HEATIT ZM THERMOSTAT 16A

Installers manual

Firmware 1.0

01.09.2021

Ver 2021-A

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1. INTRODUCTION

Heatit ZM Thermostat is an electronic thermostat for electrical floor heating designed for in-wall installations.
The thermostat allows you to control your electrical heating through your Z-Wave™ network. The module is equipped with a 16A single pole relay. The thermostat requires you to connect an external wired sensor which is included with the device.
The device can withstand a max load of 16A at 230VAC.

2. STATEMENT REGARDING PRODUCTS FROM MULTIPLE MANUFACTURERS

Please read this before installation

This device may be used with all devices certified with the Z-Wave Plus™ certificate and should be compatible with such devices produced by any manufacturer. Every primary controller is different depending on the manufacturer, their target audience and intended use/application. Please review the functionalities implemented by the primary controller you intend to use with our Z-Wave Plus certified device to ensure that it provides the necessary controls to take full advantage of our product's capabilities.

3. BEHAVIOR WITHIN THE Z-WAVE™ NETWORK

This device may be operated within any Z-Wave network with Z-Wave-certified devices from other manufacturers. All non-battery-operated nodes within the network will act as repeaters regardless of manufacturer to increase the reliability of the network. On delivery, the device does not belong to any Z-Wave network.
The device needs to be added to an existing network to communicate with the other devices within it. Devices may also be removed from a network. The add/remove processes are initiated by the primary controller of the Z-Wave network.

4. QUICK START

1. Switch off the mains supply (disable the fuse).
2. Open the wall box.
3. Connect the wires according to the description in Chapter 5; "Installation".
4. After verifying the connections, switch the mains supply back on.
5. Set the primary controller in add mode (security/non-security).
6. Press the configuration button 3 times in rapid succession.
7. The device LED will blink in green when the adding procedure has been successfully initiated. When the device is included in the home automation system, the LED will light up in green for 3 seconds.

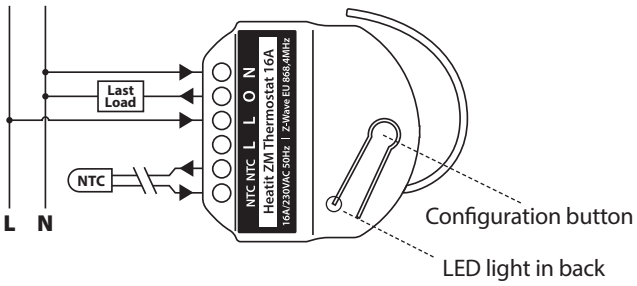
5. INSTALLATION

Installation must be done by a qualified electrician in accordance with the national building codes. Before installation, disconnect any power to the device mains. During installation of the device, power to the device must be disconnected AT ALL TIMES!

The product allows for wiring of cables with a cross section of up to 1x2.5mm^2.

CE

heatit CONTROLS



N Power connection (Neutral) 230VAC.
O Output. Load need to be connected between O and Neutral.
L Power connection (Live) 230VAC.
L Power connection (Live) 230VAC.
NTC 10K NTC Temperature sensor.
NTC 10K NTC Temperature sensor.

6. ADD/REMOVE

Please read this before installation

The primary controller/gateway has a mode for adding or removing devices. Please refer to your primary controller manual on how to set the primary controller in add/remove mode. The device may only be added or removed from the network if the primary controller is in add/remove mode.
When the device is removed from the network, it will NOT revert to factory settings.

There are two ways to add the device to a Z-Wave network.

6.1 Method 1: Standard (Manual)

Add/remove mode is indicated on the device by a blinking green LED. It indicated this for 90 seconds until a timeout occurs, or until the module has been added to/removed from the network.
To start the configuration process, press the configuration button 3 times in rapid succession. The LED will light up green for 3 seconds if adding/removing is successful.
The device is now ready for use with default settings.

NB! When the device is removed from the gateway, the parameters are not reset. To reset the parameters, see Chapter 7 "Factory reset".
If inclusion fails, please perform a "remove device" process and try again. If inclusion fails again, please see Chapter 7 "Factory reset".

6.2 Method 2: SmartStart (Automatic)

SmartStart enabled products may be added to a Z-Wave network by scanning the Z-Wave QR-Code on the product if your primary controller supports SmartStart inclusion. No further action is required and the SmartStart product will be added automatically after being powered on within range of the primary controller.

7. FACTORY RESET

Press and hold the configuration button. After 3 seconds the LED will start to blink in green. After 20 seconds the LED will start to blink green rapidly for 5 seconds. You may now release the button.

NB! Please use this procedure only when the primary controller/ gateway is missing or otherwise inoperable.

8. STARTUP

After powering up the device for the first time, all the parameters will have default settings.

9. PRINCIPLES OF REGULATION

The thermostat uses temperature readings retrieved from the sensor to regulate heating. When you have chosen a setpoint temperature, the thermostat will use an internal hysteresis to regulate the temperature.

10. HYSTERESIS

You can make changes to the thermostat hysteresis. You may change the hysteresis from between 0.3°C and 3.0°C using parameter 2.
The default setting is 0.5°C. When using water-based heating, the recommended hysteresis is 1.0°C.

11. SAFETY FEATURES

The device security features make the device safe to use and notifies the user of any unexpected behavior in the device, such as overload or overheating. If this happens, the thermostat turns the relay OFF and starts to blink red and green from the LED until the error(s) have been resolved and the device has been disconnected and reconnected from the mains. The following temperature notifications will be sent to the gateway/controller:

- 121°C = Overheat
- 122°C = Overload
- 123°C = Sensor short
- 124°C = Sensor not connected

11.1 Overload

The device features a 16A overload protection. The overload is triggered if there is a current draw of more than 16A. The relay allows for inrush current. If the current is between 16-20A it waits for 2 seconds, if it is between 20-30A it waits for 0.5 seconds and if it is above 30A it will wait for 0.2 seconds. After the given time the device will do the following:

- Set the relay OFF
- Blink red and green
- Send a temperature report of 122°C

To clear the overload state, the connected load has to be checked and the thermostat must be disconnected and reconnected from the mains.

11.2 Overheating

The device features an internal temperature sensor which prevents overheating inside the device or wall.
When overheating is detected, the device will:

- Set the relay to OFF
- Blink red and green
- Send a temperature report of 121°C

To clear the overheating state, the thermostat must be allowed to cool down and the cause of the overheating must be removed.

11.3 Sensor short circuit

The device has the ability to detect a sensor short circuit. This is to ensure that the device regulates correctly from the sensor.
When a sensor short circuit is detected, the device will:

- Set the relay to OFF
- Blink red and green
- Send a temperature report of 123°C

To clear the sensor short circuit error the device has to be disconnected from the mains, then the wiring and sensor needs to be checked. When the fault is resolved the mains can be reconnected and the device will function normally again.

11.4 Sensor not connected

The device has the ability to detect when there is no sensor connected or when the sensor is broken and causes an open circuit.
When the device detects the sensor error, the device will:

- Set the relay to OFF
- Blink red and green from the LED
- Send a temperature report of 124°C

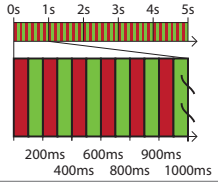
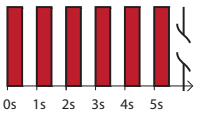
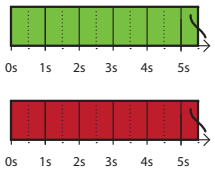
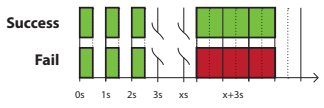
To clear the "Sensor not connected" error the device has to be disconnected from the mains, and the wiring and sensor needs to be checked. When the fault is resolved the mains can be reconnected and the device will function normally again.

12. CALIBRATION

Parameter 6 allows you to calibrate the temperature displayed in the controller/gateway and what the thermostat uses for regulation. If the temperature sensor readout is not correct, you can make minor changes to the temperature readout. You can calibrate the measured temperature by ±6°C degrees.

13. LED BLINKING PATTERNS DESCRIPTION

The device supports numerous LED blinking patterns to make it as easy as possible to identify what the device is doing.

Error code Error status on device: Alternating red and green blinking pattern (100ms duration) for 5 seconds.	
Device Not in Network The LED will flash red when the device is not added to a Z-Wave network	
Device Status On: Green Off: Red When the device is in OFF Mode, LEDs will be off.	
Add/Remove When device enters add/remove mode the LED will flash green. If successful, the LED will light up in green for 3 seconds. If unsuccessful, the LED will light up in red for 3 seconds.	

14. QR-CODE PLACEMENT (DSK)

The QR-Code is needed when including a device using S2 security or SmartStart. The DSK can be found in the QR-Code and is located;

- On the product.
- On the Quick Guide manual.
- On the product box.

15. SECURITY

S2 security enhances Z-Wave Plus with an additional layer of AES 128-bit encryption of the wireless Z-Wave communication to prevent hacking and man-in-middle attacks on the home network. This device supports S2 and has a Z-Wave DSK QR-Code label that may be used when the module is added to the Z-Wave home network. The primary controller will ask for a 5-digit code, which can be found underneath the QR-Code. The primary controller will then ask you to confirm the rest of the code that is contained in the QR-Code.

16. NODE INFORMATION FRAME

The node information frame is the "business card" of a Z-Wave device. It contains information about the device type and its technical features. The add and remove procedure of the device is confirmed by sending out a node information frame. Besides this, it may be necessary for certain network operations to send out a node information frame.

17. ASSOCIATIONS

Z-Wave devices interact with other Z-Wave devices. The relationship between one device controlling another device is called an association. In order to control a subordinate device, the controlling device needs to maintain a list of devices that will receive controlling commands. These lists are called "Association Groups". They are always related to the specific event triggered (e.g., sensor reports). In case the event is triggered, all devices stored in the respective association group will receive a joint wireless command.

17.1 Setting and removing associations

Associations may be assigned and removed via Z-Wave commands. Please refer to your primary controller/Z-Wave gateway for more information.

17.2 Association groups

RELAY DEVICE	THE MAIN DEVICE
Group 1 Lifeline	Lifeline. (Normally used by the Z-Wave Controller) Sends: - Device Reset Notifications. - Thermostat Setpoint Reports. - Thermostat Mode Reports. - Thermostat Operating State. - Sensor Multilevel Report. - Meter report. - Basic report. - Indicator report. Max. nodes in group: 5
Group 2 External Control	Send Binary Switch set commands representing the status of the internal relay. (0x00, 0xFF) ON/OFF Max. nodes in group: 5

18. CONFIGURATION PARAMETERS

Z-Wave products are supposed to work out of the box after inclusion. Some device configuration may, however, alter the functionality to better serve user needs or unlock further enhanced features. All the parameters below do not feature altering capabilities, advanced or read only flag.

Parameter 1, Parameter size 1. Operating mode.
Sets the thermostat mode.

NO #	PARA SIZE (BYTE)	NAME	SHORT DESCRIPTION / COMMENT	MIN	MAX	DE-FAULT	DESCRIPTION OF VALUE
1	1	Operating mode	Sets the thermostat mode	0		1	OFF Thermostat will not operate
				1			Heating Thermostat is in heating mode
				2			Cooling Thermostat is in cooling mode

2	1	Temperature control hysteresis	Chooses the hysteresis for the thermostat.	3	30	5 (0.5°C)	0.3°C to 3.0°C.
3	2	Minimum temperature	Decides the lowest setpoint temperature allowed by the thermostat.	50	400	50 (5°C)	5.0°C to 40.0°C.
4	2	Maximum temperature	Decides the highest setpoint temperature allowed by the thermostat.	50	400	400 (40°C)	5.0°C to 40.0°C.
5	2	Thermostat setpoint	Decides the thermostat setpoint.	50	400	210 (21°C)	5.0°C to 40.0°C.
6	1	Sensor calibration	Manually calibrates the sensor by ±6°C.	-60	60	0	-6.0°C to 6.0°C. Calibrates the sensor by ±6°C. NB! To set a negative value, use 256 and subtract the desired value.
7	2	Temperature report interval	Sets time interval between consecutive temperature reports.	30	65535	1020 (17 minutes)	30 to 65 535 seconds.
8	1	Temperature report hysteresis	Temperature reports based on change in temperature from last report.	0		10 (1°C)	Temperature report based on delta value is disabled.
				1	100		0.1°C to 10°C.
9	2	Meter report interval	Sets time interval between consecutive meter reports.	30	65535	1020 (17 minutes)	30 to 65 535 seconds.
10	1	Inverted output	Decides if the relay output should be inverted.	0		0	Standard input.
				1			Inverted input.
11	2	Relay state update interval	Sets the time interval of how often the device reports Binary Switch Set and thermostat mode.	0		43200 (12 hours)	Disabled
				30	65535		30 to 65535 seconds.

19. COMMAND CLASSES

Besides the mandatory command classes, the device has support for the following command classes:

19.1 Basic Command Class

A Basic command to the device will change the thermostat mode.
Uses the following values:
0x00 = OFF (0x00)
0xFF = HEAT (0x01)

19.2 Binary Switch Command Class

Binary Switch commands are used to control external relays associated in group 2.
Uses the following values:
0x00 = OFF
0xFF = ON

19.3 Meter Command Class

The device supports Meter Command Class Get, and the thermostat will only respond on supported electric meter scales:
kWh (accumulated) and Watt (instant). The device will report when asked:
Rate import: Import (0x01)
Meter type: Electric meter (0x01)
Precision: 2 decimals (0x02)

PRECISCION (VALUE)	SCALE SUPPORTED (VALUE)	SIZE
2 decimals (0x02)	kWh (0x01)	4
2 decimals (0x02)	W (0x02)	4

19.4 Indicator Command Class

The device supports the Indicator Command Class.
The indicator Command Class will turn ON/OFF internal LED as wanted as well as turning the relay ON/OFF.

Controlled command classes

	INSECURE INCLUSION	INSECURE ON SECURE INCLUSION	SECURE ON SECURE INCLUSION
Binary Switch v2	Yes		Yes

20. SUPPORTED COMMAND CLASSES

The following table lists all Command Classes supported by the Z-Wave device. The device supports S0, S2 Authenticated security and S2 Unauthenticated security.

	INSECURE INCLUSION	INSECURE ON SECURE INCLUSION	SECURE ON SECURE INCLUSION
Association v2	Yes		Yes
Association Group Information v3	Yes		Yes
Basic v2	Yes		Yes
Configuration v4	Yes		Yes
Device Reset Locally v1	Yes		Yes
Firmware Update Meta Data v5	Yes		Yes
Manufacturer Specific v2	Yes		Yes
Meter v3	Yes		Yes
Multichannel Association v3	Yes		Yes
Power level v1	Yes		Yes
Security 0 v1	Yes	Yes	
Security 2 v1	Yes	Yes	
Supervision v1	Yes	Yes	
Indicator v3	Yes		Yes
Transport Service v2	Yes	Yes	
Version v3	Yes		Yes
Z-Wave Plus Information v2	Yes	Yes	
Thermostat Setpoint v3	Yes		Yes
Thermostat Mode v3	Yes		Yes
Thermostat Operating State v1	Yes		Yes
Multilevel Sensor v5	Yes		Yes

PRODUCT INFO Heatit ZM Thermostat 16A

FEATURES

- Z-Wave thermostat for in-wall installations
- 16A/3600W
- NTC 10 sensor
- SmartStart
- Firmware update (OTA)
- Power Metering
- Supports encryption modes S0, S2 Authenticated Class, S2 Unauthenticated Class

This product is a security-enabled Z-Wave Plus product with encryption. The product must be used with a security-enabled Z-Wave Controller in order to fully utilize the product.

TECHNICAL DATA

Protocol	Z-Wave
Chip	Z-Wave 700 chip
Rated voltage	230VAC 50Hz
Max load	3600W 16A
Power Consumption	<1W
Ambient temperature	5°C to 40°C (-30°C to 70°C storage)
Humidity	Max 95% RH
Range RF	Min. 40 meters
IP Code	IP 20
Size (DxWxH)	46 x 45 x 25mm

Approvals Z-Wave Plus V2, CE

EN 60669-1:2018, EN 60669-2-1:2004 + A1:2009, EN 60669-1:2004/A12:2010, EN 60669-2-5:2016, IEC 965-2-1, EN 62479:2010, ETSI EN 301 489-3 V2.1.1(2017-03), ETSI EN 300 220-2 V3.1.1 (2017-02), RoHS 2002/95/EG, WEE 2002/96/EC

MAINTENANCE

The device is maintenance-free. Indoor use only.

ART. NO.	PRODUCT	COLOR	FREQUENCY
45 126 73	Heatit ZM Thermostat 16A	Grey RAL 6015	EU 868.4MHz

The product is also available in other Z-Wave frequency versions on request.

DISPOSAL GUIDELINES

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging health and well-being.

Heatit Controls AB can not be held liable for typographical errors, other errors or omittances in our information. Product specifications may change without further notice. All electrical installations must be carried out by a licensed electrician. The product must be installed in accordance with national building codes and our installers manual.

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