AEOTEC

LED BULB

View the expanded manual:
http://aeotec.com/support

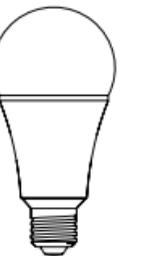**① Aeotec by Aeon Labs LED Bulb.**

Aeotec LED Bulb is a low-cost Z-Wave® LED module which allows control (on/off/dim) with the use of Z-Wave.

It's a bulb has a Smart RGB LED, which can be used to add colour to your home. The bulb has 5 main colour channels available for you to adjust: Red, Green, Blue, Warm White and Cold White. You can configure its colour according to your favour.

The LED Bulb is also a security Z-wave device and supports the Over The Air (OTA) feature for the product's firmware upgrade.

② Familiarize yourself with your LED Bulb.
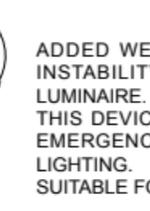
ADDED WEIGHT OF THE DEVICE MAY CAUSE INSTABILITY OF A FREE-STANDING PORTABLE LUMINAIRE.
THIS DEVICE IS NOT INTENDED FOR USE WITH EMERGENCY EXITS OR NOT FOR EMERGENCY LIGHTING.
SUITABLE FOR USE IN ENCLOSED LUMINARIES.

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③ Quick start.

Getting your LED Bulb up and running is as simple as inserting it into a lamp holder and adding it to your existing Z-Wave network. The following instructions tell you how to add your LED Bulb to your Z-Wave network using an Aeotec by Aeon Labs' Z-Stick or Minimote controllers. If you are using other products as your main Z-Wave controller, such as a Z-Wave gateway, please refer to the part of their respective section of that instruction manual that tell you how to add new devices to your network.
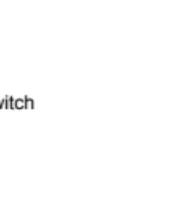
Note: if you use other Z-wave controller, the first step is let your controller into inclusion/exclusion mode, the next step will be the same with the step 5 or 4 of using Z-Stick/Minimote.

If you're using a Z-Stick:

1. Decide on where you want your LED Bulb to be placed and insert it into a lamp holder. Its RGB LED will be solid.
If your Z-Stick is plugged into a gateway or a computer, unplug it.
2. Take your Z-Stick to your LED Bulb.
3. Press the Action Button on your Z-Stick.
4. Press the wall switch of LED Bulb to turn it off and then press the wall switch again to turn it on, the green LED will blink to indicate the Bulb is entering into inclusion mode.
5. If LED Bulb has been successfully added to your Z-Wave network, its RGB LED will be solid when you turn the Bulb off and then turn it on via pressing the wall switch again. If the adding was unsuccessful, repeat the instructions from step 4.
6. Press the Action Button on the Z-Stick to take it out of

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inclusion mode and return it to your gateway or computer.

Note:
1. If your Bulb has been added into the other Z-Wave network, you need to remove it from the network first and then start the adding steps. How to remove the Bulb from network, see the section of "Removing your LED Bulb from a Z-Wave network" below.
2. You can check the LED status to know whether the Bulb has been added into the other network or not, if it has been added into the other network, the orange LED will blink for 3 seconds when you switch the Bulb off and on 3 times via pressing the wall switch. Otherwise, the bulb is out of network.

If you're using a Minimote:

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1. Decide on where you want your LED Bulb to be placed and insert it into a lamp holder. Its RGB LED will be solid.
2. Take your Minimote to your LED Bulb.
3. Press the Include button on your Minimote.
4. Press the wall switch of LED Bulb to turn it off and then press the wall switch again to turn it on, the green LED will blink to indicate the Bulb is entering into inclusion mode.
5. If LED Bulb has been successfully added to your Z-Wave network, its RGB LED will be solid when you turn the Bulb off and then turn it on via pressing the wall switch again. If the adding was unsuccessful, repeat the instructions from step 3.
6. Press any button on your Minimote to take it out of inclusion mode.

Note:
1. If your Bulb has been added into the other Z-Wave network, you need to remove it from the net work first and then start the adding steps. How to remove the Bulb from network, see the section of "Removing your LED Bulb from a Z-Wave network" below.
2. You can check the LED status to know whether the Bulb

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has been added into the other network or not, if it has been added into the other network, the orange LED will blink for 3 seconds when you switch the Bulb off and on 3 times via pressing the wall switch. Otherwise, the bulb is out of network.

With your LED Bulb now working as a part of your smart home, you'll be able to configure it to indicate different colours from your home control software via setting the RGB value. Please refer to your software's user guide for precise instructions on configuring your LED Bulb to your needs.

You're able to change your LED Bulb's colour manually. After the LED Bulb is included into your network, switching the LED Bulb on and off 2 times before the Power Outage LED is turned off via wall switch, the Bulb's colour will automatically change from the current colour to the next (Warm white, Cold white, Red, Orange, Yellow, Green, Cyan, Blue or Purple), these changes will keep in the state of circulation gradient. When the colour that you desired comes out, press the wall switch to turn the Bulb off immediately, the colour will be locked by the LED Bulb and then press the wall switch to turn the Bulb on, the Bulb's status will be solid with the colour you desired.

Note:
1. The Power Outage LED is a small red LED in the Bulb, which is used to indicate the power outage state of the LED Bulb. When the LED Bulb is switched off by the wall switch, it will keep solid with red light for 1.2 second and then be turned off automatically.
2. The wall switch needs to be left in the "On" position in order for the bulb to function properly in the Z-Wave world. This functionality would include being an active member of the routing tables, repeating the Z-Wave RF commands and being controlled remotely.

**✳ Removing your LED Bulb from a Z-Wave network.**

Your LED Bulb can be removed from your Z-Wave network at any time. You'll need to use your Z-Wave network's main controller, and to do this, and the following instructions will tell you how using the Aeotec by Aeon Labs' Z-Stick or Minimote controller. If you are using other products as your main Z-Wave controller, please refer to the part of their respective manuals that tells you how remove devices from your network.

If you're using a Z-Stick:

1. If your Z-Stick is plugged into a gateway or a computer, unplug it.
2. Take your Z-Stick to your LED Bulb.
3. Press the Action Button on your Z-Stick.
4. Press the wall switch of LED Bulb to turn it off and then press the wall switch again to turn it on, it repeat the operation 3 times before the Power Outage LED is turned off.
5. If your LED Bulb has been successfully removed from your network, its orange LED will be solid for 2 seconds and then the warm white LED keeps turning on. If the removal was unsuccessful, the orange LED continues to blink for 3 seconds and then the red LED keeps turning on for 2 seconds, repeat the instructions from step 3.
6. Press the Action Button on the Z-Stick to take it out of removal mode.

If you're using a Minimote:
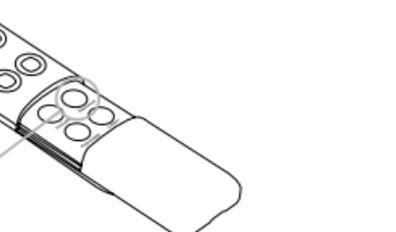
1. Take your Minimote to your LED Bulb.
2. Press the Remove Button on your Minimote.
3. Press the wall switch of LED Bulb to turn off and then press the wall switch again to turn it on, it repeat the operation 3 times before the Power Outage LED is turned off.
4. If your LED Bulb has been successfully removed from your network, its orange LED will be solid for 2 seconds and then the warm white LED keeps turning on. If the removal was unsuccessful, the orange LED continues to blink for 3 seconds and then the red LED keeps turning on for 2 seconds, repeat the instructions from step 2.
5. Press any button on your Minimote to take it out of removal mode.

Note: The Power Outage LED is a small red LED in the Bulb, which is used to indicate the power outage state of the LED Bulb. When the LED Bulb is switched off by the wall switch, it will keep solid with red light for 1.2 second and then be turned off automatically.

④ Advanced functions.

* Security or Non-security feature of your LED Bulb in Z-wave network.

If you want your LED Bulb is a non-security device in Z-wave network, you just need to press the wall switch to turn the Bulb off and then turn it on when you use a controller/gateway to add/include your LED Bulb. The green LED will blink to indicate the Bulb is entering into non-security inclusion mode

In order to take full advantage of all functionality the LED Bulb, you may want your LED Bulb is a security device that uses secure/encrypted message to communicate in Z-wave network, so a security enabled controller/gateway is needed and then you need to press the wall switch turn the Bulb off and on 3 times when your security controller/gateway starts the network inclusion. The Blue LED will blink to indicate the Bulb is entering into security inclusion mode.

* Reset your LED Bulb.

At some stage, may be your primary Controller is missing or inoperable, you can let your new controller into exclusion mode and then press the external switch to turn the Bulb off and then to turn on it, repeat the operation 3 times. After the LED Bulb is excluded from network, it will be reset to factory default state.

⑤ Technical specifications.

Model number: ZW098.
Bulb holder type: E26 for USA version, E27 for EU/AU version.
Max operating power: 9W.
Max brightness: 850 lumens.
Rated colour temperature: 4700K.
Useful life: 50000 hours.
Operating temperature: 0℃ to 40℃ /32℉ to 104℉.
Relative humidity: 8% to 80%.
Operating distance: Up to 492 feet/150 metres outdoors.

AC Input:

Version	Input (Standby Power)	Working band
AU	230V 50Hz, Max: 0.7W	921.42MHz
BR	220V 60Hz, Max: 0.7W	921.42MHz
CN	220V 50Hz, Max: 0.7W	868.40MHz
EU	230V 50Hz, Max: 0.7W	868.42MHz
IL	230V 50Hz, Max: 0.7W	916.02MHz
IN	230V 50Hz, Max: 0.7W	865.20MHz
UK	230V 50Hz, Max: 0.7W	868.42MHz
US	120V 60Hz, Max: 0.5W	908.42MHz

⑥ Warranty.

Aeon Labs warrants to the original purchaser of Products that for the Warranty Period (as defined below), the Products will be free from material defects in materials and workmanship. The foregoing warranty is subject to the proper installation, operation and maintenance of the Products in accordance with installation instructions and the operating manual supplied to Customer. Warranty claims must be made by Customer in writing within thirty (30) days of the manifestation of a problem. Aeon Labs' sole obligation under the foregoing warranty is, at Aeon Labs' option, to repair, replace or correct any such defect that was present at the time of delivery, or to remove the Products and to refund the purchase price to Customer.

The "Warranty Period" begins on the date the Products is delivered and continues for 3 years.

Any repairs under this warranty must be conducted by an authorized Aeon Labs service representative and under Aeon Labs' RMA policy. Any repairs conducted by unauthorized persons shall void this warranty.

Excluded from the warranty are problems due to accidents, acts of God, civil or military authority, civil disturbance, war, strikes, fires, other catastrophes, misuse, misapplication, storage damage, negligence, electrical power problems, or modification to the Products or its components.

Aeon Labs does not authorize any person or party to assume or create for it any other obligation or liability in connection with the Products except as set forth herein.

Aeon Labs will pass on to Customer all manufacturers' Material warranties to the extent that they are transferable, but will not independently warrant any Material.

Customer must prepay shipping and transportation charges for returned Products, and insure the shipment or accept the risk of loss or damage during such shipment and transportation. Aeon Labs will ship the repaired or replacement products to Customer freight prepaid.

Customer shall indemnify, defend, and hold Aeon Labs and Aeon Labs' affiliates, shareholders, directors, officers, employees, contractors, agents and other representatives harmless from all demands, claims, actions, causes of action, proceedings, suits, assessments, losses, damages, liabilities, settlements, judgments, fines, penalties, interest, costs and expenses (including fees and disbursements of counsel) of every kind (i) based upon personal injury or death or injury to property to the extent any of the foregoing is proximately caused either by a defective product (including strict liability in tort) or by the negligent or willful acts or omissions of Customer or its officers, employees, subcontractors or agents, and/or (ii) arising from or relating to any actual or alleged infringement or misappropriation of any patent, trademark, mask work, copyright, trade secret or any actual or alleged violation of any other intellectual property rights arising from or in connection with the products, except to the extent that such infringement exists as a result of Aeon Labs' manufacturing processes.

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☎ Certifications (regional):

FCC ID: XBAFT098
CONFORMS TO UL STD.1993
CERTIFIED TO CSA STD.C22.2 NO.1993-09

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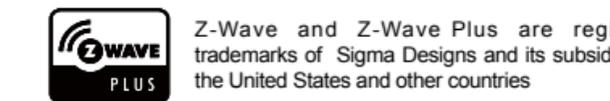
Version:501009800001-X02   www.aeotec.com

Aeon Labs LED Bulb
Engineering Specifications and Advanced Functions for Developers

Aeon Labs LED Bulb is a switch multilevel device based on Z-wave enhanced 232 slave library of V6.51.06. Its bulb has the Smart RGB LEDs in, which can be used for adding colour to your home, the bulb has 5 main colour channels available for you to adjust: Red, Green, Blue, Warm white and Cold white. You can configure its indication colour according to your favour.

LED Bulb can be included and operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers and/or other applications. All non-battery operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

The LED Bulb is a security Z-Wave device, so a security enabled controller is needed for take full advantage of all functionally for the LED Bulb. It also supports the Over The Air (OTA) feature for the product's firmware upgrade.

1. Library and Command Classes
1.1 SDK: 6.51.06
1.2 Library
- Basic Device Class: BASIC_TYPE_ROUTING_SLAVE
- Generic Device class: GENERIC_TYPE_SWITCH_MULTILEVEL
- Specific Device Class: SPECIFIC_TYPE_POWER_SWITCH_MULTILEVEL

1.3 Commands Class

	Included Non-Secure	Included Secure
Node Info Frame	COMMAND_CLASS_ZWAVEPLUS_INFO V2 COMMAND_CLASS_SWITCH_MULTILEVEL V2 COMMAND_CLASS_SWITCH_COLOR V1 COMMAND_CLASS_SWITCH_ALL V1 COMMAND_CLASS_SCENE_ACTUATOR_CONF V1 COMMAND_CLASS_SCENE_ACTIVATION V1 COMMAND_CLASS_CONFIGURATION V1 COMMAND_CLASS_ASSOCIATION_GRP_INFO V1 COMMAND_CLASS_ASSOCIATION V2 COMMAND_CLASS_MANUFACTURER_SPECIFIC V2 COMMAND_CLASS_VERSION V2 COMMAND_CLASS_FIRMWARE_UPDATE_MD V2 COMMAND_CLASS_POWERLEVEL V1 COMMAND_CLASS_SECURITY V1 COMMAND_CLASS_MARK V1 COMMAND_CLASS_DEVICE_RESET_LOCALLY V1 COMMAND_CLASS_HAIL V1	COMMAND_CLASS_ZWAVEPLUS_INFO V2 COMMAND_CLASS_VERSION V2 COMMAND_CLASS_MANUFACTURER_SPECIFIC V2 COMMAND_CLASS_SECURITY V1 COMMAND_CLASS_MARK V1 COMMAND_CLASS_DEVICE_RESET_LOCALLY V1 COMMAND_CLASS_HAIL V1
Security Command Supported Report Frame	–	COMMAND_CLASS_SWITCH_MULTILEVEL V2 COMMAND_CLASS_SWITCH_COLOR V1 COMMAND_CLASS_SWITCH_ALL V1 COMMAND_CLASS_SCENE_ACTUATOR_CONF V1 COMMAND_CLASS_SCENE_ACTIVATION V1 COMMAND_CLASS_CONFIGURATION V1 COMMAND_CLASS_ASSOCIATION_GRP_INFO V1 COMMAND_CLASS_ASSOCIATION V2 COMMAND_CLASS_MANUFACTURER_SPECIFIC V2 COMMAND_CLASS_VERSION V2 COMMAND_CLASS_FIRMWARE_UPDATE_MD V2 COMMAND_CLASS_POWERLEVEL V1 COMMAND_CLASS_DEVICE_RESET_LOCALLY V1 COMMAND_CLASS_HAIL V1

2. Technical Specifications

Model number: ZW098.
Bulb holder type: E26 for USA version, E27 for EU/AU version.
Max operating power: 9W.
Max standby power: 0.7W.
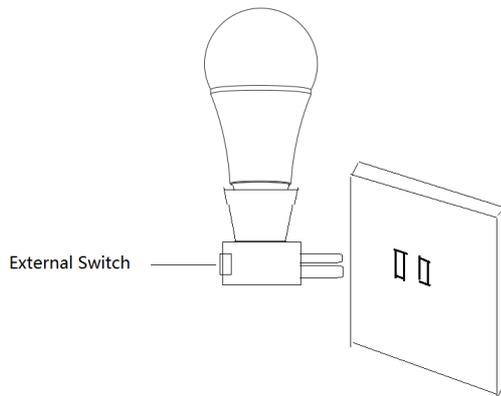Operating temperature: 0℃ to 40℃.
Relative humidity: 8% to 80%.
Operating distance: Up to 500 feet/150 metres outdoors.

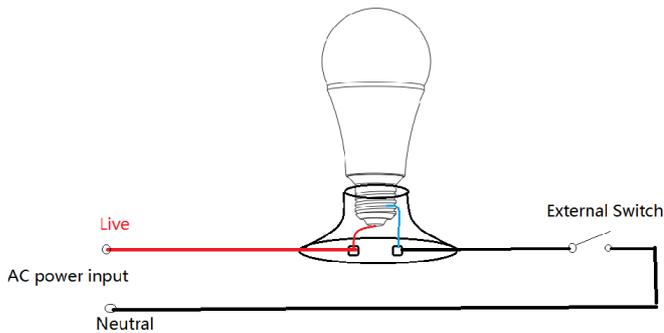## 3. Familiarize Yourself with Your LED Bulb
3.1 Interface

4. Inclusion/Exclusion of LED Bulb

External Switch

Or

Live

AC power input

Neutral

External Switch

Event	Operation Steps
Press the External switch to turn off the Bulb and then turn on it.	**1, Send out node info frame without Security CC in node info list (Non-security inclusion).** **2, Add the Bulb into z-wave network.** 1. Power on your LED Bulb as above the wire diagrams. 2. Let the primary controller into inclusion mode (If you don't know how to do this, please refer to its manual). 3. Turn off the LED Bulb and then turn on it via pressing the external switch. 4. If the inclusion is failed, please repeat the process from step 2. **Note:** If LED Bulb has been successfully included into your Z-Wave network, its warm white LED will be solid. If the adding was unsuccessful and the LED Bulb continues to be solid with the current color.
Press the External switch to turn off the Bulb and then turn on it, repeat it 3 times within 2 seconds.	**1, Send out node info frame contains Security CC in node info list (Security inclusion).** **2, Add the Bulb into z-wave network:** 1. Power on your LED Bulb as above the wire diagrams. 2. Let the primary controller into inclusion mode (If you don't know how to do this, please refer to its manual).

	3. Turn off the LED Bulb and then turn on it, repeat the operation 3 times within 2 seconds via pressing the external switch. .4. If the inclusion is failed, please repeat the process from step 2. **Note:** If LED Bulb has been successfully included into your Z-Wave network, its warm white LED will be solid. If the adding was unsuccessful and the LED Bulb continues to be solid with the current color. **3, Remove LED Bulb from z-wave network:** 1. Power on your LED Bulb as above the wire diagrams. 2. Let the primary controller into exclusion mode (If you don't know how to do this, please refer to its manual). 3. Turn off the LED Bulb and then turn on it, repeat the operation 3 times within 2 seconds via pressing the external switch. 4. If the exclusion is failed, please repeat the process from step 2. **Note:** If LED Bulb has been successfully excluded from your Z-Wave network, its orange LED will be solid for 2 seconds and then the warm white LED keeps turning on. If the exclusion was unsuccessful and the orange LED continues to blink for 3 seconds and then the red LED keeps turning on for 2 seconds.

5. Special Rule of Each Command

5.1 Z-Wave Plus Info Report

Parameter	Value
Z-Wave Plus Version	1
Role Type	5 (ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_ALWAYS_ON)
Node Type	0 (ZWAVEPLUS_INFO_REPORT_NODE_TYPE_ZWAVEPLUS_NODE)
Installer Icon Type	0x0600 (ICON_TYPE_GENERIC_LIGHT_DIMMER_SWITCH)
User Icon Type	0x0600 (ICON_TYPE_GENERIC_LIGHT_DIMMER_SWITCH)

5.2 Manufacturer Specific Report

Parameter	Value (hex)
Manufacturer ID 1	0x01
Manufacturer ID 2	0x6A
Product Type ID 1	EU=0x00, US=0x01, AU=0x02
Product Type ID 2	0x03
Product ID 1	0x00
Product ID 2	0x62

5.3 Association Command Class

The LED Bulb supports 2 association groups and Max 5 nodes for each group.

Association Group	Nodes	Send Mode	Send commands
Group 1	0	N/A	N/A
	1	Single Cast	When the state of LED Bulb (turn on/off the bulb) is changed: 1, Set Configuration parameter 80 to 0：Reserved (Default). 2, Set Configuration parameter 80 to 1：Send Hail CC. 3. Set Configuration parameter 80 to 2: Send the Basic Report.
	[2,5]		
Group 2	0	N/A	N/A

	[1,5]	Single Cast	Forward the Basic Set, Switch Binary Set, Switch Multilevel Start Level Change, Switch Multilevel Stop Level Change, Switch Multilevel Set, Scene Activation Set to associated nodes in Group 2 when the LED Bulb receives the Basic Set, Switch Binary Set, Switch Multilevel Start Level Change, Switch Multilevel Stop Level Change, Switch Multilevel Set, Scene Activation Set commands from main controller.

5.4 Association Group Info Command Class

5.4.1 Association Group Info Report Command Class

Profile: General: NA (Profile MSB=0, Profile LSB=0)

5.4.2 Association Group Name Report Command Class
Group 1：Lifeline
Group 2：Retransmit

5.5 Scene Actuator Conf Command Class
The LED Bulb supports max 255 Scene IDs.

The Scene Actuator Conf Set command is effective, when only Level>=0 and Level<0x64 or Level=0xff, otherwise, it will be ignored.

The Scene Actuator Configuration Get Command is used to request the settings for a given scene, if scene ID is not setting, it will be ignored. If Scene ID =0, then the LED Bulb will report currently the activated scene settings. If the currently activated scene settings do not exist, the LED Bulb will reports Level = currently load status and Dimming Duration=0

5.6 Scene Activation Set Command Class
The Scene Activation Set Command is effective, when only Level>=0 and Level<0x64 or Level=0xff, otherwise, it will be ignored. If the requested Scene ID is not configured, it will be ignored too.

5.7 Color Control State Set Command Class

Priority	Capability ID	color
1 (Highest)	0	Warm white
2	8	White
3	1	Cold white
4 (lowest)	2、3、4	R、G、B

Note: White LED and RGB LED will not light up at the same time, so the software makes the following processing. When you want to activate the current RGB color, the color value of higher priority should be set to 0.
For example: The warm white is the highest priority, when it is configured to 0, the Cold white or RGB color configuration values can be activated. Otherwise, the bulb is always be activated by warm white.

5.8 Configuration Set Command Class

7	6	5	4	3	2	1	0
Command Class = COMMAND_CLASS_CONFIGURATION							
Command = CONFIGURATION_SET							
Parameter Number							
Default	Reserved					Size	
Configuration Value 1(MSB)							
Configuration Value 2							
………							
Configuration Value n(LSB)							

Parameter Number Definitions (8 bit):

Parameter Number Hex / Decimal	Description	Default Value	Size
0x22 (34)	Enable/disable the function of using External Switch to turn on/off the bulb. 0=disable. 1=enable. Others=ignore.	0	1
0x23 (35)	Enable/disable the function of using External Switch to changes the bulb's color. 0=disable. 1=enable. Others=ignore.	1	1
0x50 (80)	Enable to send notifications to associated devices (Group 1) when the state of LED Bulb is changed (0=nothing, 1=hail CC, 2=basic CC report).	1 (US version) 2(other version)	1
0xC8 (200)	Partner ID (0= Aeon Labs Standard Product).	0	1
0xFC (252)	Enable/disable Lock Configuration (0 =disable, 1 = enable). Value=0, the setting of configuration parameters is allowed. Value=1, all configuration parameters cannot be set (Locked).	0	1
0xFF (255)	1, Value=0x55555555、Default=1、Size=4 Reset to factory default setting and removed from the z-wave network	N/A	4
	2, Value=0、Default=1、Size=1 Reset to factory default setting	N/A	1