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**ZigBee™- Wireless Window Door Sensor & On/Off Switch**

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# **User Manual**

**Wireless Window Door Sensor & On/Off Switch**

**Model: Z311J**

20140305  
FW V1.0  
HW V1.1

# Table of Contents

<b>1. Introduction.....</b>	<b>3</b>
<b>2. Product Appearance.....</b>	<b>4</b>
<b>3. Specification.....</b>	<b>5</b>
<b>4. Installation Diagram.....</b>	<b>5</b>
<b>5. Setting up Z311J.....</b>	<b>6</b>
5.1. Turn On/ Turn Off Z311J.....	6
5.2. Join the ZigBee Network.....	6
5.3. Enroll in the ZigBee Security System.....	7
5.4. Sleeping Mode.....	7
5.5. Wake up Z311J.....	7
5-6. Door Window Contact Sensor.....	7
5.7. HeartBeat Technique.....	9
5.8. Battery.....	9
5.9. Restore to Factory Setting.....	9
<b>6. Home Automation Clusters for Z311J.....</b>	<b>10</b>
<b>7. Important Maintenance Instructions.....</b>	<b>12</b>

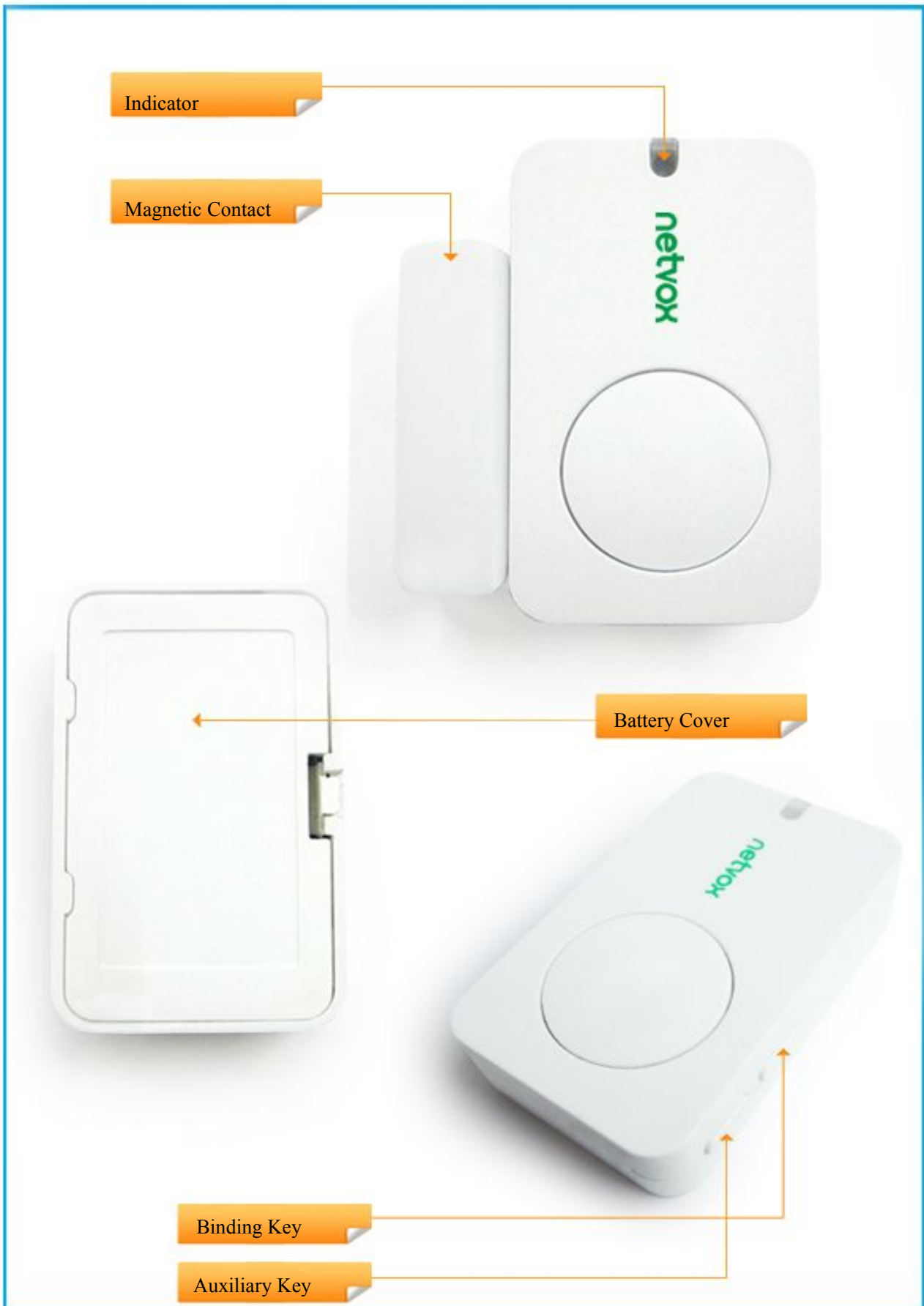
## 1. Introduction

Netvox Z311J, a Window Door Contact Sensor, acts as an End Device in ZigBee network. It does not perform permit-join function as a coordinator or a router for other devices to join the network. Z311J is featured to play a role of the sensor (Zone device) in the ZigBee security system. It is installed for being a window/door opening detector. Z311J will notify the central security unit, CIE (Control and Indicating Equipment) device, to send commands to a siren device to trigger an alarm while the window/door is opened. When the window/door has been closed, Z311J will send the normal-condition report to the CIE device. Z311J also features On/Off switch. When the window/door is opened/ closed, Z311J sends the On/Off command to the ZigBee network to turn the device on/off.

### *What is ZigBee?*

ZigBee is a short range wireless transmission technology based on IEEE802.15.4 standard and supports multiple network topologies such as point-to-point, point-to-multipoint, and mesh networks. It is defined for a general-purpose, cost-effective, low-power-consumption, low-data-rate, and easy-to-install wireless solution for industrial control, embedded sensing, medical data collection, smoke and intruder warning, building automation and home automation, etc.

## 2. Product Appearance



### 3. Specification

- Fully IEEE 802.15.4 compliant
- Utilizes 2.4GHz ISM band; up to 16 channels
- Power supply: 2 x 3V CR2450 button cell batteries.
- Operating consumption:  $\leq T_x \leq 43\text{mA}$ ;  $R_x \leq 28\text{mA}$
- Standby consumption:  $\leq 3.5\mu\text{A}$
- 6 years battery life\*
- Up to 70 meters wireless transmission range in non-obstacle space
- Easy installation and configuration

*\* Battery life may vary based on operating conditions.*

### 4. Installation Diagram

- Remove the battery cover, insert the batteries, and then mount the cover to complete the installation.
- This device is NOT truly waterproof/ resistant and is for indoor use.
- Installation: the distance between the body and the magnetic contact should be less than 2cm when the door/window is closed.

## 5. Setting up Z311J

### 5.1. Turn On/ Turn Off Z311J

Under the circumstances Z311J is first time used or after resetting, when it is powered on and cannot successfully search a network, Z311J will go into **turn-off mode**. Turn-off mode ensures the minimum power consumption. Under this mode, any other buttons and contacts are not active except the binding key.

When Z311J had previously joined a ZigBee network, Z311J will go to **turn-on mode** and is ready to work in the network after powering on it.

Users can also manually turn on or turn off Z311J using the following instructions:

- A. **Turn it on:** Press the *Binding Key* once. The indicator will flash **green once**, and the device is ready to be used.
- B. **Turn it off:** Press the *Binding Key* once. The indicator will flash **green 10 times** in 5 seconds. Press the *Binding Key* again **within the 10 green flashes** to turn the device off. Otherwise, while the key press is not applied within 5 seconds, the device will be still in turn-on mode.

**NOTE:** We recommend that users remove the battery to power off Z311J when it is not intended to be used for a long period of time.

### 5.2. Join the ZigBee Network

After Z311J is powered on, it will search for an existing ZigBee network and send a request to join the network automatically. While Z311J is under the coverage from a coordinator or a router whose **permit-join feature is enabled**, Z311J will be permitted to join the network. Typically, the default permit-join period of time is 60 seconds. Please refer to the following steps to complete the join:

- Step1. Restore Z311J back to the default factory setting (please refer to [Chapter 5.9. Restore To Factory Setting](#)).
- Step2. Enable the permit-join function (valid for 60 seconds) of a coordinator or a router (please refer to the user manual of the coordinator or the router to enable the permit-join feature).
- Step3. Turn on Z311J. It will start to search and join the network.

The indicator will flash **red 5 times** after it is joined successfully. Otherwise, the indicator will not flash. Z311J will stop searching and go to turn-off mode when it doesn't find a network to join in 15 seconds. Press the *Binding Key* again to turn it on for searching and joining the network.

- After joining a network, Z311J would try to enroll in the ZigBee security system. Please make sure Z311J and CIE (Control and Indicating Equipment) device have enough power.

### 5.3. Enroll in the ZigBee Security System

Z311J is a Zone device in the ZigBee security system. Right after Z311J join the ZigBee network, it will automatically find out a CIE (Control and Indicating Equipment) device (i.e. Netvox Z201B) and send a registration request to the CIE device to enroll in the security system. The enrollment has these 3 situations:

- A. There is no CIE device or no compatible CIE device in the network → the indicator flashes **red twice**.
- B. There is a compatible CIE device in the network, but it is failed to enroll → the indicator flashes **red 4 times**. Users can press the *Auxiliary Key* to initiate the registration.
- C. The enrollment is completed → the indicator flashes **red 6 times**.

**NOTE:** Users had better NOT enroll multiple Zone devices at the same time to prevent registration failure.

### 5.4. Sleeping Mode

Z311J is designed to go into sleeping mode for power-saving in some situations:

- A. When it doesn't find a network to join → Z311J will go to sleeping mode.
- B. While the device is in the network → the sleeping period is 5 minutes; it will wake up every 5 minutes to keep online.
- C. Once Z311J was joined to a network and by any chance the network is no longer existed or the device is out of the network → Z311J will wake up every 15 minutes to find the network it joined before. It never keeps in sleeping mode and continues to find its network every 15 minutes. This condition would consume up to 30 times power spending compared to normal-operating status. To prevent this unwanted power consumption, we recommend that users manually power off the device.

### 5.5. Wake up Z311J

When users would like to setup or acquire data from the device which is in sleeping mode, we have to wake up the device as the following steps:

- Step1. Press and hold both the *Auxiliary Key* and the *Binding Key*.
- Step2. After the indicator flashes **red twice**, release both buttons.
- Step3. Z311J will broadcast the IP address and the IEEE address.

Z311J would be in active status for 2 minutes for communication.

### 5-6. Door Window Contact Sensor

- Z311J's Zone Type: Contact switch (ID: 0x0015)
- The value of Alarm1 is 1 when the door/window is opened.
- The value of Alarm1 is 0 when the door/window is closed.

Under the circumstances that Z311J has enrolled to the security system, it will send the contact status to the

command center (and the bound devices with ID: 0x0500) after triggering. The Warning Device will send out alarm sound or lighting alert for warning.

Under the circumstances that Z311J hasn't enrolled to the security system, it will try enroll in a security system after triggering. After the enrollment, Z311J will send the contact status to the command center.

ZoneStatusChange commands: 0x00.

The command list:

Bits:8	8	8	var	
Frame control	Transaction Sequence number	Command Identifier	Frame payload	
			16-Bit Enumeration	8-Bit Enumeration
0x09		0x00	ZoneStatus	ExtendedStatus

(ClusterID : 0x 0500)

Values of the ZoneStauts payload

ZoneStatus Attribute Bit Number	Meaning	Values
0	Alarm1	1 – opened or alarmed 0 – closed or not alarmed
1	Alarm2	1 – opened or alarmed 0 – closed or not alarmed
2	Tamper	1 – Tampered 0 – Not tampered
3	Battery	1 – Low battery 0 – Battery OK
4	Supervision reports	1 – Reports 0 – Does not report
5	Restore reports	1 – Reports restore 0 – Does not report restore
6	Trouble	1 – Trouble/Failure 0 – OK
7	AC (mains)	1 – AC/Mains fault 0 – AC/Mains OK
8-15	Reserved	

Values of the ExtendedStatus payload

ExtendedStatus Attribute Bit Number	Meaning	Values
0-6	ZoneID	
7	<b>ZoneStatusChange Or Heartbeat</b>	<b>1 – HeartBeat</b> <b>0 – ZoneStatusChange</b>



## 5.7. HeartBeat Technique

In a security system, it is important that Zone devices report the conditions to the central security unit (the CIE device). To meet this need, Netvox came up with a technique called “**HeartBeat**”.

Right after Z311J enrolls to a security system, it sends a HeartBeat signal to the CIE device. Afterward, it will send HeartBeat data every 2-hour period of time by default settings.

## 5.8. Battery

Low-power report: The working voltage for Z311J is 2.1~3.6V. When the operating voltage is lower than 2.1V, Z311J will send a low-power report to the CIE device.

The related data:

- Power configuration cluster (ID:0x0001)
- Battery voltage attribute (ID:0x0020)

## 5.9. Restore to Factory Setting

While Z311J is unable to communicate with its enrolled CIE device or users would like Z311J to join a new network, a factory reset is required. To restore it to factory setting, please follow the steps:

Step1. Press and hold both the *Auxiliary Key* and the *Binding Key*.

Step2. The indicator will flash **red twice**. Keep pressing and holding the both buttons.

Step3. Until the indicator starts flashing **red** again, release both buttons.

Step4. After 10 **red** flashes, it will go into turn-off mode.

After the factory restore, please refer to [Chapter 5.1. Turn On/ Turn Off Z311J](#) to setup it.

## 6. Home Automation Clusters for Z311J

A cluster is a set of related attributes and commands which are grouped together to provide a specific function. A simple example of a cluster would be the On/Off cluster which defines how an on/off switch behaves. This table lists the clusters which are supported by Z311J.

1. End Point(s) : 0x01 ;  
                  0x02 ;
2. Device ID : HA On/Off Switch ( 0x0000 ) ;  
                  IAS Zone ( 0x0402 )
3. EndPoint Cluster ID

Server side	Client side
<b>EP 0x01 (Device ID: HA On/Off Switch(0x0000) )</b>	
Basic(0x0000)	On/Off(0x0006)
Power configuration(0x0001)	
Identify(0x0003)	
On/Off Switch Configuration(0x0007)	
Poll Control ( 0x0020 )	
Diagnostics ( 0x0B05 )	
<b>EP 0x02 (Device ID: IAS Zone(0x0402) )</b>	
Basic(0x0000)	<i>None</i>
Identify(0x0003)	
IAS zone ( 0x0500)	

This lists the attributes of the basic information.

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>ZCLVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x03	M
0x0001	<i>ApplicationVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x0A	O
0x0002	<i>StackVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x33	O
0x0003	<i>HWVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x0B	O
0x0004	<i>ManufacturerName</i>	Character string	0 – 32 bytes	Read only	netvox	O

0x0005	<i>ModelIdentifier</i>	Character string	0 – 32 bytes	Read only	Z311JE3ED	O
0x0006	<i>DateCode</i>	Character string	0 – 16 bytes	Read only	20140305	O
0x0007	<i>PowerSource</i>	8-bit Enumeration	0x00 – 0xff	Read only	0x03	M
0x0010	<i>LocationDescription</i>	Character string	0 – 16 bytes	Read/write	-	O
0x0011	<i>PhysicalEnvironment</i>	8-bit Enumeration	0x00 – 0xff	Read/write	0x00	O
0x0012	<i>DeviceEnabled</i>	Boolean	0x00 – 0x01	Read/write	0x01	M

## 7. Important Maintenance Instructions

- Please keep the device in a dry place. Precipitation, humidity, and all types of liquids or moisture can contain minerals that corrode electronic circuits. In cases of accidental liquid spills to a device, please leave the device dry properly before storing or using.
- Do not use or store the device in dusty or dirty areas.
- Do not use or store the device in extremely hot temperatures. High temperatures may damage the device or battery.
- Do not use or store the device in extremely cold temperatures. When the device warms to its normal temperature, moisture can form inside the device and damage the device or battery.
- Do not drop, knock, or shake the device. Rough handling would break it.
- Do not use strong chemicals or washing to clean the device.
- Do not paint the device. Paint would cause improper operation.

Handle your device, battery, and accessories with care. The suggestions above help you keep your device operational. For damaged device, please contact the authorized service center in your area.

## FCC Statement:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note:

1. Use the product in the environment with the temperature between -10°C and 50°C.

For the following equipment:

**CE 0700**

Is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC,  
The equipment was passed. The test was performed according to the following European standards:

**EN 301 489-1 V1.9.2: 2011-09**

**ETSI EN 301 489-17 V2.1.1: 2009-05**

**ETSI EN 300 328 V1.7.1:2006-10**

**EN62311:2008**

**EN 60950-1:2006+A11:2009+A1:2010+A12:2011**

**CAUTION  
RISK OF EXPLOSION IF BATTERY IS REPLACED  
BY AN INCORRECT TYPE.  
DISPOSE OF USED BATTERIES ACCORDING  
TO THE INSTRUCTIONS**