

T-MO Electric Heating Thermostat

Installation Guide



T-MO1 White



T-MO1B Matt Black

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Features

- Wi-Fi (2.4 GHz) and BLE.
- Open API for integration.
- Profiles: Home, Away, Night, Work.
- DirectLink.
- Bluefusion.
- 14 segment LED display.
- Internal room sensor.
- External room sensor (wired).
- External floor sensor (wired).
- 3 modes: Heat, Cool, Eco.
- Relay function (no temperatures).
- Power regulator.
- Temperature limiter.
- Temperature calibration.
- Hysteresis and PWM.
- ZeroX™ detection.
- Open window detection.
- Adjustable active brightness.
- Adjustable standby brightness.
- Single pole switch.
- Child lock.
- Overload protection.
- Overheat protection.
- Google Home and Amazon Alexa compatibility (pending).
- Weekly schedule in app.
- Copy & paste scheduling.
- Active power metering.
- OTA firmware updates.

Maintenance

The device is maintenance free. For indoor use only.

Working frequency 2.4GHz. The distance between user and products should be no less than 20cm. There is no restriction to use this product across the EU countries.



Book a call to have your T-MO set up by an expert!

1. Install your T-MO and make sure it has power.
2. Download the T-MO app and connect T-MO to your Wi-Fi.
3. In the app, go to Settings > Support and tick "Grant support access".
4. Book a setup call online at t-mo.pro or call 01622 689 440.

Scan to book a setup or support call



Introduction

T-MO is an electronic thermostat designed to make electric heating easy. T-MO can also function as a relay, allowing for simple On/Off functionality without a temperature setting, useful for things like electric towel rails.

Controls

T-MO can be controlled via the touch buttons on the thermostat and also via Wi-Fi or Bluetooth (BLE) using the T-MO App. The thermostat features a user-friendly interface and an easy-to-read LED display. The display backlight can be set to switch off completely when in standby so it won't disturb you at night time.

Modes

T-MO has 3 modes: Heat, Cool and Eco.

Installation

It has a sturdy metal frame for secure fastening in a 35mm deep junction box. The thermostat has a built-in room temperature sensor. Two additional external temperature sensors may also be connected.

Get remote expert setup, commissioning, and ongoing support

If Wi-Fi is available, we recommend our expert setup and commissioning service. Simply connect T-MO to Wi-Fi, allow support access in the app and book a setup call to have one of our experts set up your thermostat for you. ThermoSphere will then take responsibility for ongoing remote technical support for the T-MO and the associated ThermoSphere heating system. You can also use this feature at any time to get help and support.

Wi-Fi and Bluetooth connectivity

T-MO connects to both Wi-Fi and Bluetooth. This means you can use the app even if Wi-Fi is not available. After the system is set up, the installer can transfer the property to the customer's T-MO app account. The customer can then add the system to their local Wi-Fi network.

When used with Wi-Fi, the thermostat can communicate over a local API, allowing the user to integrate it with a local gateway, server or controller that offers such a service, without the need to connect it to the cloud. The device also supports Amazon Alexa and Google Home (support for Amazon Alexa and Google Home is pending).

All ThermoSphere products with Wi-Fi support and marked with the T-MO logo, can be controlled via the T-MO App. In the app, you can create profiles such as Home, Away, Night and Work to easily control, monitor, and organize your connected devices or control them via a weekly schedule.

DirectLink to other products

The thermostat can connect wirelessly to other T-MO devices via DirectLink. It can be controlled by other thermostats, and it can also control other thermostats and relays and act as a wireless temperature sensor.

Active power metering

T-MO features active power metering, providing real-time information about your power consumption over 6, 12 and 24 hour. You can see historic usage in the monthly chart. If switching through a contactor, you can manually set the power metering value in settings.

ZeroX™ technology

The device is equipped with ZeroX™ technology, which ensures the relay switches at 0V when turning on and off. This technology significantly extends the thermostat's lifespan and allows us to give a 5-year warranty.

Electrical load compatibility

The thermostat is designed specifically for resistive loads. When controlling large resistive, capacitive or inductive loads, it is essential to use an appropriate contactor to protect the thermostat from excessive load to ensure safe operation. The thermostat can withstand a resistive load of up to 16A/3600W at 230VAC. For loads above 13A, we recommend using a contactor.

Important information!

All electrical installations must be carried out by a competent professional electrical installer. The product must be installed in accordance with our instruction manual and national building regulations. Any wrongful installation, misuse or damage of the product is not covered under warranty.

Before installation, disconnect the power to the device from the mains. During installation of the device, and any maintenance, power to the device must be disconnected and the circuit must be safely isolated AT ALL TIMES!

We develop and design our products in accordance with our strict quality requirements (ISO 9001) and environmental requirements (ISO 14001). Updated documentation is available at www.thermosphere.com. Thermogroup Ltd will not be held liable for any type of errors and omissions in our product information. Product specifications may change without further notice.

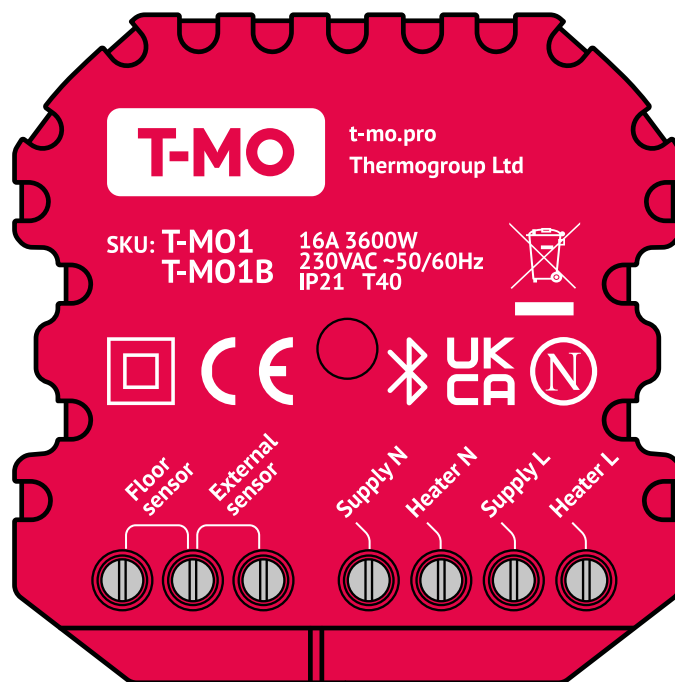
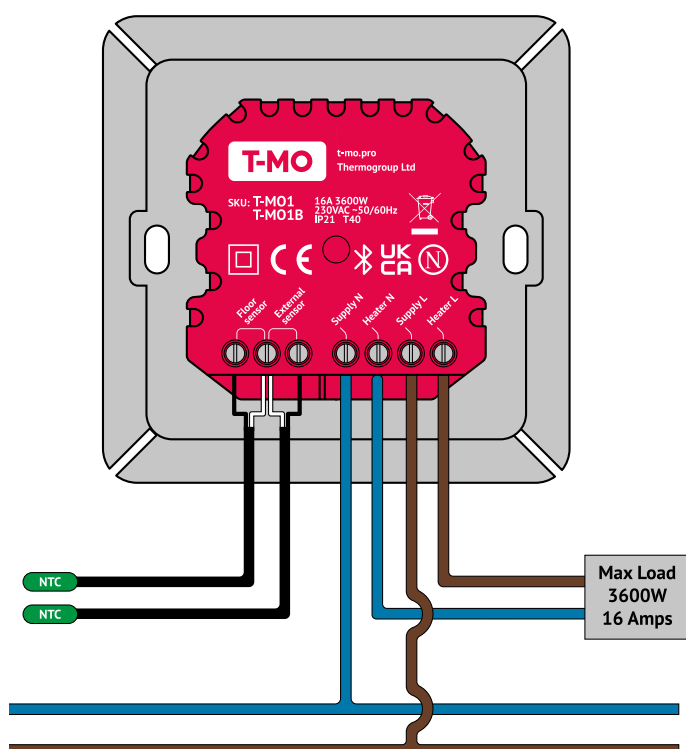
Wiring connections

Maximum tightening torque for the terminal screws is 2Nm.

Maximum cable cross section of up to 2.5mm².

If the cable used has multiple strands, use of a ferrule is advised.

The screw terminals are accessible at the back of the device.



Floor sensor - Recommended for underfloor heating applications

NTC type 6.8, 10, 12, 15, 22, 33, 47 or 100kΩ. Default 10kΩ. No polarity.

External sensor - Use when T-MO is not installed in the heated room
NTC type 6.8, 10, 12, 15, 22, 33, 47 or 100kΩ. Default 10kΩ. No polarity.

Supply N

Neutral connection to the 230VAC supply circuit. Blue.

Heater N

Neutral connection to the heating circuit (load). Blue.

Supply L

Live connection to the 230VAC supply circuit. Brown.

Heater L

Live 230VAC connection to the heating circuit (load). Brown.

Earth: The device is double insulated. The Earth/Ground connection must be made inside the back box in accordance with all relevant local wiring regulations.

Installation

To ensure accurate temperature readings, the thermostat must be installed in an area away from direct temperature influences such as direct sunlight, hot water pipes, heaters and ventilation.

We recommend installing T-MO in a 45mm deep backbox to allow adequate space for all of the required cables within the backbox.

Position the thermostat and mount it into the junction box using 2 screws.

Position the thermostat front over the part mounted in the junction box, then carefully press the front until it clicks into place.

In order to get power metering values, the load needs to be connected to both heating L + N.

Never change the front from one thermostat to another. Doing so can affect the ZeroX function and damage the relay. This will void the warranty.

When two or more thermostats are mounted too close to each other, the heat they emit can interfere with the internal temperature sensors and the temperature in the junction box can become too high. This can cause inaccurate temperature readings, especially under high load, leading to incorrect heating control.

To avoid such issues, thermostats should be installed as far apart as possible and always in separate junction boxes. This ensures more accurate temperature readings.

T-MO app: Wi-Fi connection

Upon connecting T-MO to power, it will automatically enter "add" mode for a duration of 60 minutes. During this time the device can be added to the app without initiating the connection locally on the thermostat.

Ensure your Wi-Fi router is switched on and within range of the thermostat.

1. If T-MO is not already in "add" mode, hold the middle button for 5 secs. The display will show "OFF".
2. Press the right button once to see "CON" in the display.
3. Start "add" mode on the thermostat by clicking the middle button to see "APP", then hold the middle button for approximately 2 seconds.
4. Add mode is indicated on T-MO by rotating LED segments in the display. It indicates this for 90 seconds until a timeout occurs or until the device has been added to the network.
5. In the T-MO app go to the Device page, choose "Add Device", press "Add Wi-Fi Device" and enter your Wi-Fi details. Your device will show on the device list - select it.
6. On successful connection "INCL" and the Wi-Fi icon will show on the display and you will see your T-MO in the app's Wi-Fi device list.
7. The device is now ready for use with default settings. You can create a heating schedule and edit all other settings within the app.
8. If connection fails, please perform a "Factory reset" and try again.

T-MO app: Bluetooth connection

Upon connecting T-MO to power, it will automatically enter "add" mode for a duration of 60 minutes. During this time the device can be added to the app without initiating the connection locally on the thermostat.

Ensure that you are within Bluetooth range of the thermostat.

1. If T-MO is not already in "add" mode, hold the middle button for 5 secs. The display will show "OFF".
2. Press the right button once to see "CON" in the display.
3. Start add mode on the thermostat by clicking the middle button to see "APP" then hold the middle button for approximately 2 seconds.
4. Add mode is indicated on T-MO by rotating LED segments in the display. It indicates this for 90 seconds until a timeout occurs or until the device has been added to the network.
5. In the T-MO app go to the Device page, choose "Add Device", press "Add Bluetooth Device" and enter your Wi-Fi details. Your device will show on the device list - select it.
6. On successful connection "INCL" and the Bluetooth icon will show on the display and you will see your T-MO in the app's Bluetooth device list.
7. The device is now ready for use with default settings. When you are within Bluetooth range (approximately 5m), you can create a heating schedule and edit all other settings within the app.
8. If connection fails, please perform a "Factory reset" and try again.

Connect via QR code

Connection to Wi-Fi and Bluetooth is even easier with the QR code located on the product.

1. If T-MO is not already in "add" mode, hold the middle button for 5 secs. The display will show "OFF".
2. Press the right button once to see "CON" in the display.
3. Start add mode on the thermostat by clicking the middle button to see "APP", then hold the middle button for approximately 2 seconds.
4. In the T-MO app tap "Add Wi-Fi device" or "Add Bluetooth device".
5. Press the QR Code button in the bottom right of the app screen and scan the QR code on the device.
6. The device will connect and show up in the app device list. "INCL" and the relevant connectivity icon will show on the display.

T-MO app: Remove device

To remove a device, find the device in the T-MO App and choose "Delete this device". If the app is unavailable perform a factory reset. When the device is removed from the T-MO App, the parameters are reset to factory defaults.

Thermostat controls

Icon	Name	Description
—	Left	Previous. Decrease set temperature. Decrease setting value.
≡	Middle	Menu confirm. Menu enable.
+	Right	Previous. Increase set temperature. Increase setting value.

Child lock

Child lock prevents local button operations on the display. Hold the left and right buttons for 10 seconds to lock and unlock the buttons. When enabled, "LOCK" appears on the display. When unlocked, "OPEN" is shown.

Display icons and messages

Icon	Description
⋈	The relay is on in Heating or Relay mode.
❄	The relay is on in Cooling mode.
📶	The current Wi-Fi signal strength.
📶	There is an active Bluetooth connection.

The following messages will sometimes be displayed on the screen:

Display	Description
LOCK	Child lock activated. Buttons locked by child lock.
OPEN	Child lock disabled. Buttons active.
STOR	Settings stored. Changes have been saved.

Standby and main screen

When the thermostat remains untouched for a while, it will automatically go to the standby screen. The standby will by default show the setpoint temperature.

By pressing any button once, you will see the measured temperature. By pressing the left or right button multiple times, you will change the setpoint.

Temperature shown on display

During standby the display shows the setpoint temperature by default.

You can change what is shown by choosing either measured temperature "REL" or the setpoint "SETT".

You select "SETT" or "REL" by holding down the middle button for 2 seconds on the "MODE" menu item, or by changing the "Temperature display" setting in the app.

Display brightness

The display brightness for active and standby states are managed separately and can be adjusted between 100 and 0%. You can set the values using the "BRIT" menu option or by setting "Active display brightness" and "Standby display brightness" in the app.

BR1 - Active display brightness.

BR2 - Standby display brightness.

Settings menu

To enter the settings menu, hold the middle button for 5 seconds. The display will show "OFF". You are now in the settings menu.

Scroll up and down using the left and right buttons.

Some options have submenus. To enter the submenus, press the middle button once to enter or exit the submenu.

Press the left and right buttons to find your desired value and hold the middle button for 2 seconds to confirm your selection. "STOR" will appear to indicate settings are stored.

Setting	Description
OFF	The first menu section.
CON	Connect to the app or setup DirectLink
MODE	Set to Heat, Cool or Eco. Change displayed temperature.
OPER	Select the active sensor mode
SEN	Select the NTC rating for wired floor and external sensors.
MIN	Set the minimum temperature limit.
MAX	Set the maximum temperature limit.
CAL	Displayed temperature calibration
REG	Set hysteresis value and select HYST or PWM regulation.
BRIT	Change active and standby brightness values.
DISB	Turn the display on and off.
OWD	Turn Open Window Detection on and off.
LOAD	Set the load value if switching heating via a contactor.
KWH	The total energy use since last reset. Hold to reset.
FACT	Hold to factory reset.
ESC	Exit settings.

Thermostat mode (THER)

When the device is set to THER, it will operate as a normal thermostat and switch the heating on and off according to the measured temperature and temperature set point.

Some configuration parameters and menu options are limited to Thermostat mode.

The thermostat has 3 modes: HEAT (heating), COOL (cooling), and ECO (energy-saving mode with reduced heating setpoint). You select "HEAT", "COOL" or "ECO" via the MODE menu option or by adjusting "Operating Mode" in the app.

Relay mode (RELA)

When the device is set to RELA, it will work as a relay without any temperature regulation. While it is in Relay mode, the display can be set to show a number of different items. Some configuration parameters and menu options are limited to Relay mode.

Principles of regulation (Thermostat)

The thermostat uses temperature readings from the internal sensor and/or from external wired sensors, it regulates the temperature using either hysteresis (HYST) or PWM based on your choice.

You select "HYST" or "PWM" via the "REG" menu option, or by adjusting "Regulation mode" in the app.

Hysteresis (HYST) - Best for electric underfloor heating

Hysteresis sets the offsets that are used with the setpoint to determine when the heating is switched on and off relative to the measured temperature.

You can adjust the thermostat hysteresis, choosing values between 0.3°C and 3.0°C. The default setting is 0.5°C. When using water-based heating, we recommend a hysteresis of 1.0°C.

You can change the hysteresis by entering the local settings menu and holding the middle button for 2 seconds when "REG" is displayed. Here you can choose values between 0.3 and 3.0. It can also be changed by adjusting "Temperature control hysteresis" in the app.

Pulse-width modulation (PWM) - Best for wet underfloor heating

With PWM regulation enabled, the thermostat will regulate based on duty cycles. The thermostat is turned on and off in percentage intervals of the cycle. The amount of time the relay will be on is based on how far the measured temperature is from the setpoint. This is ideal for water based underfloor heating systems with large thermal mass.

Sensor selection

The thermostat has multiple sensors and sensor modes which are listed below. This lets you configure the thermostat to work correctly in most installations. The sensor mode is selected from the menu option "OPER" or by adjusting "Sensor mode" ("OPER") in the app.

Sensor mode	Description
F	Floor sensor - Recommended for UFH
A	Internal room sensor
AF	Internal room sensor with Floor sensor limit (Both sensors must have the same NTC value)
A2	External wired room sensor - Use to monitor ambient temperature when T-MO is not in the heated room.
A2F	External wired room sensor with Floor sensor limit (Both sensors must have the same NTC value)
PWER	Power regulator mode (no sensor used)
EXT	External wireless sensor (DirectLink)
RELA	Relay functionality (no sensor used)

Floor sensor requirement and temperature limiting

Some types of flooring require the use of a floor sensor to ensure that the floor temperature does not exceed 27°C. Refer to the floor manufacturer's manual for specific guidelines.

When the thermostat operates in AF or A2F mode, the floor temperature limit is automatically set to 27°C by default.

In all other sensor modes (A, F or A2), the temperature limits are set to minimum 5°C and maximum 40°C by default.

Select a sensor value

The thermostat allows you to select between a range of different resistance values for the NTC sensors. These are the most common values for popular NTC sensors and makes it easy to switch an existing thermostat to T-MO.

The supported sensor values are as follows: 6.8, 10, 12, 15, 22, 33, 47 or 100KΩ.

In AF and A2F mode T-MO uses the same sensor value for both connected sensor. You must make sure that both sensor probes use the same value to prevent errors and inaccuracies.

You select "SEN" via the menu option, or by adjusting "Sensor value (SEN)" in the app.

Minimum and maximum temperature settings

The thermostat allows you to set minimum and maximum temperatures for the connected sensors. You set the values via the "MIN" and "MAX" menu options. Only the options for the active sensor mode will be displayed.

Menu Item	Description
ALO	Internal (ambient/air) sensor minimum temperature limit.
FLO	Floor sensor minimum temperature limit.
A2LO	External wired sensor minimum temperature limit.
AHI	Internal (ambient/air) sensor maximum temperature limit.
FHI	Floor sensor maximum temperature limit.
A2HI	External wired sensor maximum temperature limit.

External wireless sensors

T-MO devices can also be used as wireless temperature sensors. You can use a second T-MO device, installed in another room, as the temperature sensor for the primary T-MO device. This is useful in situations where the wiring point for the underfloor heating is not in a good position.

The thermostat allows you to choose EXT as a sensor mode.

When EXT is chosen, the device uses the temperature received from an external wireless sensor which is linked with the device through a DirectLink.

If the device detects loss of communication with the linked T-MO device, the thermostat will revert to using a different sensor or turning the thermostat off. By default, it will revert to the internal sensor.

You can change what happens on loss of communication by changing the "External sensor fallback" setting in the app.

DirectLink

DirectLinks are direct connections between one or more supported T-MO devices. A DirectLink will send specific commands to linked T-MO devices when events are triggered on the primary device.

Setting and removing DirectLinks

A DirectLink can be set directly from a device, from the app and from the API. When creating a DirectLink directly from the device, the link set will depend on the Primary and Secondary device capabilities.

Thermostat - Transmitting capabilities

Link name	Description
Relay control	Control external relays based on the status of the thermostat's relay.
Primary thermostat	Send thermostat mode and setpoint.

Thermostat - Receiving capabilities

Link name	Description
Secondary thermostat	Receive thermostat mode and setpoint and regulate based on them.
External wireless sensor	Receive temperature reports from an external temperature sensor, if the sensor mode is set to "EXT", the thermostat will use the temperature to regulate the connected heating system.

Relay - Transmitting capabilities

Link name	Description
Relay control	Control external relays based on the status of the thermostat's relay.

Relay - Receiving capabilities

Link name	Description
ON/OFF	Receives ON/OFF commands from another device to mirror the relay state.

Temperature calibration

If the temperature sensor readout is inaccurate, you can correct it by up to $\pm 6^{\circ}\text{C}$. You calibrate using the CAL menu option and selecting the appropriate sensor. You can also adjust the "Internal sensor calibration (CAR)", "External sensor calibration (CAE)" or "Floor sensor calibration (CAF)" settings in the T-MO app. The app and thermostat will show the calibrated value.

Size of heating load

The device has active power metering, but in some cases, you might want to adjust the measured value, for example if the load is switched by a contactor instead of directly by the thermostat.

By default, it is set to 0 and it uses the active power metering values. You can adjust it in increments of 100W up to 9900W, using the "LOAD" menu option or by adjusting "Size of Load" in the app.

Energy use (kWh)

The device supports real time power metering to give insight into the power consumption of the connected heating system. The total consumption of the device can be seen from the "kWh" menu option.

Enter the "KWH" submenu by pressing the middle button once to see the total consumption. Hold the middle button for 2 seconds within the "KWH" submenu to reset it.

Safety features

T-MO has safety features to ensure safe operation and warn the user of any faults or unexpected behaviour. T-MO has an Overheat and an Overload function. If the thermostat registers an Overheat or Overload incident, the thermostat will switch off and an error will appear in the display.

Overheat protection

The device features internal temperature sensors that detect overheating. It warns the user and turns off the relay to prevent any damage.

When overheating is detected, the device will:

- Turn off the relay.
- Show ERR6 on the display.
- Send a notification to the T-MO app.

Overload protection

The device features a 16A overload protection. Overload protection is triggered if there is a current draw of more than 16A.

When an overload is detected, the device will:

- Turn off the relay.
- Show ERR7 on the display.
- Send a notification to the T-MO app.

Sensor failure

The device has the ability detect when there is no sensor connected or the sensor is broken or otherwise defective, causing an open circuit.

When a sensor error is detected, the device will:

- Turn off the relay.
- Show the relevant error in the display.

To clear a "Sensor not connected" error disconnect T-MO from the mains and check the wiring. When the fault is resolved the mains can be reconnected and the device will function normally again.

Open window detection (OWD)

Open window detection is a function which will reduce the thermostat setpoint on detection of an open window. This happens when the temperature sensor registers a rapid temperature drop.

When OWD is activated, the setpoint is reduced to 5°C in order not to waste energy. OWD will automatically be cancelled if it has been active for more than 1 hour or if the temperature increases by 3°C. OWD can also be cancelled manually by increasing/decreasing the setpoint with the left and right buttons.

You enable or disable "OWD" via the OWD menu option or by adjusting "Open window detection" in the app.

Bluefusion

Bluefusion is a function that allows Bluetooth exclusive devices to also communicate on Wi-Fi enabling them to be controlled via API commands.

BlueFusion requires that both a Bluetooth only device and a Wi-Fi-compatible device are added to the same property in the T-MO app.

Once added, you can choose which Wi-Fi device the Bluetooth device should use as a communication bridge from an overview in the app.

Open API

T-MO features an Open API, enabling integration and remote control over the internet without requiring the use of our app or cloud. This means the device can be integrated into any system capable of sending and receiving data through an API, allowing developers to build custom solutions and automate interactions using standard HTTP requests.

Firmware updates - OTA

It is possible to update a Wi-Fi enabled T-MO product using the integrated "Over The Air" (OTA) update function. The product must be connected to the T-MO app using Wi-Fi, and the product must have access to the internet.

In the app, go into the settings on the device you want to update and press "Update Firmware". This will check if a newer version is available. If there is a newer version it will be downloaded and installed onto your T-MO device.

Error codes

If you encounter an error code, try removing and reattaching the front of the thermostat to restart the device. If the issue persists, it is recommended to contact an electrician or support for further assistance.

Error code	Description
ERR	Connection failed. Re-try adding to your network.
ERR1	Internal error. Usually a fault. Contact support.
ERR2	Radio error. Usually a fault. Contact support.
ERR3	Internal error. Usually a fault. Contact support.
ERR4	Floor sensor error. You may have selected F, AF or A2F sensor mode without a sensor connected to the correct terminals. The sensor may be damaged.
ERR5	External sensor error. You may have selected A2 or A2F sensor mode without a sensor connected to the correct terminals. The sensor may be damaged.
ERR6	Overheating. Isolate from power and contact an electrician.
ERR7	Overload. Isolate from power and contact an electrician.

Thermogroup Ltd hereby declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.



Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

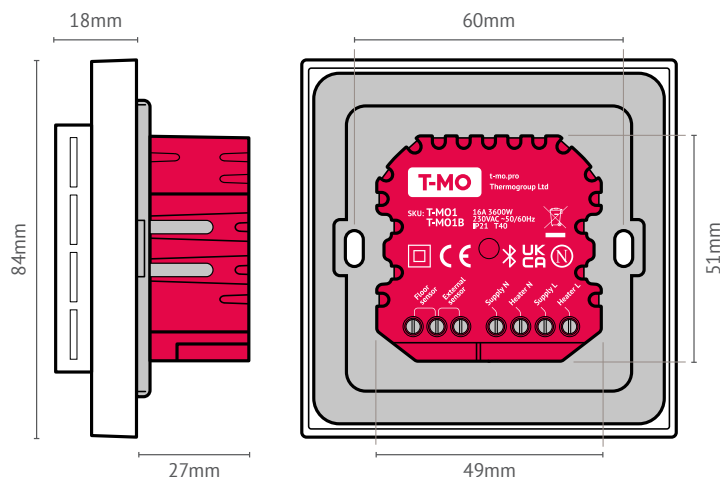
Factory reset

Enter the menu by holding the middle button for about 5 seconds, navigate the menu with the left button until you see "FACT". Press the middle button until you see "---" blinking in the display, then hold for about 5 seconds to perform a reset.

You can also initiate a reset by holding the right and middle buttons for 60 seconds.

When either of these procedures has been performed, the thermostat will perform a complete factory reset. The device will display "RES" for 5 seconds while performing a factory reset. When "RES" is no longer displayed, the reset is complete.

Dimensions



Technical data

Connectivity	Wi-Fi (2.4GHz)/BLE
Rated voltage	230VAC 50Hz
Max load	3600W 16A (resistive load)
Max current	16A
Power consumption	<2W
Power regulator time cycle	30 min.
Ambient temperature	5°C to 40°C
Regulation temperature	5°C to 40°C
Storage temperature	-30°C to 70°C
Hysteresis	0.3°C to 3.0°C (default 0.5°C)
Humidity	10% to 85% RH
Compatible NTC sensors	6.8, 10, 12, 15, 22, 33, 47, 100kΩ @ 25°C
Length of NTC sensor	Max. 50 meters
Screw terminals	Max. 2.5mm ² 2Nm
IP Code	IP21
Size (L x W x H)	84 x 84 x 45.5mm
Approvals	CE, UKCA, PSTI, Nemko
Warranty	5 years