# HELTUN

## FLOOR HEATING THERMOSTAT

## HE-ZW-THERM-FL1

## USER MANUAL

**THERMOSAT OVERVIEW & OPERATING INSTRUCTIONS**

This is a programmable electronic room thermostat for flush mounting into most standard wall boxes. It is designed to maintain a constant ambient temperature, the criteria of which can be simultaneously either floor, room or both sensors.

It is recommended for the control of electric heating devices (radiators/convectors) or electric under floor heating. The heating element is directly controlled by a single pole switch. The maximum loading for the thermostat is 16A over which a contactor will be required. (16A – 3600W @ 220/240V.)

The thermostat has a LCD screen, four sensitive capacitive touch control buttons and two temperature sensors (external NTC floor sensor and a built-in room air temperature sensor). The thermostat is also equipped with built-in humidity and energy consumption sensors.

The thermostat has a built-in 5th generation Z-Wave module which allows to integrate the device to Z-Wave Home Automation systems such as Fibaro, Vera, Zipato and others. The thermostat can be connected with up to 10 Z-Wave devices (relays, switchers etc.)

One of four operation modes can be selected either manually or via the Z-Wave controller. The 4 operating modes are: DRY - floor quick drying mode, ECO – energy saving mode, GEN - general (most comfortable) mode and manual mode. The thermostat protects the floor from overheating by automatically switching off the load when the temperature reaches a maximum of 40°C.

The LCD screen with white icons has a user-friendly interface, displaying:
floor temperature, air temperature, humidity level, user set temperature, operating mode, relay and Z-Wave network status.

## TECHNICAL SPECIFICATIONS:

- Front frame dimensions: 89x89x9mm
- Back dimensions: 53x53x28mm
- Material: Flame retardant plastic, tempered glass
- Colour: silver frame, black or white glass
- LCD: 73x42mm, black with white icons
- 4 sensitive capacitive touch buttons
- Operating temperature: -10°C – +40°C
- Power supply: 100V – 230VAC, 50Hz/60Hz
- Power consumption: 1.5W
- Maximum resistive load: 16A  3600W
- Relay life time: 100.000 switches
- Internal temperature sensor
  - Measurement range:  -40°C to +125°C
  - Accuracy: ±0.5°C
- Internal humidity sensor
  - Measurement range: 0 – 80%RH
  - Accuracy: ±3.0%RH
- External floor temperature sensor
  - NTC 10kOhm
  - Measurement range:  -30°C to +80°C
  - Accuracy: ±0.5°C
- Energy consumption meter
- IP class: IP21
- Z-Wave frequency: EU-868/869 MHz
  (other frequencies available on request)
- Z-Wave SDK: V6.51.06
- Z-Wave Plus module: ZM5202
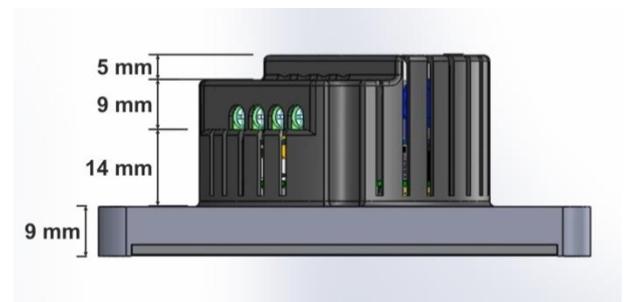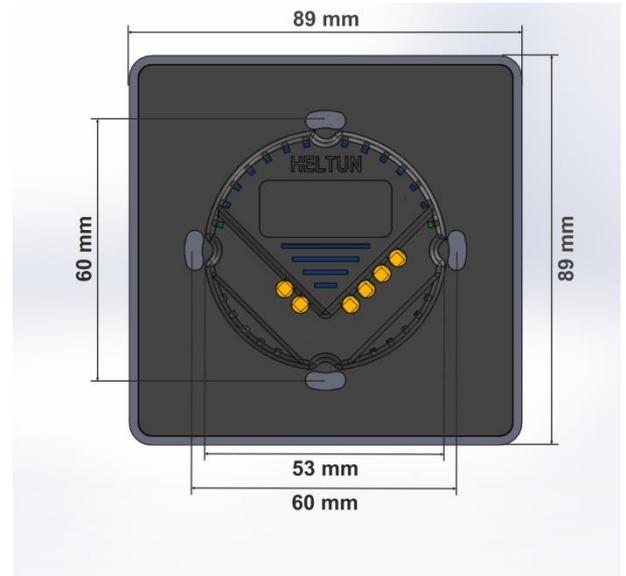


## FUNCTIONAL SPECIFICATIONS (FEATURES):

- Inclusion/exclusion into/from z-wave network
- Association control of 10 devices from network
- 4 operation modes: ECO, GEN, DRY, MANUAL
- Choosing a temperature sensor for operation
  - Floor temperature only
  - Air temperature only
  - Floor + Air temperature
- Power regulator (Automatic ON/OFF timer)
  Time cycle: 10-90 minutes
- Usable with different NTC-sensor
- Temperature sensors calibration
- Temperature set intervals: 4°C to 37°C
- Temperature limiter
- Choosing a temperature hysteresis
- Choosing a degree  (Celsius / Fahrenheit)
- Adjustable LCD brightness
- LCD standby mode
- Child lock
- Consumption meter reset
- Factory reset
- OTA function (Firmware update over the air).

## Z-WAVE CLASSES:

CLASSES GENERIC_TYPE_THERMOSTAT
SPECIFIC_TYPE_THERMOSTAT_GENERAL_V2
COMMAND_CLASS_BASIC
COMMAND_CLASS_THERMOSTAT_SETPOINT_V3
COMMAND_CLASS_THERMOSTAT_SETBACK
COMMAND_CLASS_THERMOSTAT_MODE_V3
COMMAND_CLASS_THERMOSTAT_OPERATING_STATE
COMMAND_CLASS_SENSOR_MULTILEVEL_V7
COMMAND_CLASS_VERSION
COMMAND_CLASS_MANUFACTURER_SPECIFIC
COMMAND_CLASS_ZWAVEPLUS_INFO
COMMAND_CLASS_METER_V3
COMMAND_CLASS_DEVICE_RESET_LOCALLY
COMMAND_CLASS_POWERLEVEL
COMMAND_CLASS_CONFIGURATION_V2
COMMAND_CLASS_ASSOCIATION
COMMAND_CLASS_ASSOCIATION_GRP_INFO
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V3

**INSTALLATION**

We recommend the installation conforms to your local regulations and is undertaken by a qualified electrical engineer. Positioning of the thermostat is of the utmost importance and must be away from sunlight and sources of direct heat. We recommend installation about 1.5 metres above the floor.

**Electrical power must be switched off during all aspects of installation.**

1. Remove the front cover and back plate of the thermostat from the main box.
2. Ensuring the power is off and using a small cross head screwdriver connect the wires to the thermostat terminals:
   IN – L: Power connection (Live)
   IN – N: Power connection (Neutral)
   HEATING – L: Heating Cable connection (Live)
   HEATING – N:  Heating Cable connection (Neutral)
3. If using the thermostat for floor heating, connect the floor sensor wires to terminals NTC.
   10 kΩ NTC sensor is included in the box but any NTC sensor can be used.
   If another sensor other than 10 kΩ NTC is used then ensure changing the sensor value in the thermostat settings ("NTC SENSOR" in instructions).
4. Making sure "TOP" is uppermost secure the back plate into the wall mounting box using the screws provided. Install the thermostat body by carefully aligning the top snap connectors and then  pushing on the front cover with gentle pressure ensuring it snaps firmly into position all the way round.
5. POWER CONNECTION
   Switch on the main power and the thermostat will start up showing the original default factory settings.
6. Remove protective film by pulling the tab in the bottom left hand side.
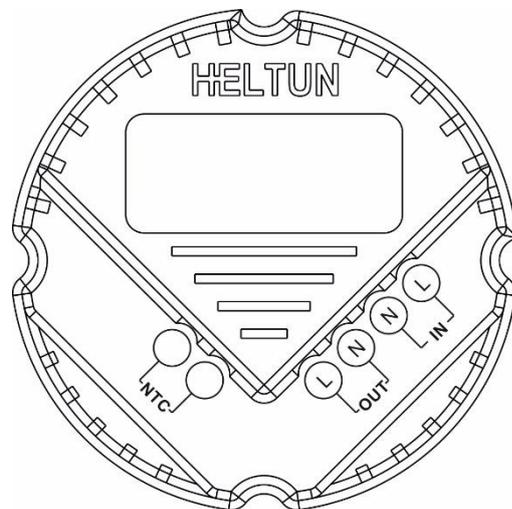
**DISASEMBLY**
1. ENSURE POWER IS SWITCHED OFF AND SCREEN IS BLANK.
2. To remove thermostat body grasp firmly and pull back from the top until tabs disconnect.
3. Remove screws from back plate and disconnect the wires.

**TOUCH PANEL OPERATION**

The touch panel has four touch buttons which require minimal pressure to operate.
- Plus
- Minus
- Mode
- Heating

"+" key will increase set point temperature by 0.5°C (or 1°F), and "-" key will decrease set point temperature by 0.5°C (or 1°F). The set point temperature is displayed in the bottom left corner of the display as "SET TEMP".
The minimum set point is 4°C (39°F) and the maximum set point is 37°C (99°F).

The thermostat has two working modes - HEATING and IDLE. In HEATING mode the operating state floor symbol will appear on the right bottom corner of the display, and the floor symbol will disappear in IDLE operating mode.

**OPERATION MODE**

Current mode is displayed in the middle of bottom line of display under "HEATING MODE" section.

The thermostat has 4 operating modes:

GEN – general (comfort) mode. Recommended normal comfort.

ECO – economy mode. Power efficient saving.

DRY – fast floor drying.

OFF – manual mode. The thermostat logic is disabled and mode display is blank.

Change the mode by touching the MODE key and reselecting as above.

Each mode has its own settings for maximum and minimum temperature.

The thermostat will operate automatically depending on the current set point. To change the set point values choose the desired mode and press "+" key to increase  or press "-" key to reduce the value. Alternatively control from your Z-wave gateway.

The three operating modes have individual temperature set points which operate automatically depending on the settings.

In the OFF mode the thermostat heating state can be switched manually by pressing the "HEATING" key.

Note: if the OFF mode is enabled nothing will be displayed in the HEATING MODE section and the SET POINT will indicate OFF.

GEN (comfortable) MODE

This mode is recommended for normal comfort.

Factory default set point is 25.0°C (77°F)

Minimum set point is 4.0°C (39°F)

Maximum set point is 37.0°C (99°F)

ECO (energy saving) MODE

You can use this mode if lower temperature and energy consumption is required. It can also be used at night or when absent from all or part of the property for a length of time.

Factory default set point is 18.0°C (64°F)

Minimum set point is 4.0°C (39°F)

Maximum set point is 37.0°C (99°F)

DRY MODE

This mode is recommended for use if a high floor temperature is required for a limited period of time for example after floor washing. By choosing DRY mode the thermostat will increase the temperature to the selected set point for a limited time specified in the "Dry Time" Parameter. The time range of 5-90 minutes can be selected. After the drying time the thermostat will automatically change back to GEN mode.

To change the Dry Time, go to "Settings Mode" by pressing the "MODE" key for 3 seconds. Use the keys "HEATING" or "MODE" to scroll the menu to Parameter 09, then use keys "+" and "-" to increase or reduce the time. The value of Dry Time is in minutes.

Factory default Dry time is 30 min.

Factory default set point is 30.0°C (86°F)

Minimum set point is 4.0°C (39°F)

Maximum set point is 37.0°C (99°F)

## SETTINGS MODE

To activate the settings mode, press and hold "MODE" key for 3 seconds. The display will show the settings menu. In the top left corner is shown "PAr" (parameter), in the middle is the parameter number, in the right top corner is the parameter value, and in the left bottom corner is the parameter display indication (the parameter name).

To scroll the menu navigation just press "HEATING" key to go up and "MODE" key to go down. To change the parameters value press the "+" or "-" keys.

To leave the Settings mode to go to the main display mode press and hold "MODE" key for 3 seconds.

The thermostat will automatically leave to the display mode if no action is detected for 10 seconds.
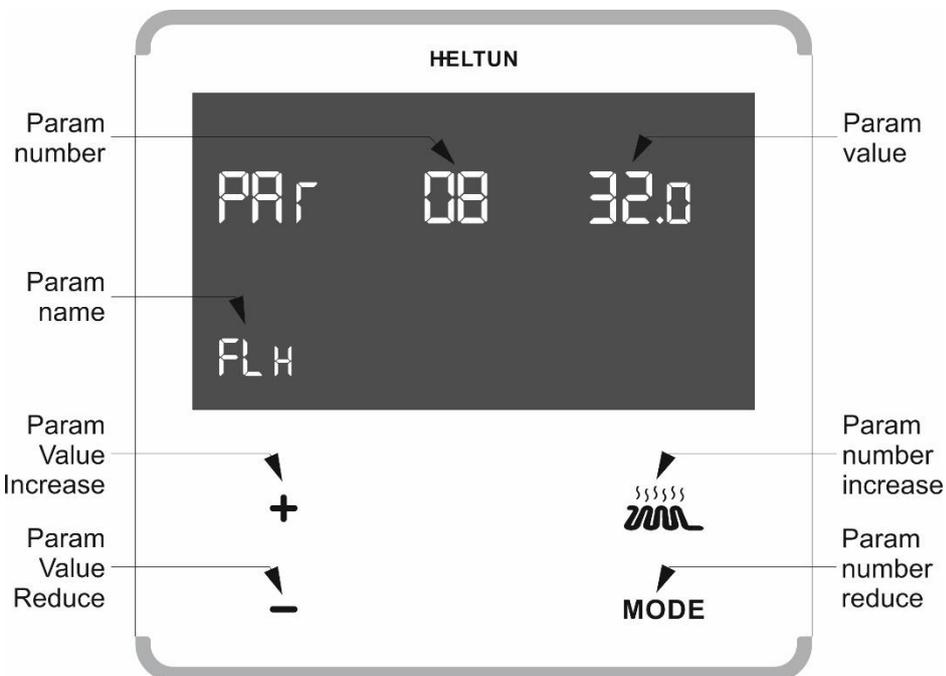
Parameters list:

| Parameter Number | Display Indication | Description | Default Value | Available Values |
|---|---|---|---|---|
| 01 | dEg | Degree Mode | C | C, F |
| 02 | SEn | Source Sensor | F | F, FA, A, AF, P, PF, PA |
| 03 | Pon | Power Regulation ON time, min | 15 | 10 – 90 |
| 04 | PoF | Power Regulation OFF time, min | 15 | 10 – 90 |
| 05 | AIL | Air Temperature Minimum, °C / °F | 21 / 70 | 4 – 36 in Celsius mode<br>39 - 99 in Fahrenheit mode |
| 06 | AIH | Air Temperature Maximum, °C / °F | 27 / 81 | 5 – 37 in Celsius mode<br>39 – 99 in Fahrenheit mode |
| 07 | FLL | Floor Temperature Minimum, °C / °F | 18 / 64 | 4 – 36 in Celsius mode<br>39 – 99 in Fahrenheit mode |
| 08 | FLH | Floor Temperature Maximum, °C / °F | 32 / 90 | 5 – 37 in Celsius mode<br>39 – 99 in Fahrenheit mode |
| 09 | dry | Dry Time, min | 30 | 5 – 90 |
| 10 | FSr | Floor Sensor Resistance, kΩ | 10 | 9 – 100 |
| 11 | FCA | Floor Temperature Calibration, °C / °F | 0 | -9.5 – 9.5 in Celsius mode<br>-19 – 19 in Fahrenheit mode |
| 12 | ACA | Air Temperature Calibration, °C / °F | 0 | -9.5 – 9.5 in Celsius mode<br>-19 – 19 in Fahrenheit mode |
| 13 | HYS | Temperature Hysteresis, °C / °F | 0.5 | 0.5 – 9.5 in Celsius mode<br>1 – 19 in Fahrenheit mode |
| 14 | brH | Active display brightness level | 3 | 1 – 4 |
| 15 | brL | Inactive display brightness level | 2 | 1 – 4, but <= Param 14 |
| 16 | Inc | Inclusion Mode | Ecl | Inc, Ecl |
| 17 | Prr | Power Meter Reset | 0 | |

<u>Parameter 01 (dEg) – Degree mode</u>
You can choose Celsius (°C) or Fahrenheit (°F). Floor and air temperature, as well as set point and all parameters will be indicated in the chosen mode.
Default - Celsius (°C).

<u>Parameter 02 (Sen) – Source sensor</u>
The thermostat has seven regulation modes based on different sensors values. Use keys "+" and "-" to choose follow modes:
1) F – Floor sensor
2) FA – Floor sensor + Air sensor
3) A – Air sensor
4) AF – Air sensor + Floor sensor
5) P – Power regulator
6) PF – Power regulator + Floor sensor
7) PA – Power regulator + Air sensor

Thermostat parameters.
1) F – Floor sensor: Parameter is based on the SET POINT reading of the external floor temperature sensor.
2) FA – Floor sensor plus air sensor parameters: Regulation is based on SET POINT applied to the external floor sensor but also controlled by the internal air temperature sensor ensuring that the room temperature remains within the set limits. The lower air temperature limit is specified in Param 05 - AIL and the high temperature limit in Param 06 – AIH.
3) A – Air sensor: Parameter is based on the SET POINT applied to the internal sensor.
4) AF – Air sensor plus floor sensor parameters: Regulation is based on SET POINT applied to the internal room temperature sensor but also controlled by the floor temperature sensor ensuring that the floor temperature remains within the set limits. The lower floor temperature limit is specified in Param 07 - FLL and the high temperature limit in Param 08 – FLH.
5) Power regulator: Parameter is time settings for heating which will be ON during the time in Param 03 – Pon and then OFF during the time in Param 04 - Pof.
6) PF – Power regulator + Floor sensor parameters: Parameter is heating time set by Params 03 and 04, but also controlled by the floor temperature sensor. The lower floor temperature limit is specified in Param 07 - FLL and the high temperature limit in Param 08 – FLH
7) PA – Power regulator + Air sensor parameters: : Parameter is heating time set by Params 03 and 04, but also controlled by the air temperature sensor. The lower air temperature limit is specified in Param 05 - AIL and the high temperature limit in Param 06 – AIH.

For example:
In FA mode the SET POINT is set to 30°C, AIL is set to 24°C and AIH is set to 27°C:
a) If floor temperature is lower than 30°C and the room temperature is lower than 27°C the thermostat will operate in heating mode.
b) If the floor temperature is higher than 30°C or the room temperature is higher than 27°C then the thermostat will go to IDLE mode which switches off the heater.
c) If the room temperature is lower than 24°C the thermostat will operate in heating mode even though the floor temperature is higher than 30°C.

Attention: Be careful when setting the lower limitation (Param 05 - AIL and Param 07 – FLL) to be sure that the value is not too high and it can be reached. Otherwise the thermostat will always operate in the heating mode.

Note: For safety reasons the thermostat will go to the IDLE mode if the floor temperature reaches 40°C despite the parameter settings.
Note: If there is no floor sensor installed or it becomes damaged (indicated by "- - " in the "FLOOR TEMP") the regulation mode (A) will be automatically selected as the source sensor. This can only be changed to (P) or (PA). Regulation modes (F), (FA), (AF) and (PF) will not be able to be selected.

## Parameter 03 (Pon) – Power regulator ON time

This parameter defines floor heating time in minutes when Power Regulator (P, PA or PF) is selected as the source sensor.

Factory default value is 15 minutes.

## Parameter 04 (Pof) – Power regulator OFF time

Floor idle time in minutes when Power Regulator (P, PA or PF) is selected as the source sensor.

Factory default value is 15 minutes.

## Parameter 05 (AIL) – Air Temperature Minimum

Room temperature low limit. Reading of internal temperature sensor. It has effect only if FA or PA is selected as the source sensor.

Factory default value is 21°C or 70°F.

*Note: AIL value cannot be higher than AIH value - 1°C

## Parameter 06 (AIH) – Air Temperature Maximum

Room temperature high limit. Reading of the internal temperature sensor. It has effect only if FA or PA is selected as the source sensor.

Factory default value is 27°C or 81°F.

*Note: AIH value cannot be lower than AIL value + 1°C

## Parameter 07 (FLL) – Floor Temperature Minimum

Floor temperature low limit. Reading of external floor temperature sensor. It has effect only if AF or PF are selected as the source sensor.

Factory default value is 18°C or 64°F.

*Note: FLL value cannot be higher than FLH value - 1°C

## Parameter 08 (FLH) – Floor Temperature Maximum

Floor temperature high limit. Reading of the external floor temperature sensor. It has effect only if AF or PF are selected as the source sensor.

Factory default value is 32°C or 90°F.

*Note: FLH value cannot be lower than FLL value + 1°C

## Parameter 09 (dry) – Dry Time

This parameter specifies how long in minutes the thermostat will be in heating mode when the DRY mode is selected. After this time the thermostat will go to the GEN mode. The time range is 5-90 minutes.

Factory default time is 30 minutes.

## Parameter 10 (FSr) – Floor sensor resistance

If the external floor NTC temperature sensor is used it is necessary to select the correct ohm value (resistance) of the sensor.  9 – 100 kΩ is available to select.

In the box is included one floor NTC 10kΩ temperature sensor with three metre connection wire.

The factory default value is 10kΩ.

Note: If the floor sensor is disconnected or damaged "- -" will indicate on the display FLOOR TEMP field and regulation modes F, FA, AF, PF will be not able to be selected.

## Parameter 11 (FCA) – Floor Temperature Calibration

This parameter defines the offset value for floor temperature. Should the external floor temperature sensor not be correctly calibrated then temperature changes are able to be adjusted by up to +/- 9.5°C or +/- 19°F. This value will be added or subtracted from the floor temperature sensor reading.

Default value is 0.

Room Temperature Calibration (ACA) – Parameter 12

This parameter defines the offset value for room air temperature. If the internal air temperature sensor is not correctly calibrated changes of temperature can be made by adjusting the values by up to +/- 9.5°C or +/- 19°F. This value will be added or subtracted from the internal air temperature sensor reading.
Default value is 0.

HYSTERESIS (HYS) – Parameter 13

This parameter defines the hysteresis value for temperature control. The thermostat will stabilize the temperature with selected hysteresis. For example, if the SET POINT is set for 25°C and HYSTERESIS is set for 0.5°C then the thermostat will change the state to HEATING if the temperature will be lower than 24.5°C and it will change the state to idle if temperature reaches 25.5°C.
You can change the hysteresis from 0.5°C up to a maximum of 9.5°C in Celsius mode and from 1°F to 19°F in Fahrenheit mode.
Default values are 0.5°C or 1°F.

DISPLAY BRIGHTNESS

The thermostat has two states of brightness.
Active state – when you press any key and commence adjustments.
Inactive state – after five seconds of inactivity it will revert to inactive state.
The display brightness in either state can be adjusted.

Parameter 14 (brH) – Display brightness high level

You can select the brightness level in the active state from values 1 to 4.
Default value is 3.

Parameter 15 (brL) – Display brightness low level

This parameter defines the brightness level of the display in the inactive state. You can select the level from values 1 to 4 but the level cannot be higher than the level of brightness for the active state.
Default value is 2.

Parameter 16 (nEt) – INCLUSION / EXCLUSION MODE

If the thermostat is included in the z-wave network the antenna will indicated in the main display and Inc will be indicated in the Param 16 value. If the thermostat is not included in the network, no antenna will be indicated in the main display and the Param 16 value will be ECL.
To include or exclude the thermostat into/from your home automation gateway, activate inclusion or exclusion mode on your gateway then press "+" key on the thermostat for inclusion and the "-" key for exclusion.
For more details go to point "Z-Wave Functions" – "Network "of this manual on page 9.

Parameter 17 (Prr) – Power Meter Reset

The Heltun thermostat monitors the load and power consumption. The data of total consumption in kWh is indicated in the Param 17 value. If the device is included in the Z-Wave network it will also send the data of the current load and total consumption to the main controller.
The thermostat, even when the electricity is disconnected, maintains the electric consumption record in its memory. To reset the consumption memory press and hold "+" key until the parameter value will be changed to 0 (about 3 seconds).

CHILD LOCK – LOC

To activate the child lock mode, press and hold the "HEATING" key for 5 seconds. The LOC text will appear in the bottom left hand corner. To deactivate the child lock press the FLOOR key for 5 seconds and the "UnL" will appear in the display.

<u>FACTORY RESET – RES</u>
By pressing and holding the "MODE" key for 6 seconds, the thermostat will enter the Factory Reset mode and "Res" will appear in left bottom corner, "y" in left top corner and "n" in top right corner.  Press "+" key if you want to revert to factory reset or the "HEATING" key to cancel.  The factory reset will change all the parameters to the original factory defaults and will also exclude from the Z-Wave network.

Note: After 3 seconds it will enter the setting mode BUT if the "HEATING" key is not released in a further 3 seconds it will revert to factory reset mode.


## Z-WAVE NETWORK

### Inclusion
To include the thermostat in the Z-Wave network
1. Go to the "SETTINGS" mode by pressing and holding the "MODE" key for 3 seconds
2. Go to "Par 16 – NET" of the menu by using the "HEATING" key for scrolling up and the  "MODE" key for scrolling down.
3. In the value position you will see the current state of the network. It should be ECL. If Inc is indicated, an exclusion must be first performed.
4. To start the  inclusion mode from the gateway
5. Press "PLUS" key to start inclusion process
6. Lines will be moving in value position.
7. The  "Inc" should appear  in the value position if the inclusion has been successful.
8. Should "Err" appear in the value position then the inclusion was not completed.

Note: In case the device has been part of a system before and not excluded since, inclusion is not possible. In this case, exclusion must be performed before inclusion.


### Exclusion
To exclude the thermostat from the Z-Wave network
1. Go to "SETTINGS" mode by pressing and holding the  "MODE" key for 3 seconds
2. Go to "Par 16 – NET" of the menu using the keys "HEATING" for scrolling up and "MODE" for scrolling down.
3. In the value position the current state of network state will be displayed. It should be Inc. If ECL is indicated then the device is already excluded.
4. To commence the exclusion from the gateway.
5. Press the "MINUS" key to start the exclusion process
6. Lines will be moving in the value position.
7. The "Ecl" should appear with successful deletion.
8. If the "Err" should appear then start again.

If the thermostat  is included in the network then in the bottom right corner of the main screen the antenna icon will be displayed with connection lines . If not on the network then it will be displayed without lines.


### Association
Association enables the thermostat to control other Z-Wave products from the network including relays etc.
Up to ten other products from different manufacturers can be within the association grouping.


### Parameters configuration using gateway
All configuration parameters are accessed through COMMAND_CLASS_CONFIGURATION

1 – Degree Mode

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 0 | 0x00 | °C – Celsius | **Read:** Command = CONFIGURATION_GET |
| | 1 | 0x01 | °F – Fahrenheit | Parameter Number = 1 (0x01) |
| | | | | Report is returned. |
| | | | | **Write:** Command = CONFIGURATION_SET |
| | | | | Parameter Number = 1 (0x01) |
| **Default settings** | 0 | 0x00 | °C | **Parameter size:** 1 byte |

2 – Source Sensor

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 0 | 0x00 | F – Floor sensor | **Read:** Command = CONFIGURATION_GET |
| | 1 | 0x01 | FA – Floor+Air sensors | Parameter Number = 2 (0x02) |
| | 2 | 0x02 | A – Air sensor | Report is returned. |
| | 3 | 0x03 | AF – Air+Floor sensors | **Write:** Command = CONFIGURATION_SET |
| | 4 | 0x04 | P – Time regulation | Parameter Number = 2 (0x02) |
| | 5 | 0x05 | PF – Time+Floor sensor | |
| | 6 | 0x06 | PA – Time+Air sensor | |
| **Default settings** | 0 | 0x00 | F | **Parameter size:** 1 byte |

3 – Power Regulation ON time

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 10 | 0x0A | Minutes | **Read:** Command = CONFIGURATION_GET |
| | - | - | | Parameter Number = 3 (0x03) |
| | 90 | 0x5A | | Report is returned. |
| | | | | **Write:** Command = CONFIGURATION_SET |
| | | | | Parameter Number = 3 (0x03) |
| **Default settings** | 15 | 0x0F | 15 min | **Parameter size:** 1 byte |

4 – Power Regulation OFF time

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 10 | 0x0A | Minutes | **Read:** Command = CONFIGURATION_GET |
| | - | - | | Parameter Number = 4 (0x04) |
| | 90 | 0x5A | | Report is returned. |
| | | | | **Write:** Command = CONFIGURATION_SET |
| | | | | Parameter Number = 4 (0x04) |
| **Default settings** | 15 | 0x0F | 15 min | **Parameter size:** 1 byte |

5 – Air Temperature Minimum

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 40 | 0x28 | (Value/10), Temperature in Celsius | **Read:** Command = CONFIGURATION_GET |
| | - | - | | Parameter Number = 5 (0x05) |
| | 360 | 0x0168 | | Report is returned. |
| | | | | **Write:** Command = CONFIGURATION_SET |
| | | | | Parameter Number = 5 (0x05) |
| **Default settings** | 210 | 0xD2 | 21.0°C | **Parameter size:** 2 byte |

## 6 – Air Temperature Maximum

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 50 - 370 | 0x32 - 0x0172 | (Value/10), Temperature in Celsius | **Read:** Command = CONFIGURATION_GET Parameter Number = 6 (0x06) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 6 (0x06) |
| **Default settings** | 270 | 0x010E | 27.0°C | **Parameter size:** 2 byte |

## 7 – Floor Temperature Minimum

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 40 - 360 | 0x28 - 0x0168 | (Value/10), Temperature in Celsius | **Read:** Command = CONFIGURATION_GET Parameter Number = 7 (0x07) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 7 (0x07) |
| **Default settings** | 180 | 0xB4 | 18.0°C | **Parameter size:** 2 byte |

## 8 – Floor Temperature Maximum

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 50 - 370 | 0x32 - 0x0172 | (Value/10), Temperature in Celsius | **Read:** Command = CONFIGURATION_GET Parameter Number = 8 (0x08) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 8 (0x08) |
| **Default settings** | 320 | 0x0140 | 32.0°C | **Parameter size:** 2 byte |

## 9 – Dry Time

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 5 - 90 | 0x05 - 0x5A | Time in minutes | **Read:** Command = CONFIGURATION_GET Parameter Number = 9 (0x09) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 9 (0x09) |
| **Default settings** | 30 | 0x1E | 30 min | **Parameter size:** 1 byte |

## 10 – Floor Sensor Resistance

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 10000 - 100000 | 0x03E8 - 0x0186A0 | Resistance in Ohm (Ω) | **Read:** Command = CONFIGURATION_GET Parameter Number = 10 (0x0A) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 10 (0x0A) |
| **Default settings** | 10000 | 0x2710 | 10kΩ | **Parameter size:** 4 byte |

## 11 – Floor Temperature Calibration

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | **Dec** | **Hex** | | |
| **Available settings** | -95 - 95 | 0xFFA1 - 0x5F | (Value/10) in Celsius -9.5°C to +9.5°C | **Read:** Command = CONFIGURATION_GET Parameter Number = 11 (0x0B) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 11 (0x0B) |
| **Default settings** | 0 | 0x00 | 0°C | **Parameter size:** 2 byte |

## 12 – Air Temperature Calibration

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | **Dec** | **Hex** | | |
| **Available settings** | -95 - 95 | 0xFFA1 - 0x5F | (Value/10) in Celsius -9.5°C to +9.5°C | **Read:** Command = CONFIGURATION_GET Parameter Number = 12 (0x0C) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 12 (0x0C) |
| **Default settings** | 0 | 0x00 | 0°C | **Parameter size:** 2 byte |

## 13 – Temperature Hysteresis

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | **Dec** | **Hex** | | |
| **Available settings** | 5 - 95 | 0x5 - 0x5F | (Value/10) in Celsius 0.5°C to 9.5°C | **Read:** Command = CONFIGURATION_GET Parameter Number = 13 (0x0D) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 13 (0x0D) |
| **Default settings** | 5 | 0x05 | 0.5°C | **Parameter size:** 1 byte |

## 14 – Active display brightness level

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | **Dec** | **Hex** | | |
| **Available settings** | 1 2 3 4 | 0x01 0x02 0x03 0x04 | 1 – Lowest level 4 – Highest level | **Read:** Command = CONFIGURATION_GET Parameter Number = 14 (0x0E) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 14 (0x0E) |
| **Default settings** | 3 | 0x03 | Level 3 | **Parameter size:** 1 byte |

## 15 – Inactive display brightness level

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | **Dec** | **Hex** | | |
| **Available settings** | 1 2 3 | 0x01 0x02 0x03 | 1 – Lowest level 3 – Highest level | **Read:** Command = CONFIGURATION_GET Parameter Number = 15 (0x0F) Report is returned. **Write:** Command = CONFIGURATION_SET Parameter Number = 15 (0x0F) |
| **Default settings** | 2 | 0x02 | Level 2 | **Parameter size:** 1 byte |

**FUNCTIONAL PARAMETERS**

**1 – Setpoint Temperature in GEN mode**

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 40 - 370 | 0x28 - 0x0172 | Temperature setpoint used in GEN mode. (Value/10) in Celsius. 4.0°C to 37.0°C | **Read:** Command Class = COMMAND_CLASS_THERMOSTAT_SETPOINT Command = THERMOSTAT_SETPOINT_GET Type=Heating(0x01) Report is returned. **Write:** Command Class = COMMAND_CLASS_THERMOSTAT_SETPOINT Command = THERMOSTAT_SETPOINT_SET Type=Heating(0x01) |
| **Default settings** | 250 | 0xFA | 25.0°C | |

**2 – Setpoint Temperature in DRY mode**

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 40 - 370 | 0x28 - 0x0172 | Temperature setpoint used in DRY mode. (Value/10) in Celsius. 4.0°C to 37.0°C | **Read:** Command Class = COMMAND_CLASS_THERMOSTAT_SETPOINT Command = THERMOSTAT_SETPOINT_GET Type=Dry air(0x08) Report is returned. **Write:** Command Class = COMMAND_CLASS_THERMOSTAT_SETPOINT Command = THERMOSTAT_SETPOINT_SET Type=Dry air(0x08) |
| **Default settings** | 300 | 0x012C | 30.0°C | |

**3 – Setpoint Temperature in ECO mode**

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | Dec | Hex | | |
| **Available settings** | 40 - 370 | 0x28 - 0x0172 | Temperature setpoint used in ECO mode. (Value/10) in Celsius. 4.0°C to 37.0°C | **Read:** Command Class = COMMAND_CLASS_THERMOSTAT_SETPOINT Command = THERMOSTAT_SETPOINT_GET Type=Energy save heating(0x0B) Report is returned. **Write:** Command Class = COMMAND_CLASS_THERMOSTAT_SETPOINT Command = THERMOSTAT_SETPOINT_SET Type=Energy save heating(0x0B) |
| **Default settings** | 180 | 0xB4 | 18.0°C | |

4 – Thermostat operation mode

| | Value | | Description | How to Read and Write |
|---|---|---|---|---|
| | **Dec** | **Hex** | | |
| **Available settings** | 0 | 0x00 | OFF | **Read:** |
| | 1 | 0x01 | GEN | Command Class = COMMAND_CLASS_THERMOSTAT_MODE |
| | 8 | 0x08 | DRY | Command = THERMOSTAT_MODE_GET |
| | 11 | 0x0B | ECO | Report is returned. |
| | | | | **Write:** |
| | | | | Command Class = COMMAND_CLASS_THERMOSTAT_MODE |
| | | | | Command = THERMOSTAT_MODE_SET |
| | | | | Supported modes: Off (0x00), heating (0x01), dry air (0x08), energy save heating (0x0B). |
| **Default settings** | 1 | 0x01 | GEN | |