ZME_MBINAR
Binary Sensor, Thermostat for Heating and Cooling and Temperature Sensor

Firmware Version : 2.1

Quick Start

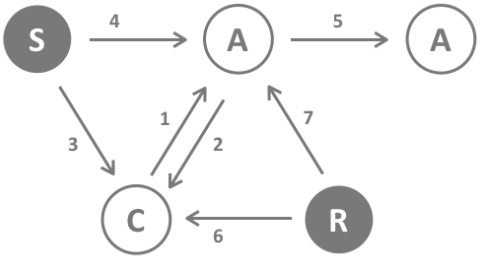
S This device is a Z-Wave Sensor. A tripple click on the tampering switch behind the battery cover within 1.5 seconds will confirm standard inclusion and exclusion, double click confirms network wide inclusion. A single click on the same switch will wake up the device and keeps it awake for 10 seconds.

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

This product is a combination of a binary sensor with external switches, temperature sensor and a thermostat controlling a remote heating device by comparing the target temperature set with the measured temperature. The three functions can be used in parallel or independent of each other. The temperature sensor has a high accuracy +/- 0.2 K. The device is battery operated and can be placed on every flat surface either using screws or double sides tape.

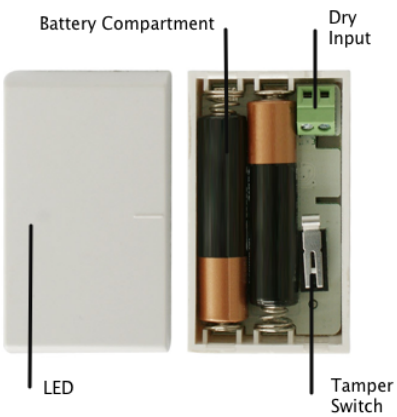
Batteries

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: 2 * AAA

Installation Guidelines

The devices cover can be mounted on every flat surface either using two screws or strong double sides type. Insert both the batteries (2 x AAA) into the battery case while paying attention to the indicated plus (+) / minus (-) poles. The MBINAR can now be mounted. The device itself is then just pushed on the cover. Make sure the dry input terminals match with the little spacing on the edge of the cover part.



Attention: The electronic circuit of the MBINAR can be damaged in the case of wrong insertion of batteries.

Behavior within the Z-Wave network

I 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.

Once the controller is turned into standard inclusion mode **tripple click the tamper switch will include the device**. In case the controller is in network wide inclusion mode a double click will confirm inclusion. In case of doubt about the type of inclusion please assume standard inclusion.

Operating the device

The **temperature sensor** function (communication pattern 3) can be used without any further installation or configuration. The **binary sensor** function is available on the two terminal blocks inside the device. Please wire these terminals to the external switch that can be used. Beware: You must not power the two terminals. They are only connected with an external switch that is connecting the two wires or not. Switching the binary input can be used to control a wireless actor using Z-Wave commands (communication pattern 4).

The device can be used as a **room thermostat**. This function monitors the measured temperature against a desired temperature set point or a temperature range defined by a lower and an upper temperature trigger. The setpoint temperature can be set wirelessly using a Z-Wave command (Command Class Temperature Setpoint) MBINAR will send on and off commands to a wirelessly controlled heating device (communication pattern 4) to keep the temperature within the desired range. Please refer to the description of the configuration parameters **1**,**2**,**4** and **5** for more information how to control wireless devices and how to set a desired temperature range.

To gain higher accuracy with the temperature sensor the device can be calibrated.

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.

MBINAR is awake right after inclusion for 2.5 seconds allowing the controller to perform certain configuration. It is possible to manually wake up the device by pushing the tamper switch. MBINAR will accept wakeup intervals between 4 minutes and 180 days.

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

NI 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.

A single click on the tampering switch behind the battery cover will send out a Node Information Frame.

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	Nodes to be switched on/off on dry contacts switch (max. nodes in group: 5)
2	Nodes to be controlled by thermostat (max. nodes in group: 5)
3	Nodes to receive updates on thermostat set point change and binary reports (max. nodes in group: 5)

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 to configure 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 two byte value the same logic applies: Values greater than 32768 may needed to be given as negative values too.

Binary sensor active (Parameter Number 1, Parameter Size 1) defines of the binary sensor is active

Value	Description
0	Off
255	On (Default)

Binary sensor mode (Parameter Number 2, Parameter Size 1) defines the command sent when the binary sensor is triggered

Value	Description
0	Basic On on connected, Basic Off on diconnected (Default)
255	Basic Off on connected, Basic On on diconnected

Send Unsolicited temperature report (Parameter Number 3, Parameter Size 1) Threshold temperature to send unsolicited report. 10 = 1 °C

Value	Description
0	Disabled (Default)
5 — 50	in 0.1 °C

Maximum deviation for thermostat (Parameter Number 4, Parameter Size 1) Maximum deviation (threshold) of temperature from set point before switching on/off cooling/heating for thermostat. 10 = 1 °C

Value	Description
5 — 50	in 0.1 °C units (Default 10)

Repeat thermostat ON (Parameter Number 5, Parameter Size 1) Repeat thermostat events (switch ON events only) periodically

Value	Description
0	Send only once (Default)
1 — 255	each Nth wakeup time

Unsolicited temperature report period (Parameter Number 6, Parameter Size 1)

Value	Description
0	Off (Default)
1 — 255	each Nth wakeup time

Temperature shift (Parameter Number 7, Parameter Size 1) Threshold correction. For positive value 10 = 1 °C, for negative value x = 256 - (T°C * 10). Example, if need shift -2°C, value calculate: 256 - (2 * 10) = 236.

Value	Description
0	Disabled (Default)
1 — 127	in 0.1 °C
127 — 255	in 0.1 °C

Send unsolicited Battery Report on Wake Up (Parameter Number 30, Parameter Size 1)

Value	Description
0	No (Default)
1	To wakeup node
2	To broadcast

Command Classes

Supported Command Classes
Battery (version 1)
Thermostat Mode (version 2)
Thermostat Setpoint (version 2)
Wake Up (version 2)
Association (version 2)
Version (version 1)
Basic (version 1)
Configuration (version 1)
Multilevel Sensor (version 3)
Manufacturer Specific (version 1)
Binary Sensor (version 1)
Node Naming and Location (version 1)
Multi Channel Association (version 2)
Multi Channel (version 2)

Controlled Command Classes

Basic (version 1)
Multi Channel (version 2)

Technical Data

IP Rating	IP 20
Battery Type	2 * AAA
Frequency	868.42 MHz (SRD Band)
Wireless Range	up to 100 m outside, on average up to 20 m inside buildings
Explorer Frame Support	Yes
SDK	4.55.00
Device Type	Slave with routing capabilities
Generic Device Class	Binary Sensor
Specific Device Class	Routing Binary Sensor
Routing	No
FLiRS	No
Firmware Version	2.1

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 annonces that is 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.