

tio



Programmable Modbus Thermostat
Installation & User Manual

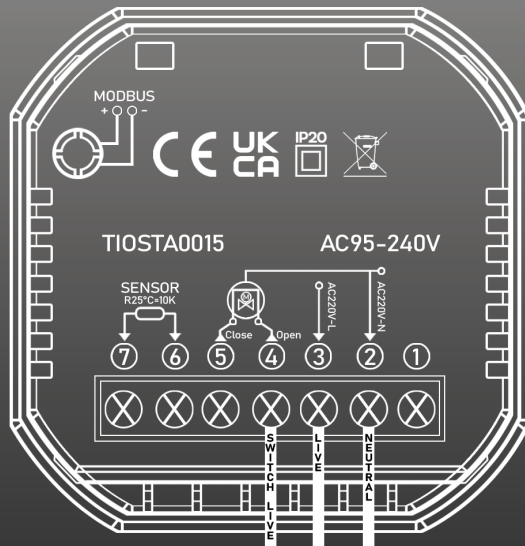
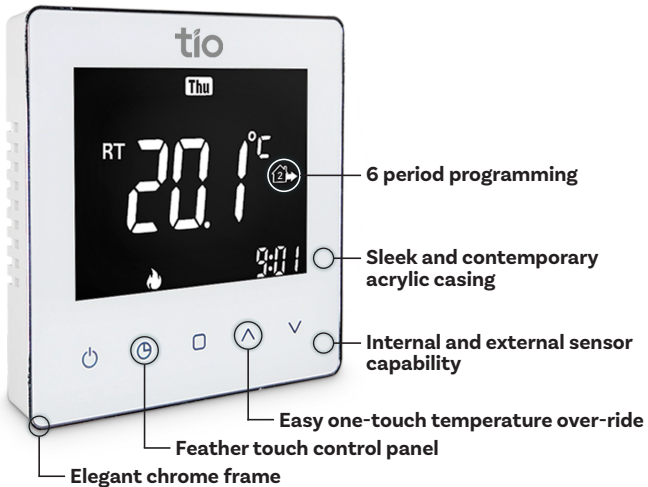


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Welcome to your new thermostat.

Your thermostat comes fully integrated with the latest features and functions.



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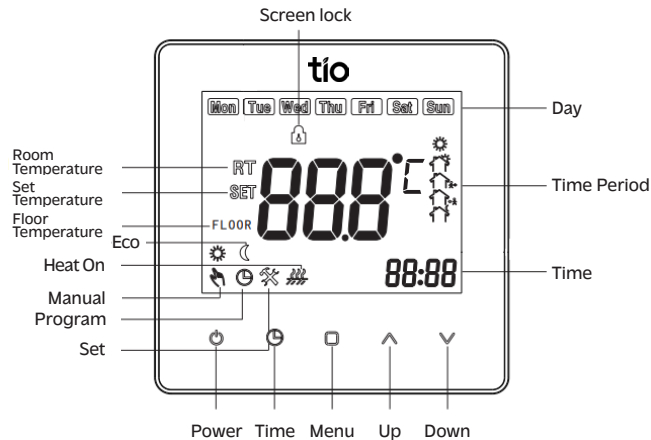
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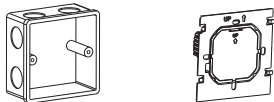


Installation

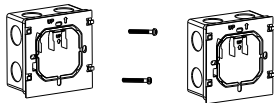
Your thermostat is suitable for installation within a standard 86mm pattress box or European 60mm round pattress box.

Please ensure that the electrics are disconnected or isolated prior to making electrical connections. Contact with high voltage components can cause electrical shock, sever injury or death.

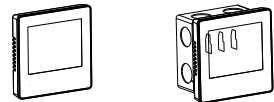
1. Remove the mounting backplate.



2. Connect power supply, load and external (floor) sensor into the appropriate terminals. Fix the mounting plate into the wall with the provided screws. (Floor sensor is optional)



3. Fasten the body of the thermostat and the mounting plate through the groove to complete the installation.



Quick Functions

 Press this button to power your thermostat on or off.

 Time setting button to set minute, hour and day.

 Menu button which allows you to change between manual and programme mode.

Manual mode: Press  to select manual mode. A  symbol will appear in the bottom left corner when this mode has been selected. You can now set you desired temperature using  .

Temporary mode: During programme mode, you can manually change the temperature if required. You may use   to set the temperature accordingly. Both   icons will appear on screen. Your pre-programmed settings will return in the next period.

Child lock: Press and hold   over 5 seconds to lock/unlock your thermostat.

Factory reset: Press  over 5 seconds to enter programme mode. Next, hold   over 5 seconds. The thermostat will have been factory reset when 'def' flashes on screen.

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 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

To access the configuration;

Firstly, turn off your thermostat .

Then, press and hold  over 5 seconds to enter the menu.

Using  to change through the different parameter and   to change the settings.

Once you have selected your desired settings, press  to confirm these settings.

Programme Settings

Please familiarise yourself with your thermostats pre-programmed factory 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

Before configuring your thermostat, please consider key parts of your day in order to maximise it's efficiency and efficacy.

Please remember that your underfloor heating will need a longer period of time to heat up when compared to your typical radiator system. With this in mind, it is advised to have your heating turn on roughly an hour in advance.

Using  to change through the different parameters, adjustments can be made to Day, Time & Temperature for each of the time periods detailed in the table. Use   to adjust the flashing parameter.

The programme cycle uses a 5+1+1 layout which groups Monday to Friday (5) and gives you individual customisation for Saturday (1) and Sunday (1) for more flexibility.

To access these settings, firstly with the thermostat powered on, press  over 5 seconds.

Using  to change through the different parameters are explained above and using   to set the relative values.

Modbus Settings

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)

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

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

Command	Byte	Description	Reg. Address
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

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

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

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
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

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.

Changing your thermostats IP address?

Whilst powered off, press  over 8 seconds until the screen changes.

Press  to scroll to item C.

Using   to change the relative value. The default is 0X01.



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