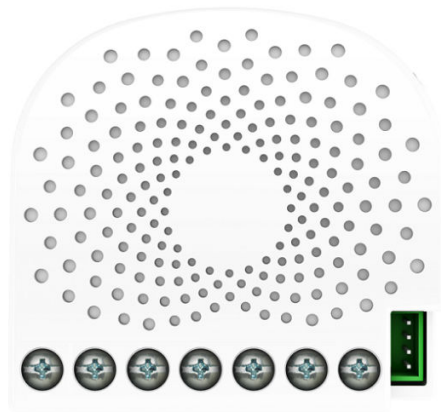




# Aeon Labs Nano Shutter

(Z-Wave Nano Shutter)



### Change history

Revision	Date	Change Description
1	10/9/2017	Initial draft.
2	11/17/2017	Update
3	11/21/2017	Update
4	11/28/2017	Update the wiring diagram
5	12/13/2017	Update the wiring diagram notes
6	1/4/2018	Update
7		
8		

## Aeon Labs Nano Shutter

### Engineering Specifications and Advanced Functions for Developers

Aeon Labs Nano Shutter is a Z-Wave power binary switch device based on Z-Wave enhanced 232 slave library V6.71.01.

You can use it to control your home light or bulbs on/off and get the immediate consumption or kWh energy usage over a period of time.

It can connect to 2 external manual switches to control the load ON/OFF independently. Its surface has a pin socket, which can be used for connecting to the touch panel, so you can also use the touch panel to control the Nano Shutter.

It can also 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.

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

As soon as Nano Shutter is removed from a Z-Wave network it will be restored into default factory setting.

## 1. Library and Command Classes

### 1.1 SDK: 6.71.01

### 1.2 Library

- Generic Device class: GENERIC\_TYPE\_SWITCH\_MULTILEVEL
- Specific Device Class: SPECIFIC\_TYPE\_CLASS\_A\_MOTOR\_CONTROL

### 1.3 Commands Class

	Non-Secure included	Secure included
Node Info Frame	COMMAND_CLASS_ZWAVEPLUS_INFO V2 COMMAND_CLASS_ASSOCIATION V2 COMMAND_CLASS_ASSOCIATION_GRP_INFO V1 COMMAND_CLASS_TRANSPORT_SERVICE_V2, COMMAND_CLASS_CONFIGURATION V1 COMMAND_CLASS_SCENE_ACTUATOR_CONF, COMMAND_CLASS_SCENE_ACTIVATION, COMMAND_CLASS_SWITCH_BINARY, COMMAND_CLASS_SWITCH_MULTILEVEL, COMMAND_CLASS_VERSION V2 COMMAND_CLASS_MANUFACTURER_SPECIFIC V2 COMMAND_CLASS_DEVICE_RESET_LOCALLY V1 COMMAND_CLASS_POWERLEVEL V1 COMMAND_CLASS_SECURITY COMMAND_CLASS_SECURITY_2 COMMAND_CLASS_SUPERVISION, COMMAND_CLASS_FIRMWARE_UPDATE_MD COMMAND_CLASS_MARK V1	COMMAND_CLASS_ZWAVEPLUS_INFO V2 COMMAND_CLASS_TRANSPORT_SERVICE_V2, COMMAND_CLASS_SUPERVISION, COMMAND_CLASS_SECURITY COMMAND_CLASS_SECURITY_2

Security Command Supported Report Frame	-	COMMAND_CLASS_ASSOCIATION V2 COMMAND_CLASS_ASSOCIATION_GRP_INFO V1 COMMAND_CLASS_CONFIGURATION V1 COMMAND_CLASS_SCENE_ACTUATOR_CONF, COMMAND_CLASS_SCENE_ACTIVATION, COMMAND_CLASS_SWITCH_BINARY, COMMAND_CLASS_SWITCH_MULTILEVEL, COMMAND_CLASS_FIRMWARE_UPDATE_MD V2 COMMAND_CLASS_POWERLEVEL V1 COMMAND_CLASS_VERSION V2 COMMAND_CLASS_MANUFACTURER_SPECIFIC V2 COMMAND_CLASS_DEVICE_RESET_LOCALLY V1 COMMAND_CLASS_MARK V1
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## 2. Technical specifications

Model number: ZW141.

Operating distance: Up to 492 feet/150 meters outdoors.

Input: 120VAC to 240VAC, 50Hz to 60Hz

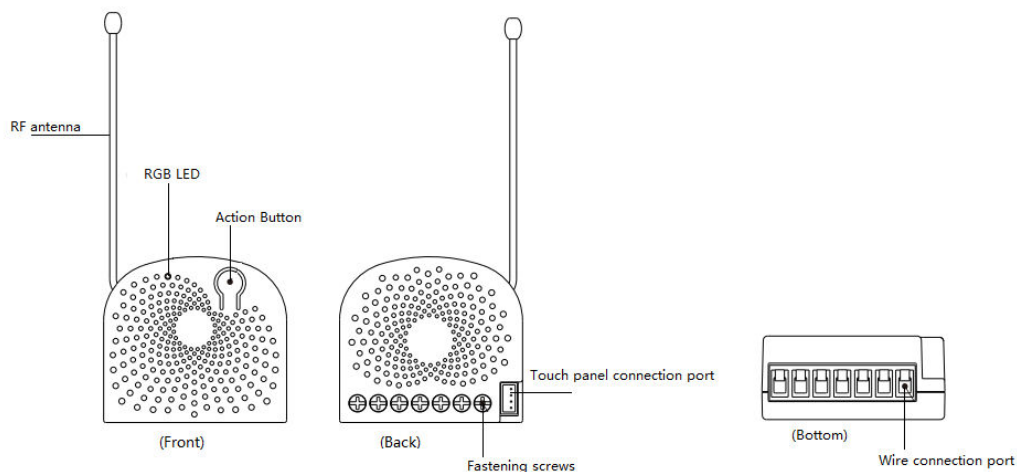
Output: 120VAC to 240VAC, 50Hz to 60Hz, 5A per channel for resistive load. Total current: Max 10A.

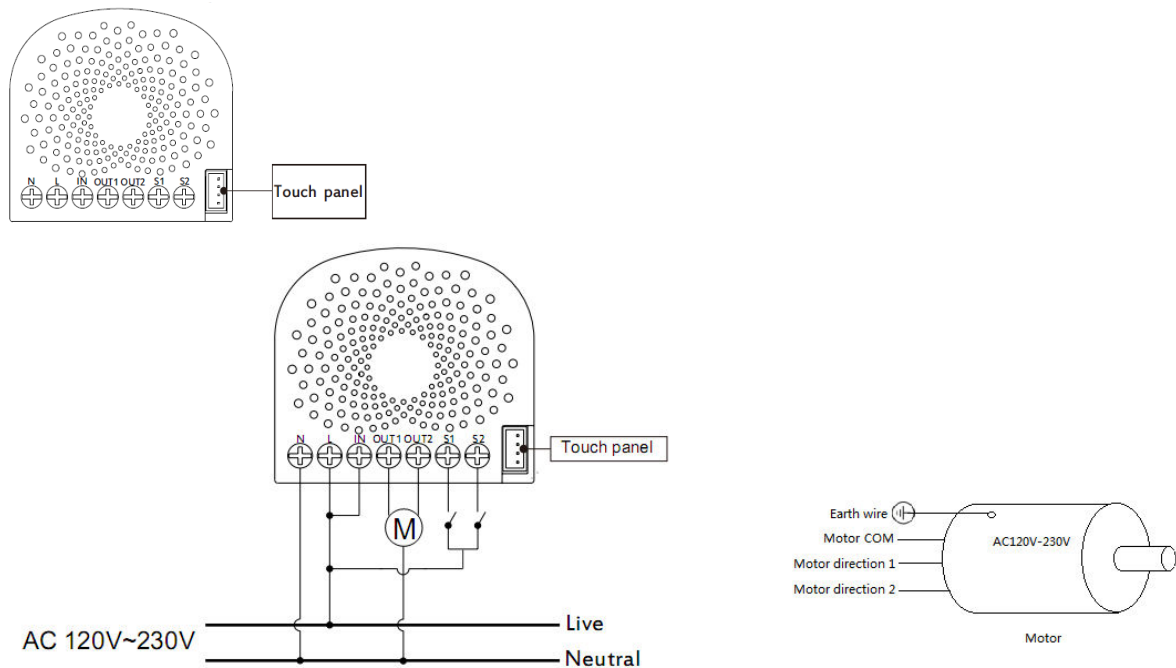
Operating temperature: 0°C to 40°C.

Relative humidity: 8% to 80%.

## 3. Familiarize yourself with your Nano Shutter

### 3.1 Interface





#### Notes for the wire connection ports:

**N** – Power input for neutral  
**L** – Power input for live  
**IN** – Input for load power supply  
**OUT1** – Output for Motor direction 1  
**OUT2** – Output for Motor direction 2  
**S1** – External switch 1 control for Motor  
**S2** – External switch 2 control for Motor

## 4. All functions of each trigger

### 4.1 Function of Action Button

Action	Description
Click one time	<b>1. Send out a Node info.</b> <b>2. Add Nano Shutter into a Z-Wave network:</b> <ol style="list-style-type: none"> <li>1. Power on your Nano Shutter, the RGB LED will be colorful gradient status.</li> <li>2. Let the primary controller into inclusion mode (If you don't know how to do this, refer to its manual).</li> <li>3. Press the Action button.</li> <li>4. If the inclusion is successful, the LED will be solid. Otherwise, the LED will remain colorful gradient status, in which you need to repeat the process from step 2.</li> </ol>
Quick press 2 times	<b>Activate the automatic identification mode for external switch S1.</b>

	<p>The blue LED will fast blink to indicate the Nano Shutter is in this mode.</p> <p><i>Note:</i> When the Nano Shutter enters this mode, toggle the external switch S1 once and wait 2 seconds for the Nano Shutter to detect the external switch type of S1.</p>
Quick press 4 times	<p><b>Activate the automatic identification mode for external switch S2.</b></p> <p>The green LED will fast blink to indicate the Nano Shutter is in this mode.</p> <p><i>Note:</i> When the Nano Shutter enters this mode, toggle the external switch S2 once and wait 2 seconds for the Nano Shutter to detect the external switch type of S2.</p>
Quick press 6 times	<p><b>1. Send out a Node info.</b></p> <p><b>2. Remove Nano Shutter from a Z-Wave network:</b></p> <ol style="list-style-type: none"> <li>1. Power on your Nano Shutter, the LED will be solid.</li> <li>2. Let the primary controller into remove mode (If you don't know how to do this, refer to its manual).</li> <li>3. Quick press the Action button 6 times.</li> <li>4. If the remove is successful, the LED will be colorful gradient status. If the LED is still solid, please repeat the process from step 2.</li> </ol>
Press and hold 20 seconds	<p><b>Reset Nano Shutter to factory default:</b></p> <ol style="list-style-type: none"> <li>1. Make sure the Nano Shutter has been powered on.</li> <li>2. Press and hold the Action Button for 20 seconds.</li> <li>3. The green LED will be on for 2 seconds and then remain colorful gradient status, which indicates the reset is successful, otherwise please repeat from step 2.</li> </ol> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. This procedure should only be used when the primary controller is missing or inoperable.</li> <li>2. Reset the Nano Shutter to factory default will exclude the Nano Shutter from Z-Wave network, clear the Association settings, Scene configuration settings and restore the Configuration settings to the default.</li> </ol>

#### 4.2 RGB LED indication when Nano Shutter is in RF Power Level Test Mode

RGB	RGB indication	Status
RGB LED	Blue LED fast blink	Enter into the wireless power level test mode
	Green LED is switched to ON state for 2 seconds	wireless power level is good
	Yellow LED is switched to ON	wireless power level is acceptable but latency can o

	state for 2 seconds	ccur
	Red LED is switched to ON state for 2 seconds	wireless power level is insufficient

## 5. Special rule of each command

### 5.1 Z-Wave Plus Info Report Command Class

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	0x1A00 (ICON_TYPE_GENERIC_WINDOW_COVERING_POSITION_ENDPOINT_AWARE)
User Icon Type	0x1A00 (ICON_TYPE_GENERIC_WINDOW_COVERING_POSITION_ENDPOINT_AWARE)

### 5.2 Basic Command Class

Basic Set = 0x00 maps to Multilevel Switch Set/ Binary Switch Set = 0x00, go to 0% position.

Basic Set = 0xFF maps to Multilevel Switch Set/ Binary Switch Set = 0xFF, go to 100% position.

Basic Set = 0x01 to 0x63, ignored.

Basic Get/Report maps to Multilevel Switch Get/Report or Binary Switch Get/Report.

Basic Report = 0x00, at 0% position.

Basic Report = 0xFF, at 100% position.

Basic Report = 0xFE, unknown position.

### 5.3 Association Command Class

Nano Shutter supports 2 association groups and Max 5 nodes for every group.

Association Group	Nodes	Send Mode	Send commands
Group 1	[1,5]	Single Cast	When the state of Nano Shutter (turn on/off the load ) is changed: 1. Set Configuration parameter 80 to 0: Send nothing (default). 2. Set Configuration parameter 80 to 1: Send the Basic Report.
Group 2	[1,5]	Single Cast	Forward the Basic Set, Binary set, Scene Activation Set to associated nodes in Group 2 when the Nano Shutter receives the Basic Set, Binary set, Scene Activation Set commands

			from main controller. (E.g. Send/forward Basic Set to control the other nodes in association Group 2)
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## 5.4 Association Group Info Command Class

### 5.4.1 Association Group Info Report

Group 1: 01 01 00 00 01 00 00 00

Group 2: 01 02 00 00 00 00 00 00

### 5.4.2 Association Group Command List Report

Group 1: 20 03 82 01 5A 01

COMMAND_CLASS_BASIC	BASIC_REPORT	20 03
COMMAND_CLASS_DEVICE_RESET_LOCALLY	DEVICE_RESET_LOCALLY_NOTIFICATION	5A 01

Group 2: 20 01 27 01

COMMAND_CLASS_BASIC	BASIC_SET	20 01
COMMAND_CLASS_SWITCH_BINARY	SWITCH_BINARY_SET	27 01

### 5.4.3 Association Group Name Report

Group 1: Lifeline (01 08 4C 69 66 65 6C 69 6E 65)

Group 2: Retransmit (02 0A 52 65 74 72 61 6E 73 6D 69 74)

## 5.5 Scene Actuator Conf Command Class

The Nano Shutter supports max 255 Scene IDs.

The Scene Actuator Conf Set command is effective, when only Level $\geq$ 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 Nano Shutter will report currently the activated scene settings. If the currently activated scene settings do not exist, the Nano Shutter 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 $\geq$ 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 Manufacturer Specific Report



Parameter	Value
Manufacturer ID 1	US/EU/AU=0x00 CN=0x01
Manufacturer ID 2	US/EU/AU=0x86 CN=0x6A
Product Type ID 1	EU=0x00, US=0x01, AU=0x02 CN=0x1D (29)
Product Type ID 2	0x03
Product ID 1	0x00
Product ID 2	0x8D (141)

### 5.9 Multilevel Switch Command Class

	Multilevel Switch Set		Multilevel Switch Level Change		
Value	0x00	0x01...0x63, 0xFF	Start Down	Start Up	Stop
Action	Go to 0%	Go to 100%	Go to 0%	Go to 100%	Stop

	Basic Set					
Value	0x00			0xFF		
Current state	Stop	Moving to 0%	Moving to 100%	Stop	Moving to 0%	Moving to 100%
Action	Go to 0%	Go to 0%	Go to 0%	Go to 100%	Go to 100%	Go to 100%

	Basic Report /Multilevel Switch Report				
Current state	At 0%	Moving to 0%	Moving to 100%	At 100%	Stop
State Value	0x00	0x00	0x63	0x63	0x00/ 0x63

### 5.9 Binary Switch Set Command Class

Binary Switch Set						
Value	0x00			0x01...0x63, 0xFF		
Current State	Stop	Moving to 0%	Moving to 100%	Stop	Moving to 0%	Moving to 100%
Action	Go to 0%	Go to 0%	Stop	Go to 100%	Stop	Go to 100%
Binary Switch Report						
Current State	At 0%	Moving to 0%	Moving to 100%	At 100%		
Value	0x00	0x00	0xFF	0xFF		

## 5.10 Security Command Class

### 5.10.1 Security 2 supported Command Class List:

85 - COMMAND\_CLASS\_ASSOCIATION  
59 - COMMAND\_CLASS\_ASSOCIATION\_GRP\_INFO  
70 - COMMAND\_CLASS\_CONFIGURATION  
2C - COMMAND\_CLASS\_SCENE\_ACTUATOR\_CONF  
2B - COMMAND\_CLASS\_SCENE\_ACTIVATION  
25 - COMMAND\_CLASS\_SWITCH\_BINARY  
26 - COMMAND\_CLASS\_SWITCH\_MULTILEVEL  
73 - COMMAND\_CLASS\_POWERLEVEL  
7A - COMMAND\_CLASS\_FIRMWARE\_UPDATE\_MD  
86 - COMMAND\_CLASS\_VERSION  
72 - COMMAND\_CLASS\_MANUFACTURER\_SPECIFIC  
5A - COMMAND\_CLASS\_DEVICE\_RESET\_LOCALLY

### 5.10.2 Security level

Highest level: S2 authenticated.

Low level: S2 unauthenticated.

Lowest level: S0

## 5.11 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
0x23 (35)	Set the moving time from up (left) to down (right) for curtain.	30	1

0x50 (80)	<p>To set which report would be sent to the associated nodes in association group 1 when the state of output load is changed.</p> <p>0 = Nothing 1 = Basic Report CC</p> <p><i>Note:</i> When just only one channel load state is changed, the report message Basic Report CC would be Multi Channel encapsulated.</p>	0	1
0x55 (85)	<p>Set the operation mode of external switch.</p> <p>0 = Operation Mode 1. 1 = Operation Mode 2.</p> <p>For detailed instructions for Operation Mode 1 and 2, see end of this table.</p>	0	1
0x78 (120)	<p>Set the external switch mode of S1</p> <p>0 = Unidentified mode. 1 = Reserved. 2 = 3 way switch mode 3 = Push button mode 4 = Enter automatic identification mode (The blue Led will fast blink).</p> <p><i>Note:</i> When the switch mode of S1 is determined or identified or configured, this mode value will not be reset after exclusion.</p>	0	1
0x79 (121)	<p>Set the external switch mode of S2</p> <p>0 = Unidentified mode. 1 = Reserved 2 = 3 way switch mode 3 = push button mode 4 = enter automatic identification mode (The green Led will fast blink).</p> <p><i>Note:</i> When the switch mode of S2 is determined or identified or configured, this mode value will not be reset after exclusion.</p>	0	1
0xFC (252)	<p>Enable/disable the configuration parameters to be locked.</p> <p>0 = disable. 1 = enable.</p>	0	1

0xFF (255)	1, Value = 0x55555555、Default = 1、Size = 4 Reset to factory default settings and removed from the z-wave network	N/A	4
	2, Value = 0、Default = 1、Size = 1 Reset all configuration parameters to factory default settings	N/A	1

### Operation Mode 1:

	Extern button 1			Extern button 2		
Current state	Stop	Moving to 100%	Moving to 0%	Stop	Moving to 0%	Moving to 100%
Press the button once	Moving to 100%	Stop	NC	Moving to 0%	Stop	NC

### Operation Mode 2:

	Extern button 1 / Extern button 2				
Current state	At 0%	Moving to 0%	Moving to 100%	At 100%	Stop
Press the button once	Moving to 100%	Stop	Stop	Moving to 0%	Toggle