

## SST Series Digital Thermostats Modbus Network Communication Guide



# Modbus Communication Manual

## MODBUS OVERVIEW

The SST thermostats can be connected to a network master via a RS485 Modbus communication network. Typically this network master is used for centrally to show the information from each individual zone and it can be used as the Master programmer for multiple zones. The unique Modbus implementation of the SST thermostats allows the system master to be any suitable Modbus master.

## MODBUSREGISTERS

The SST Thermostats supports the following Modbus registers and function codes. The communication speed is 9600 bps, 8 data bits, Parity None and 1 Stop Bit. The communication uses Modbus RTU mode. Typically the response timeout for the messages is required to be set to 1000ms or higher.

Please note that Modbus register space is specified from the Modbus master perspective as in the Modbus Application Protocol specification. For example, the thermostat temperature is read from Modbus register 01 using Function Code 04. Some Modbus masters will require Function Code 04, register 01 to be entered, whereas the others will require register 30001 or 0.

Register	Parameter Description	Data Type	Raw Value	Range / Settings
FUNCTION CODE 01 - READ COILS				
4	Thermostat Output Relay Status	Bit 0	0 - 1	0 - 1
FUNCTION CODE 02 - READ DISCRETE INPUTS				
1	Temperature Sensor 1 Alarm	Bit 0	0 - 1	0 - normal 1 - failure
2	Temperature Sensor 2 Alarm	Bit 1	0 - 1	0 - normal 1 - failure
FUNCTION CODE 03 - READ HOLDING REGISTERS				
1	Unit Model	Signed 16	0..10	0..10
2	Unit Status (Day or Night)	Signed 16	0/1	0 - Off 1 - On
6	Keypad Lock Status	Signed 16	0/1	0 - Disabled 1 - Locked
7	Sleep Mode Status	Signed 16	0/1	0 - Disabled 1 - Enabled
11	Lock Function Mode	Signed 16	0/1/2/3	0 - Function is disabled 1 - Temperature adjustment available only 2 - ON/OFF button workable only 3 - All buttons locked
12	Temperature Sensor Selection	Signed 16	0/1/2/3	0 - Function is disabled 1 - Temperature adjustment available only 2 - ON/OFF button workable only 3 - All buttons locked
13	Temperature Unit	Signed 16	0/1	0 - Celcius display enabled 1 - Fahrenheit display enabled (when changed the calibration and all switching temperature settings return to default values)
14	Calibrated Temperature	Signed 16	-10..+10	Shows current offset temperature
15	Minimum Temperature Setpoint	Signed 16	5..95	5..95°C
16	Maximum Temperature Setpoint	Signed 16	5..95	5..95°C
17	Temperature Control Hysteresis	Signed 16	1..3	1..3°C/F
19	Low Temperature Protection Setpoint	Signed 16	5..17/41..63	5..17°C/41..63°F
20	Modbus Address	Signed 16	1..32	1..32
21	Sleep Mode	Signed 16	0/1	0 - Disabled 1 - Enabled (when enabled each day's setpoint in the last period is gradually reduced by one degree per hour)
23	Time Display	Signed 16	0/1	0 - 24 Hour Time Display 1 - 12 Hour Time Display
24	Weekday	Signed 16	1..7	1 - Monday, 7 - Sunday
25	Hours	Signed 16	0..23	0..23
26	Minutes	Signed 16	0..59	0..59
FUNCTION CODE 04 - READ INPUT REGISTERS				

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Register	Parameter Description	Data Type	Raw Value	Range / Settings
1	Temperature Sensor (Internal / External)	Signed 16	50..950	5..95°C (Raw data divided by 10)
2	Floor Temperature Sensor	Signed 16	5..95	5..95°C

## FUNCTION CODE 06 - WRITE SINGLE REGISTER

11	Lock Function Mode	Signed 16	0/1/2/3	0 - Function is disabled 1 - Temperature adjustment available only 2 - ON/OFF button workable only 3 - All buttons locked
12	Temperature Sensor Selection	Signed 16	0/1/2/3	0 - Function is disabled 1 - Temperature adjustment available only 2 - ON/OFF button workable only 3 - All buttons locked
13	Temperature Unit	Signed 16	0/1	0 - Celcius display enabled 1 - Fahrenheit display enabled (when changed the calibration and all switching temperature settings return to default values)
14	Calibrated Temperature	Signed 16	-10..+10	Shows current offset temperature (the new value can be written)
15	Minimum Temperature Setpoint	Signed 16	5..95	5..95°C
16	Maximum Temperature Setpoint	Signed 16	5..95	5..95°C
17	Temperature Control Hysteresis	Signed 16	1..3	1..3°C/F
19	Low Temperature Protection Setpoint	Signed 16	5..17/41..63	5..17°C/41..63°F
21	Sleep Mode	Signed 16	0/1	0 - Disabled 1 - Enabled (when enabled each day's setpoint in the last period is gradually reduced by one degree per hour)
23	Time Display	Signed 16	0/1	0 - 24 Hour Time Display 1 - 12 Hour Time Display

## WEEKDAY SETTINGS

27	Wake Time of Weekday	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
28	Wake Temp of Weekday	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
29	Leave Time of Weekday	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
30	Leave Temp of Weekday	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
31	Return Time of Weekday	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
32	Return Temp of Weekday	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
33	Sleep Time of Weekday	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
34	Sleep Temp of Weekday	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.

## WEEKEND

35	Wake Time of Weekend	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
36	Wake Temp of Weekend	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
37	Leave Time of Weekend	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)

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Register	Parameter Description	Data Type	Raw Value	Range / Settings
38	Leave Temp of Weekend	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
39	Return Time of Weekend	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
40	Return Temp of Weekend	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
41	Sleep Time of Weekend	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
42	Sleep Temp of Weekend	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
43	Wake Time of Monday	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
44	Wake Temp of Monday	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
<b>MONDAY</b>				
45	Leave Time of Monday	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
46	Leave Temp of Monday	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
47	Return Time of Monday	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
48	Return Temp of Monday	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
49	Sleep Time of Monday	Signed 16	0..2359	Hours in multiples of 100 plus minutes (1730 means 17:30)
50	Sleep Temp of Monday	Signed 16	5..95	5..95 If "--" displayed the temperature is above high limit.
<b>TUESDAY</b>				
51	Wake Time of Tuesday	Signed 16	0..2359	Hours in multiples of 100 plus mins
52	Wake Temp of Tuesday	Signed 16	5..95	5..95
53	Leave Time of Tuesday	Signed 16	0..2359	Hours in multiples of 100 plus mins
54	Leave Temp of Tuesday	Signed 16	5..95	5..95
55	Return Time of Tuesday	Signed 16	0..2359	Hours in multiples of 100 plus mins
56	Return Temp of Tuesday	Signed 16	5..95	5..95
57	Sleep Time of Tuesday	Signed 16	0..2359	Hours in multiples of 100 plus mins
58	Sleep Temp of Tuesday	Signed 16	5..95	5..95
<b>WEDNESDAY</b>				
59	Wake Time of Wednesday	Signed 16	0..2359	Hours in multiples of 100 plus mins
60	Wake Temp of Wednesday	Signed 16	5..95	5..95
61	Leave Time of Wednesday	Signed 16	0..2359	Hours in multiples of 100 plus mins
62	Leave Temp of Wednesday	Signed 16	5..95	5..95
63	Return Time of Wednesday	Signed 16	0..2359	Hours in multiples of 100 plus mins
64	Return Temp of Wednesday	Signed 16	5..95	5..95
65	Sleep Time of Wednesday	Signed 16	0..2359	Hours in multiples of 100 plus mins
66	Sleep Temp of Wednesday	Signed 16	5..95	5..95
<b>THURSDAY</b>				
67	Wake Time of Thursday	Signed 16	0..2359	Hours in multiples of 100 plus mins
68	Wake Temp of Thursday	Signed 16	5..95	5..95
69	Leave Time of Thursday	Signed 16	0..2359	Hours in multiples of 100 plus mins
70	Leave Temp of Thursday	Signed 16	5..95	5..95
71	Return Time of Thursday	Signed 16	0..2359	Hours in multiples of 100 plus mins
72	Return Temp of Thursday	Signed 16	5..95	5..95

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Register	Parameter Description	Data Type	Raw Value	Range / Settings
73	Sleep Time of Thursday	Signed 16	0..2359	Hours in multiples of 100 plus mins
74	Sleep Temp of Thursday	Signed 16	5..95	5..95
<b>FRIDAY</b>				
75	Wake Time of Friday	Signed 16	0..2359	Hours in multiples of 100 plus mins
76	Wake Temp of Friday	Signed 16	5..95	5..95
77	Leave Time of Friday	Signed 16	0..2359	Hours in multiples of 100 plus mins
78	Leave Temp of Friday	Signed 16	5..95	5..95
79	Return Time of Friday	Signed 16	0..2359	Hours in multiples of 100 plus mins
80	Return Temp of Friday	Signed 16	5..95	5..95
81	Sleep Time of Friday	Signed 16	0..2359	Hours in multiples of 100 plus mins
82	Sleep Temp of Friday	Signed 16	5..95	5..95
<b>SATURDAY</b>				
83	Wake Time of Saturday	Signed 16	0..2359	Hours in multiples of 100 plus mins
84	Wake Temp of Saturday	Signed 16	5..95	5..95
85	Leave Time of Saturday	Signed 16	0..2359	Hours in multiples of 100 plus mins
86	Leave Temp of Saturday	Signed 16	5..95	5..95
87	Return Time of Saturday	Signed 16	0..2359	Hours in multiples of 100 plus mins
88	Return Temp of Saturday	Signed 16	5..95	5..95
89	Sleep Time of Saturday	Signed 16	0..2359	Hours in multiples of 100 plus mins
90	Sleep Temp of Saturday	Signed 16	5..95	5..95
<b>SUNDAY</b>				
91	Wake Time of Sunday	Signed 16	0..2359	Hours in multiples of 100 plus mins
92	Wake Temp of Sunday	Signed 16	5..95	5..95
93	Leave Time of Sunday	Signed 16	0..2359	Hours in multiples of 100 plus mins
94	Leave Temp of Sunday	Signed 16	5..95	5..95
95	Return Time of Sunday	Signed 16	0..2359	Hours in multiples of 100 plus mins
96	Return Temp of Sunday	Signed 16	5..95	5..95
97	Sleep Time of Sunday	Signed 16	0..2359	Hours in multiples of 100 plus mins
98	Sleep Temp of Sunday	Signed 16	5..95	5..95