INPUT RANGE. 0 = raw data, 1 = thermistor, 2 = %, 3 = ON/OFF, 4 = N/A, 5 = OFF/ON
365	1	0-255	0	0	ANALOG INPUT RANGE. 0 = raw data, 1 = thermistor, 2 = %, 3 = ON/OFF, 4 = N/A, 5 = OFF/ON
366	1	0-255	0	0	ANALOG INPUT RANGE. 0 = raw data, 1 = thermistor, 2 = %, 3 = ON/OFF, 4 = N/A, 5 = OFF/ON
367	2	0-255	0	0	Analog inptu1 value
368	2	0-255	0	0	Analog inptu2 value
369	2	0-255	0	0	Analog inptu3 value
370	2	0-255	0	0	Analog inptu4 value
371	2	0-255	0	0	Analog inptu5 value
372	2	0-255	0	0	Analog inptu6 value
373	2	0-255	0	0	Analog inptu7 value
374	2	0-255	0	0	Analog inptu8 value
375	2	0-255	0	0	Calibration for analog input1
376	2	0-255	0	0	Calibration for analog input2
377	2	0-255	0	0	Calibration for analog input3
378	2	0-255	0	0	Calibration for analog input4
379	2	0-255	0	0	Calibration for analog input5
380	2	0-255	0	0	Calibration for analog input6
381	2	0-255	0	0	Calibration for analog input7
382	2	0-255	0	0	Calibration for analog input8
383	1	0-255	0	0	The first character on LCD line 1, ASCII code
384	1	0-255	0	0	The second character on LCD line 1, ASCII code
385	1	0-255	0	0	The third character on LCD line 1, ASCII code
386	1	0-255	0	0	The fourth character on LCD line 1, ASCII code
387	1	0-255	0	0	The fifth character on LCD line 1, ASCII code
388	1	0-255	0	0	The sixth character on LCD line 1, ASCII code
389	1	0-255	0	0	The seventh character on LCD line 1, ASCII code
390	1	0-255	0	0	The eighth character on LCD line 1, ASCII code
391	1	0-255	0	0	The first character on LCD line 2, ASCII code
392	1	0-255	0	0	The second character on LCD line 2, ASCII code
393	1	0-255	0	0	The third character on LCD line 2, ASCII code
394	1	0-255	0	0	The fourth character on LCD line 2, ASCII code
395	1	0-255	0	0	The fifth character on LCD line 2, ASCII code
396	1	0-255	0	0	The sixth character on LCD line 2, ASCII code
397	1	0-255	0	0	The seventh character on LCD line 2, ASCII code
398	1	0-255	0	0	The eighth character on LCD line 2, ASCII code
399	1	0-255	0	0	LCD turn off delay, 0 - 255 minutes
400	1	0-255	0	0	Select what parameter will display, 0 = nothing, 1 =temperature, 2 = setpoint, 3 through 10 correspond to input 1 through 8, 11 = mode
401	1	0-255	0	0	Select what parameter will display, 0 = nothing, 1 =temperature, 2 = setpoint, 3 through 10 correspond to input 1 through 8, 11 = mode
402	1	0-255	0	0	DAY icon control register. 0 = AUTO, 1 = turn OFF, 2 = turn ON.
403	1	0-255	0	0	NIGHT icon control register. 0 = AUTO, 1 = turn OFF, 2 = turn ON.