

Modbus Thermostat (BMS)

Tio programmable thermostat integrated with Modbus communication protocol.

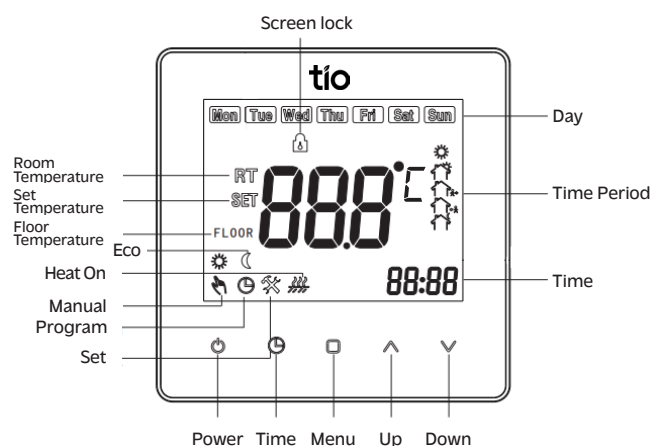
Available in black and white.



Product Code	Product Description
TIOSTA0015	230v white Modbus thermostat
TIOSTA0016	230v black Modbus thermostat

Configuration menu:

No.	Function	Press ^ v to set	Default
1	Calibrate	-9°C to 9°C	0°C
2	Dead zone	0.5°C to 5°C	0.5°C
3	Lock	0: All buttons will lock lock except power 1: All buttons will lock	1
4	Sensor selection	IN: internal sensor OU: External sensor ALL: Both sensors operating	IN
5	Minimum temperature setting	5°C to 15°C	5°C
6	Maximum temperature setting	15°C to 45°C	35°C
7	Display mode	0: Room Temperature 1: Setting Temperature	0
8	Standby backlight	0 - 100	10
9	High temperature protection setting	25°C to 70°C	45°C
A	Anti-freeze temperature range	2°C to 10°C	5°C
B	Anti-freeze protection	0: OFF 1: ON	0
C	RS485 address	1-254	001
E	Backlight	0 - 100	80



Pre-programmed settings:

	Monday - Friday		Saturday		Sunday	
Time Display	Time	Set Temperature	Time	Set Temperature	Time	Set Temperature
Period 1	06:00	22°C	06:00	22°C	06:00	22°C
Period 2	08:00	16°C	08:00	16°C	08:00	16°C
Period 3	12:00	22°C	12:00	22°C	12:00	22°C
Period 4	14:00	16°C	14:00	16°C	14:00	16°C
Period 5	18:00	22°C	18:00	22°C	18:00	22°C
Period 6	22:00	16°C	22:00	16°C	22:00	16°C

This protocol takes standard Modbus as a reference. This protocol doesn't describe the Modbus. As to standard Modbus, please refer to the relevant standard documents.

No	Parameter	Protocol Provision
1	Operating Mode	RS-485 (master slave) - thermostat is master slave
2	Physical Interface	A(+), B(-) two-wire system
3	Baud Rate	9600 bps for standard
4	Byte Format	9 Format (8 data bits + 1 stop bit + none parity)
5	Modbus	RTU
6	Transmission Mode	RTU Format (Please refer to standard Modbus)
7	Thermostat Address	1-254
8	Command Code	03 (read stat), 06 (set stat), 0x10 (set multiple stats)
9	CRC Check Code	CRC - 16 (Please refer to standard Modbus)
10	CRC Verification Mode	CRC - 16 (Please refer to standard Modbus)

Important Notes:

When the thermostat sends collected temperature data to upper computer, the value of collected temperature should be multiplied by 10 and sent completely by the format of HEX because the accuracy is 0.5°C.

For example: When the collected temperature is 25.5°C, the value sent by thermostat to the upper computer will be 255.

Similarly, when upper computer sends set temperature data to thermostat, the value of set temperature should be multiplied by 10 and sent completely by the format of HEX because the accuracy is 0.5°C.

For example: When the set temperature is 25.5°C, the value sent by upper computer to the thermostat should be 255.

Thermostat frame format: Read

Byte	Parameter
1	Thermostat Address (default is 0X01)
2	03
3	Read Register - Start Address High Byte
4	Read Register - Start Address Low Byte
5	Read Register - High Value
6	Read Register - Low Value
7	CRC High
8	CRC Low

Thermostat frame format: Set

Byte	Parameter
1	Thermostat Address (default is 0X01)
2	06
3	Set Register - Start Address High Byte
4	Set Register - Start Address Low Byte
5	Set Value - High Address
6	Set Value - Low Address
7	CRC High
8	CRC Low

**Thermostat frame format:
Set (Continuous multi-byte)**

Byte	Parameter
1	Thermostat Address (default is 0X01)
2	0X10
3	Set Register - Start Address High Byte
4	Set Register - Start Address Low Byte
5	Set Value - High Address
6	Set Value - Low Address
7	Byte Number
8	Register Data 0-6
9	CRC High
10	CRC Low

Command	Byte	Description	Reg. Address
03	High Byte	00	0
03	Low Byte	Power On/Off: 0 - Closed, 1 - Open	0
03	High Byte	00	1
03	Low Byte	Hand: 0 Automatic: 1	1
03	High Byte	00	2
03	Low Byte	Temperature Setting	2
03	High Byte	00	3
03	Low Byte	Lock: 0 Unlocked: 1	3
03	High Byte	00	4
03	Low Byte	Minute (Value 0-59)	4
03	High Byte	00	5
03	Low Byte	Hour (Value 0-23)	5
03	High Byte	00	6
03	Low Byte	Day: Mon - 1, Tue - 2, Wed - 3, Thu - 4, Fri - 5, Sat - 6, Sun - 7	6
03	High Byte	00	7
03	Low Byte	Internal Sensor Temperature	7
03	High Byte	00	8
03	Low Byte	External Sensor Temperature	8
03	High Byte	00	9
03	Low Byte	Heating Status: Not heating - 0, Heating: 1	9

Command	Byte	Description	Reg. Address
06	High Byte	00	0
06	Low Byte	Power On/Off: 0 - Closed, 1 - Open	0
06	High Byte	00	1
06	Low Byte	Hand: 0 Automatic: 1	1
06	High Byte	00	2
06	Low Byte	Temperature Setting	2
06	High Byte	00	3
06	Low Byte	Lock: 0 Unlocked: 1	3
06	High Byte	00	4
06	Low Byte	Minute (Value 0-59)	4
06	High Byte	00	5
06	Low Byte	Hour (Value 0-23)	5
06	High Byte	00	6
06	Low Byte	Day: Mon - 1, Tue - 2, Wed - 3, Thu - 4, Fri - 5, Sat - 6, Sun - 7	6

Command	Byte	Description	Reg. Address
0X10	High Byte	00	0
0X10	Low Byte	Power On/Off: 0 - Closed, 1 - Open	0
0X10	High Byte	00	1
0X10	Low Byte	Hand: 0 Automatic: 1	1
0X10	High Byte	00	2
0X10	Low Byte	Temperature Setting	2
0X10	High Byte	00	3
0X10	Low Byte	Lock: 0 Unlocked: 1	3
0X10	High Byte	00	4
0X10	Low Byte	Minute (Value 0-59)	4
0X10	High Byte	00	5
0X10	Low Byte	Hour (Value 0-23)	5
0X10	High Byte	00	6
0X10	Low Byte	Day: Mon - 1, Tue - 2, Wed - 3, Thu - 4, Fri - 5, Sat - 6, Sun - 7	6