



EVERSPRING™



## EVR\_ST814 Z-Wave Temperature and Humidity Sensor

Firmware Version : 1.8

### Quick Start

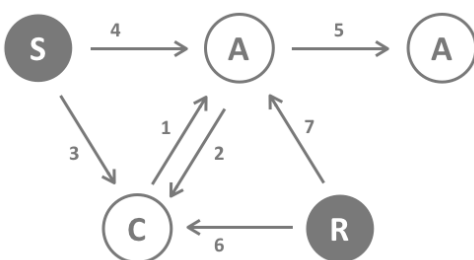
**S**This device is a Z-Wave Sensor. Inclusion, Exclusion and wakeup are confirmed by three times quickly hitting the Linking button (second from left) on the front of the device.

Please refer to the chapters below for detailed information about all aspects of the products usage.

### What is Z-Wave?

This device is equipped with wireless communication complying to the Z-Wave standard. Z-Wave is the **international standard for wireless communication** in smart homes and buildings. It is using the **frequency of 868.42 MHz** to realize a very stable and secure communication. Each message is reconfirmed (**two-way communication**) and every mains powered node can act as a repeater for other nodes (**meshed network**) in case the receiver is not in direct wireless range of the transmitter.

Z-Wave differentiates between Controllers and Slaves. Slaves are either sensors (**S**) transmitting metered or measured data or actuators (**A**) capable to execute an action. Controllers are either static mains powered controllers (**C**) also referred to as gateways or mobile battery operated remote controls (**R**). This results in a number of possible communication patterns within a Z-Wave network that are partly or completely supported by a specific device.



1. Controllers control actuators
2. Actuators report change of status back to controller
3. Sensors report change of status of measured values to controller
4. Sensors directly control actuators
5. Actuators control other actuators
6. Remote controls send signals to static controllers to trigger scenes or other actions
7. Remote controls control other actuators.

There are two different role a controller can have. There is always one single primary controller that is managing the network and including/excluding devices. The controller may have other functions - like control buttons - as well. All other controllers don't manage the network itself but can control other devices. They are called secondary controllers. The image also shows that its not possible to operate a sensor just from a remote control. Sensors only communicate with static controllers.

## Product description

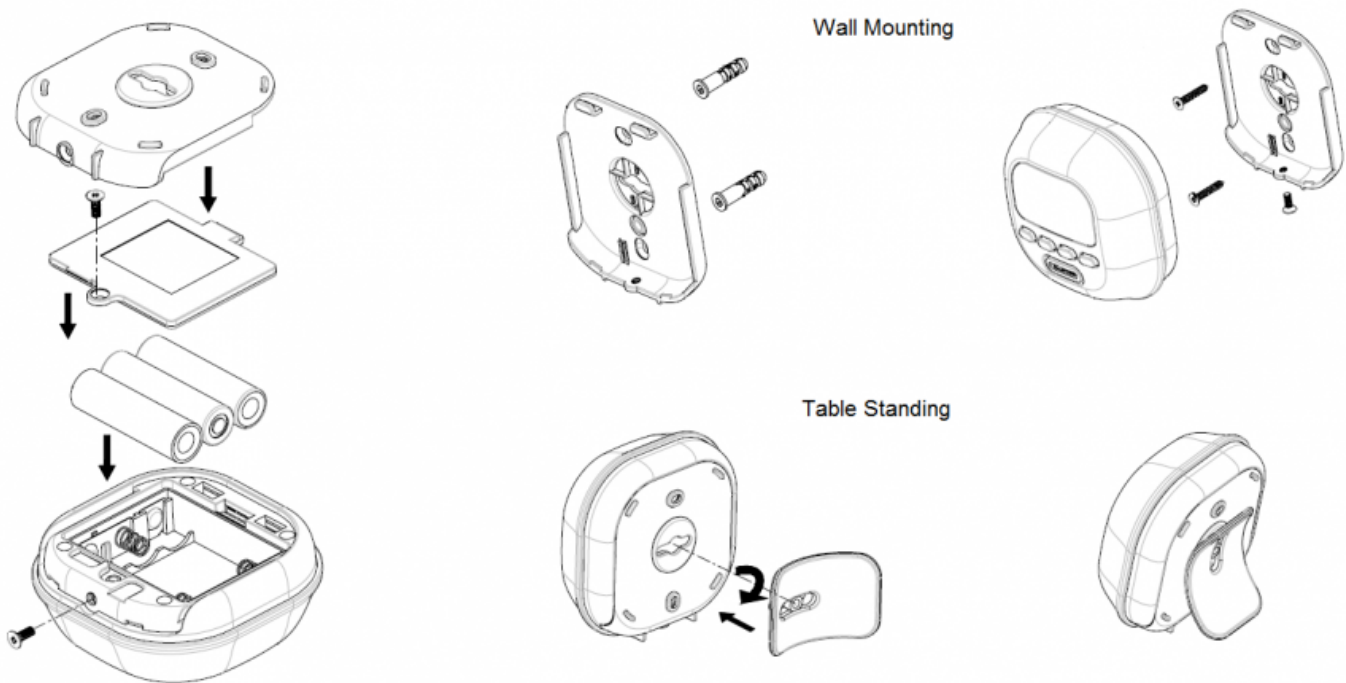
The ST812 is a combined temperature/humidity sensor which is designed for both - desktop use or wall mountable. The device has a local LCD display which either shows the temperature or the humidity. Four buttons allow to switch between minimum, maximum or actual values, humidity versus temperature and Fahrenheit versus Celsius. The device can report its values via Z-Wave and allows to set trigger level for direct control of other Z-Wave devices, when the measured value hits the trigger point. This makes the ST812 a very powerful and flexible tool to measure environmental values and control device within a Z-Wave network.

## Batteries

The unit is operated by batteries. Use only batteries of correct type. Never mix old and new batteries in the same device. Used batteries contain hazardous substances and should not be disposed of with household waste!

Battery Type: 3 \* AA

## Installation Guidelines



The Temp./Humid. Detector can either be mounted on a wall or can be freestanding on a table. Please consider a most suitable way before mounting/ placing it.

1. Release the Sensor from the mounting plate and the battery cover by removing the fixing screws.
2. Put the 3 \* AA 1.5V batteries in the battery compartment.
3. For wall mounting use mount plate and the screws.
4. Refit the device to the back cover and secure with the fixing screw.
5. For table placing insert the stand into the hole on mounting bracket and turn 90 degrees lockwise.
6. Once snapped in place, the detector can be placed on a shelf, table or other surface where the temperature and humidity measurements are desired.

## Behavior within the Z-Wave network

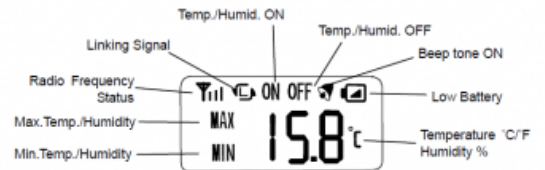
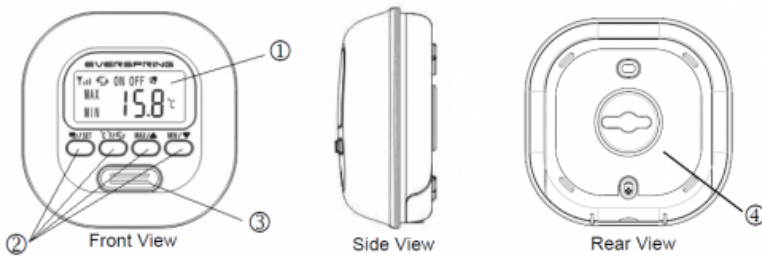
On factory default the device does not belong to any Z-Wave network. The device needs to join an existing wireless network to

communicate with the devices of this network. This process is called **Inclusion**. Devices can also leave a network. This process is called **Exclusion**. Both processes are initiated by the primary controller of the Z-Wave network. This controller will be turned into exclusion respective inclusion mode. Please refer to your primary controllers manual on how to turn your controller into inclusion or exclusion mode. Only if the primary controller is in inclusion or exclusion mode, this device can join or leave the network. Leaving the network - i.e. being excluded - sets the device back to factory default.

If the device already belongs to a network, follow the exclusion process before including it in your network. Otherwise inclusion of this device will fail. If the controller being included was a primary controller, it has to be reset first.

Make sure that your Z-Wave Controller is in the Inclusion-/Exclusion-Mode. Quickly click three times on the Linking button on the front of the device to confirm the process.

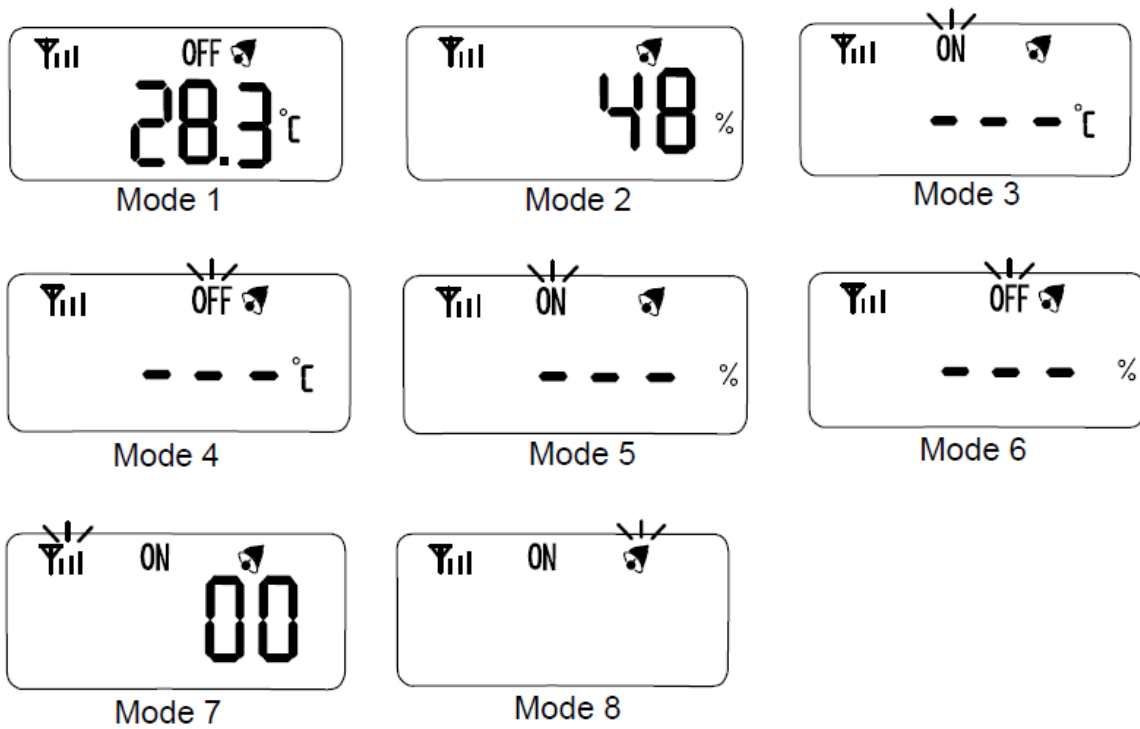
## Operating the device



**Display Overview**

①	LCD Screen
②	Function Keys
	Select modes/Change setting
	Select temperature unit/Linking
<b>MAX/▲</b>	Increase settings, displays max. temperature/humidity or enable RF & beep tone
<b>MIN/▼</b>	Decrease settings, displays min. temperature/humidity or disable RF & beep tone
③	Temperature/Humidity Sensor
④	Mounting Bracket

There are 8 modes available for selection. Press the Select Mode button to select desired mode for different settings.



Mode	Function
1	Current temperature display (°C/°F)
2	Current humidity display (%)
3	Setting for temperature trigger-ON value
4	Setting for temperature trigger-OFF value
5	Setting for humidity trigger-ON value
6	Setting for humidity trigger-OFF value
7	Setting for turning on/off Radio Frequency
8	Setting for turning on/off beep tone

MODE 1 and MODE 2 are showing as main displays on the screen. Once mode setting is finished (MODE 3 to MODE 8), the screen will return to main display automatically after 12 seconds, or by pressing the Linking button to return to main display.

## 1. Temperature

### 1.1 Display current Temperature

Press Select Mode button and select MODE 1 to display current temperature, and toggle Select Temperature Unit button to select the unit of temperature (°C /°F).

The temperature ranges from -20°C to 50°C . To show the last record of max/min temperature, press Max. or Min. button. To clear the record, press both Max. and Min. button at the same time.

#### Threshold Limit Warning:

If the temperature is reaching the limit, the icon of MAX or MIN will be displayed on the screen.

#### Ice Warning:

If the temperature falls to 0°C , temperature display will illuminate with LCD back light and beep tone will sound continuously for 1 second. Press any key to stop the beep tone.

### 1.2 Temperature Trigger-ON

Press Select Mode button and select MODE 3 to enter setting of temperature trigger-ON. Icon flashes and the screen shows the recorded trigger-ON temperature. If no value is preset, the screen will display " - - °C ".

To adjust trigger-ON value, press and hold Select Mode button for 5 seconds until a long beep is sounded. The " - - " starts flashing. Use Min. and Max. button to adjust the degree of temperature, and hold Min. or Max. button to scan through the temperature reading from -20°C to 50°C. Once the value is selected, press Select Mode button to confirm setting or press Linking button to cancel.

To clear the trigger-ON record, press both Min. and Max. button at the same time. The record is cleared after a long beep is sounded.

If the temperature reaches the preset trigger-ON value, Temp./Humid. Detector will send a Z-Wave signal. The screen of detector returns to MODE 1 and the icon "ON" is flashing with backlight illuminate and signal tone sounds for 1 second. Press any key to stop the signal tone.

### **1.3 Temperature Trigger-OFF**

Press Select Mode button and select MODE 4 to enter setting of temperature trigger-OFF. The "OFF" icon flashes and the screen shows the recorded trigger-OFF temperature. If no value is preset, the screen will display " - - °C ".

To adjust trigger-OFF value, press and hold Select Mode button for 5 seconds until a long beep is sounded. The " - - " starts flashing. Use Min. and Max. button to adjust the degree of temperature, and hold Min. or Max. button to scan through the temperature reading from -20°C to 50°C. Once the value is selected, press Select Mode button to confirm setting or press Linking button to cancel.

To clear the trigger-OFF record, press both Min. and Max. button at the same time. The record is cleared after a long beep is sounded.

If the temperature reaches the preset trigger-OFF value, Temp./Humid. Detector will send a Z-Wave signal. The screen of detector returns to MODE 1 and the icon is flashing with backlight illumination and signal tone sounds for 1 second. Press any key to stop the signal tone.

#### **Note:**

The temperature trigger-ON and trigger-OFF cannot be set equal; there MUST be at least 2°C difference in between. For example, if now the trigger-OFF temperature is already set to be 20°C, so trigger-ON temperature can only be lower 18°C or higher 22°C (values between 18°C and 22°C cannot be set).

Once the detector has been triggered, the temperature must increase or cool down at least 2°C from the preset value before it can be triggered again. For example, if the detector is triggered on at 20°C, then the temperature must be higher 22°C or lower 18°C before it can be re-triggered.

## **2. Humidity**

### **2.1 Display of Current Humidity**

Press Select Mode button and select MODE 2 to display current humidity.

The humidity ranges from 20% RH to 90% RH. To show the last record of max/min humidity, press Min. or Max. button. To clear the record, press both Min. and Max. button at the same time.

#### **Threshold Limit Warning:**

If the humidity is reaching the limit, the icon of MAX or MIN will be displayed on the screen.

### **2.2 Humidity Trigger-ON**

Press Select Mode button and select MODE 5 to enter setting of humidity trigger-ON. The "ON" icon flashes and the screen shows the recorded trigger-ON humidity. If no value is preset, the screen will display " - - % ".

To adjust trigger-ON value, press Select Mode button and hold for 5 seconds until a long beep is sounded. The " - - " starts flashing. Use Min. and Max. button to adjust the percentage of humidity, and hold Min. or Max. button to scan through the humidity reading

from 20%RH to 90%RH. Once the value is selected, press Select Mode button to confirm setting or press Linking button to cancel.

To clear the trigger-ON record, press both Min. and Max. button at the same time. The record is cleared after a long beep is sounded.

If the humidity reaches the preset trigger-ON value, Temp./Humid. Detector will send a Z-Wave signal. The screen of detector returns to MODE 2 and the "ON" icon is flashing with backlight illuminate and signal tone sounds for 1 second. Press any key to stop the signal tone.

### 2.3 Humidity Trigger-OFF

Press Select Mode button and select MODE 6 to enter setting of humidity trigger-OFF. The "OFF" icon flashes and the screen shows the recorded trigger-OFF humidity. If no value is preset, the screen will read "- - %".

To adjust trigger-OFF value, press and hold Select Mode button for 5 seconds until a long beep is sounded. The "- -" starts flashing. Use Min. or Max. button to scan through the humidity reading from 20%RH to 90%RH. Once the value is selected, press Select Mode button to confirm setting or press Linking button to cancel.

To clear the trigger-OFF record, press both Min. and Max. button at the same time. The record is cleared after a long beep is sounded.

If the humidity reaches the preset trigger-OFF value, Temp./Humid. Detector will send a Z-Wave signal. The screen of detector returns to MODE 2 and the "OFF" icon is flashing with backlight illuminates and signal tone sounds for 1 second. Press any key to stop the signal tone.

#### Note:

The humidity of trigger-ON and trigger-OFF cannot be set equal; there MUST be at least 5% difference in between. For example, if now the trigger-ON humidity is already set to be 50%, so trigger-OFF humidity can only be lower 45% or higher 55%. (Values between 45% and 55% cannot be set.)

Once the detector has been triggered, the humidity must raise up or drop down at least 5% from the preset value before it can be triggered again. For example, if the detector has been triggered on at 50%, then the temperature must be higher 55% or lower 45% before it can be re-triggered.

## 3. Z-Wave Function

This function is designed to enable or disable the sending Z-Wave commands to the associated nodes, as Temp./Humid. Detector triggered on/off.

Press Select Mode button and select MODE 7, the icon for Radio Frequency Status should flash. Press Max. button to turn On (enable) the function or Min. to turn OFF (disable) the function.

### 3.1 Programming Z-Wave

#### Z-Wave's Groups (Association Command Class Version 2)

The Temp./Humid. Detector can be set to send reports to or control associated Z-Wave devices. It supports two association groups with one node support for Grouping 1 and three nodes support for Grouping 2.

Grouping 1 includes POWER\_APPLIED, SENSOR\_MULTILEVEL\_REPORT, ALARM\_REPORT and BATTERY\_REPORT\_COMMAND.  
Grouping 2 includes BASIC\_SET.

#### Grouping 1

##### POWER\_APPLIED command

Whenever power is applied, it will send ALARM\_REPORT command to the nodes of Grouping 1 to inform the devices that the detector is powered up.

##### MULTILEVEL\_SENSOR\_REPORT

The detector will emit SENSOR\_MULTILEVEL\_REPORT to inform the nodes of Grouping 1 automatically its current temperature and

humidity. Refer to the section of Z-Wave's Configuration for settings of auto report configuration.

### Low Battery Report

When the battery level of the detector drops to an unacceptable level, the Low Battery icon will appear on the LCD and the detector will emit ALARM\_REPORT command to the nodes of Grouping 1.

### Grouping 2 (Max. Node = 3)

When the detector is triggered, it will emit BASIC\_SET\_COMMAND to the nodes of Grouping 2.

Please refer to the table below for the setting of basic set command.

#### Note:

If the Z-Wave mode is OFF, no command will be sent even the Temp./Humid. Detector has been triggered. If Z-Wave mode is ON and the detector has been triggered, the device will send commands to nodes of Grouping 2.

If the Z-Wave mode reading is 00, it implies no node ID has been allocated by Z-Wave Controller. Please execute inclusion mode as described in the manual.

## 4. Beep Tone

To set the beep tone, press Select Mode button and select MODE 8. The Beep Tone icon flashes. Press Max. for ON and Min. for OFF. If it is ON, a beep tone will be sounded whenever a button is pressed; 4 continuous beep tones will be sounded for 1 second if the detector has been triggered.

## Wakeup Intervals - how to communicate with the device?

**W** This device is battery operated and turned into deep sleep state most of the time to save battery life time. Communication with the device is limited. In order to communicate with the device, a static controller **C** is needed in the network. This controller will maintain a mailbox for the battery operated devices and store commands that can not be received during deep sleep state. Without such a controller, communication may become impossible and/or the battery life time is significantly decreased.

This device will wakeup regularly and announce the wakeup state by sending out a so called Wakeup Notification. The controller can then empty the mailbox. Therefore, the device needs to be configured with the desired wakeup interval and the node ID of the controller. If the device was included by a static controller this controller will usually perform all necessary configurations. The wakeup interval is a tradeoff between maximal battery life time and the desired responses of the device.

Quickly clicking three times on the Linking button on the front of the device will issue a Node Information Frame and keep the device awake to receive configuration commands.

It is possible to set the node ID to 255 to send wakeup notifications as broadcast. In this mode device takes more time to go to sleep and drains battery faster, but can notify all it's direct neighbors about a wakeup.

## Node Information Frame

**NIF** The Node Information Frame is the business card of a Z-Wave device. It contains information about the device type and the technical capabilities. The inclusion and exclusion of the device is confirmed by sending out a Node Information Frame. Beside this it may be needed for certain network operations to send out a Node Information Frame.

Quickly clicking three times on the Linking button on the front of the device will issue a Node Information Frame and keep the device awake to receive configuration commands.

## Associations

**A** Z-Wave devices control other Z-Wave devices. The relationship between one device controlling another device is called *association*. In order to control a different device, the controlling device needs to maintain a list of devices that will receive controlling commands. These lists are called **association groups** and they are always related to certain events (e.g. button

pressed, sensor triggers, ...). In case the event happens all devices stored in the respective association group will receive a common wireless command.

Association Groups:

1	Battery Status and Sensor Report (max. nodes in group: 1)
2	Sensor Triggered (max. nodes in group: 3)

## Configuration Parameters

Z-Wave products are supposed to work out of the box after inclusion, however certain configuration can adapt the function better to user needs or unlock further enhanced features.

**IMPORTANT:** Controllers may only allow configuring signed values. In order to set values in the range 128 ... 255 the value sent in the application shall be the desired value minus 256. For example: to set a parameter to 200 it may be needed to set a value of 200 minus 256 = minus 56. In case of a two byte value the same logic applies: Values greater than 32768 may needed to be given as negative values too.

**Basic Level Set (Parameter Number 1, Parameter Size 1)** Set basic set value to be on or off

Value	Description
0	Disable
1 – 99	Use value (Default 99)

**Temperature Trigger ON value (Parameter Number 2, Parameter Size 1)** Temperature level when a ON command is sent out

Value	Description
236 – 255	Trigger On on
0 – 50	Trigger On on
99	Disable (Default)

**Temperature Trigger OFF value (Parameter Number 3, Parameter Size 1)** Trigger Temperature level when a OFF command is sent out

Value	Description
236 – 255	Trigger Off on
0 – 50	Trigger Off on
99	Disable (Default)

**Humidity Trigger ON value (Parameter Number 4, Parameter Size 1)** Humidity level when a ON command is sent out

Value	Description
20 – 90	Trigger On on



99	Disable (Default)
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**Humidity Trigger OFF value (Parameter Number 5, Parameter Size 1)** Humidity level when a OFF command is sent out

Value	Description
20 — 90	Tigger Off on
99	Disable (Default)

**Auto Report Time (Parameter Number 6, Parameter Size 2)** Sets the time interval when a sensor report is sent

Value	Description
0	Disable (Default)
1 — 1439	Auto report periodically

**Auto Report Temperature (Parameter Number 7, Parameter Size 1)** Sets the temperature change causing a sensor report

Value	Description
0	Disabled (Default)
1 — 70	Auto report on temp. change

**Auto Report Humidity (Parameter Number 8, Parameter Size 1)** Sets the humidity change causing a sensor report

Value	Description
0	Disable (Default)
5 — 70	Auto report on humidity change

## Command Classes

### Supported Command Classes

- Basic (version 1)
- Multi Channel (version 2)
- Wake Up (version 2)
- Association (version 2)
- Version (version 1)
- Battery (version 1)
- Configuration (version 1)
- Multilevel Sensor (version 2)
- Manufacturer Specific (version 1)

## Technical Data

Battery Type	3 * AA
Explorer Frame Support	No
SDK	
Device Type	Slave with routing capabilities
Generic Device Class	Multilevel Sensor
Specific Device Class	Routing Multilevel Sensor
Routing	No
FLiRS	No
Firmware Version	1.8

## Explanation of Z-Wave specific terms

- **Controller** — is a Z-Wave device with capabilities to manage the network. Controllers are typically Gateways, Remote Controls or battery operated wall controllers.
- **Slave** — is a Z-Wave device without capabilities to manage the network. Slaves can be sensors, actuators and even remote controls.
- **Primary Controller** — is the central organizer of the network. It must be a controller. There can be only one primary controller in a Z-Wave network.
- **Inclusion** — is the process of bringing new Z-Wave devices into a network.
- **Exclusion** — is the process of removing Z-Wave devices from the network.
- **Association** — is a control relationship between a controlling device and a controlled device.
- **Wakeup Notification** — is a special wireless message issued by a Z-Wave device to announce that it is able to communicate.
- **Node Information Frame** — is a special wireless message issued by a Z-Wave device to announce its capabilities and functions.

## Disposal Guidelines

The product contains batteries. Please remove the batteries when the device is not used.

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 your health and well-being.