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**ZigBee™- Door Bell**

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# User Manual

**Door Bell**

**Model: Z312**

Firmware:V4.0

Hardware:V1.1

*Door Bell Series*

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## 1. Introduction

Netvox Z312, a Door Bell device, 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. Z312 can be logically bound with a ZigBee enable Warning Device, like Z602A, to work as a door bell button.

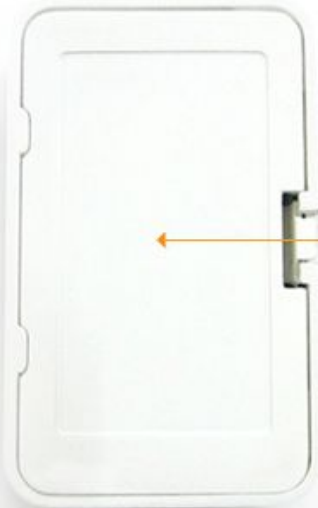
### *What is ZigBee?*

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

Indicator (Red/Green)

Doorbell Button



Battery Cover

Binding Key

Auxiliary Key

### 3. Specification

- Fully IEEE 802.15.4 compliant
- Utilizes 2.4GHz ISM band; up to 16 channels
- Power supply: 2 CR2450 button cell batteries. 715 days battery life\*
- Operating consumption:  $\leq 43\text{mA}$
- Standby consumption:  $\leq 1\mu\text{A}$
- Up to 100 meters wireless transmission range in non-obstacle space
- Easy installation and configuration

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

### 4. Installation

Z312 is powered using two 3V CR2450 button cell batteries. Please follow the instructions for installation.

Step1. Remove the battery cover (can use flathead screwdriver as an accessibility to remove cover).

Step2. Insert two CR2450 button cell batteries.

Step3. Install the battery cover.

Step4. After Z312 is powered, the indicator will flash once.

Note: default activated time to join into the network for the first time or power on are five minutes.

## 5. Setting up Z312

### 5.1. Turn On/ Turn Off Z312

Under the circumstances Z312 is first time used or after resetting, when it is powered on and cannot successfully search a network, Z312 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 Z312 had previously joined a ZigBee network, Z312 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 Z312 using the following instructions:

- A. **Turn it on:** Press the *Binding Key* once. The indicator will flash **red once**, and the device is ready to be used.
- B. **Turn it off:** Press the *Binding Key* once. The indicator will flash **red 10 times** in 5 seconds. Press the *Binding Key* again within 5 seconds 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.

**NOTE1:** We recommend that users remove the battery to power off Z312 when it is not intended to be used for a long period of time.

**NOTE2:** After Z312 first-time joins a network or re-installs the batteries, it will be activated for 5 minutes.

### 5.2. Join the ZigBee Network

After Z312 is powered on, it will search for an existing ZigBee network and send a request to join the network automatically. While Z312 is under the coverage from a coordinator or a router whose **permit-join feature is enabled**, Z312 will be permitted to join the network. Typically, the permit-join period is 1 minute. Please refer to the following steps to complete the join:

- Step1. 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).
- Step2. Turn on Z312. It will start to search and join the network.

The indicator will flash **green 5 times** after it is joined successfully. Otherwise, the indicator will not flash. Z312 will stop searching and go to turn-off mode when it doesn't find a network to join. Press the *Binding Key* again to turn it on for searching and joining the network.

### 5.3. Binding

To make Z312 work with the Warning Device such Z602A, users need to bind the two devices:

- Step1. Press and hold the *Binding Key* for 3 seconds to broadcast the binding request. The indicator will flash **red once**.

Step2. Within 13 seconds, enable the binding feature of the Warning Device.

Step3. The indicator flashes **red 5 times** after the binding is completed; otherwise, it flashes **red 10 times**.

After binding, the Warning Device would generate the doorbell sound and the indicator will flash **red once** when Z312's doorbell button is applied. Without binding, the indicator will not flash.

## 5.4. Sleeping Mode

Z312 is designed to go into sleeping mode for power-saving in some situations:

- A. A. While the device is in the network → the sleeping period is 5 minutes; it will wake up every 5 minutes to keep online.
- B. B. When it doesn't find a network to join → Z312 will go to sleeping mode. It will wake up every 15 minutes to search a network to join.
- C. C. Once Z312 was joined to a network and by any chance the network is no longer existed or the device is out of the network → Z312 will wake up every 15 minutes to find the network it joined before.

It never keeps in sleeping mode and continues to find out a 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 remove the batteries to power off the device.

## 5.5. Wake up Z312

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 *Auxiliary Key* and *Binding Key*.

Step2. After the indicator flashes **red twice**, release both buttons.

Z312 would be in active status for 2 minutes for communication.

## 5.6. Enroll in the ZigBee Security System

Z312 is a Zone device in the ZigBee security system. Right after Z312 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.

- 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 and hold for 3seconds** the *Auxiliary Key* to initiate the registration manually.
- C. The enrollment is completed → the indicator flashes **red 6 times**.

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

## 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 Z312 enrolls to a security system, it sends a HeartBeat signal to the CIE device. Afterward, it will send HeartBeat data regularly. HeartBeat period supports 30 seconds~168 hours.

## 5.8. Battery

1. Working voltage of Z312 is between 2.1-3.6V.

2. Once Z312 is joined into ZigBee network successfully, the battery voltage will be detected immediately. And then battery voltage will be detected once every hour; voltage detection will be carried out when the button is pressed. Once the voltage is less than 2.1V, Z312 will make warning once every hour. Z312 will make low voltage announcement to all the device in the same network, in the mean time, the red indicator flashes once.

3. Default low-voltage threshold:

BatteryVoltageMinThreshold: 2.1V (0x15)

BatteryVoltageThreshold1: 2.2V (0x16)

BatteryVoltageThreshold2: 2.3V (0x17)

BatteryVoltageThreshold3: 2.4V (0x18)

4. When the voltage is lower than BatteryVoltageMinThreshold, it will issue alarmcode = 0x10 the alarm broadcast command;

When the voltage is lower than BatteryVoltageThreshold1, it will issue alarmcode = 0x11 the alarm broadcast command;

When the voltage is lower than BatteryVoltageThreshold2, it will issue alarmcode = 0x12 the alarm broadcast command;

When the voltage is lower than BatteryVoltageThreshold3, it will issue alarmcode = 0x13 the alarm broadcast command.

## 5.9. Restore to Factory Setting

While Z312 is unable to communicate with its enrolled CIE device or users would like Z312 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 *Auxiliary Key* and *Binding Key* for 5 seconds.

Step2. Until the indicator starts flashing **red** quickly, release both buttons to complete the reset.

Step3. After 20 flashes, Z312 will go into the turn-off mode.



After the factory restore, please refer to [Chapter 5.1. Turn On/ Turn Off Z302](#) to setup it.

## 5.10. Report Configuration for Developer

10 seconds after powering on, Z312 will detect battery voltage, if the device report has been previously configured, it will issue 1 or 2 reports within 1-60 seconds randomly on the device, and thereafter it will report according to the configuration.

If the device was already bound related report clusterID to report according to configuration, it would issue a corresponding report (Max! = 0xFFFF) immediately after completed configuration.

Battery voltage report Default: min = 3600s, max = 3600s, reportchange = 0.1,

Battery status report Default: min = 3600s, max = 0xFFFF (off), reportchange = 0.

### Report setting table:

Min Interval (Unit:second)	Max Interval (Unit:second)	Reportable Change	Change rate $\geq$ Reportable Change	Change rate $<$ Reportable Change
1-65534	1-65534	$\neq 0$	To report per Minimum interval	To report per Maximum interval
		0	To report per Minimum interval	To report per Minimum interval
0	1-65534	$\neq 0$	To report instantly	To report per Maximum interval
		0	To report per second	To report per second
1-65534	0	$\neq 0$	To report per Minimum interval	No report
		0	To report per Minimum interval	To report per Minimum interval
0	0	$\neq 0$	To report instantly	No report
		0	To report per second	To report per second
Any	65535	Any	Stop reporting	
65535	Any	Any	Stop reporting	

**Note: (1) It is not suggested to set:**

**Min Interval =0,**

**Reportable Change=0.**

**Otherwise, ZB311B will report very densely (every second) to block up the network.**

**(2) Different attributes have different units, please refer to the product specific instructions for units of reportable change.**

## 6. Home Automation Clusters for Z312

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 Z312.

1. End Point(s) : 0x01
2. Device ID : IAS Ancillary Control Equipment ( 0x0401 )
3. EndPoint Cluster ID

Cluster ID for Z312	
Server side	Client side
<b>EP 0x01 (Device ID: IAS Ancillary Control Equipment ( 0x0401 ) )</b>	
Basic(0x0000)	Identify(0x0003)
Identify(0x0003)	IAS ACE(0x0501)
Commissioning(0x0015)	IAS WD(0x0502)
IAS Zone(0x0500)	
power configure(0x0001)	
Diagnostics Information(0x0B05)	
Poll Control(0x0020)	

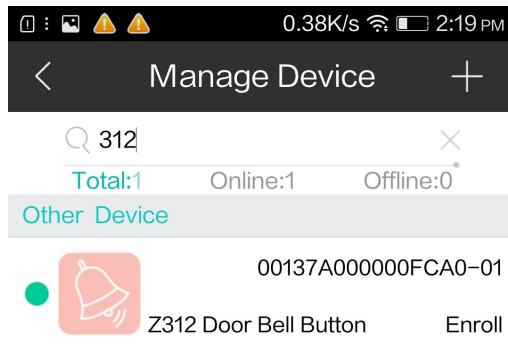
This lists the attributes of the basic information.

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	-	O
0x0002	<i>StackVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	53	O
0x0003	<i>HWVersion</i>	Unsigned 8-bit integer	0x00 – 0xff	Read only	11	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	Z312E3ED	O

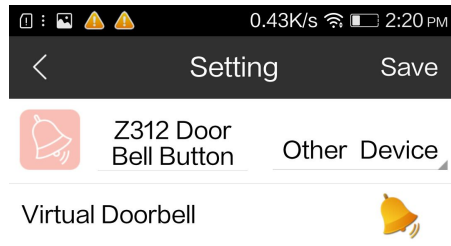
0x0006	<i>DateCode</i>	Character string	0 – 16 bytes	Read only	-	O
0x0007	<i>PowerSource</i>	8-bit Enumeration	0x00 – 0xff	Read only	0x03	M
0x0010	<i>LocationDescription</i>	Character string	0 – 16 bytes	Read/write		O
0x0011	<i>PhysicalEnvironment</i>	8-bit Enumeration	0x00 – 0xff	Read/write	0x00	O
0x0012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

## 7. Netvox App Control Interface

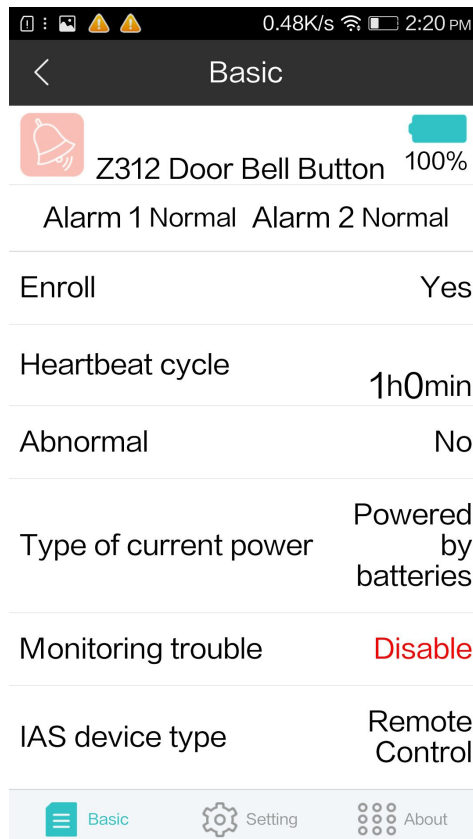
1. After joining in Netvox App system, device IEEE address will show up in device management interface. For example, 312 (Door Bell) shows information as an EP, a remote control as shown below:



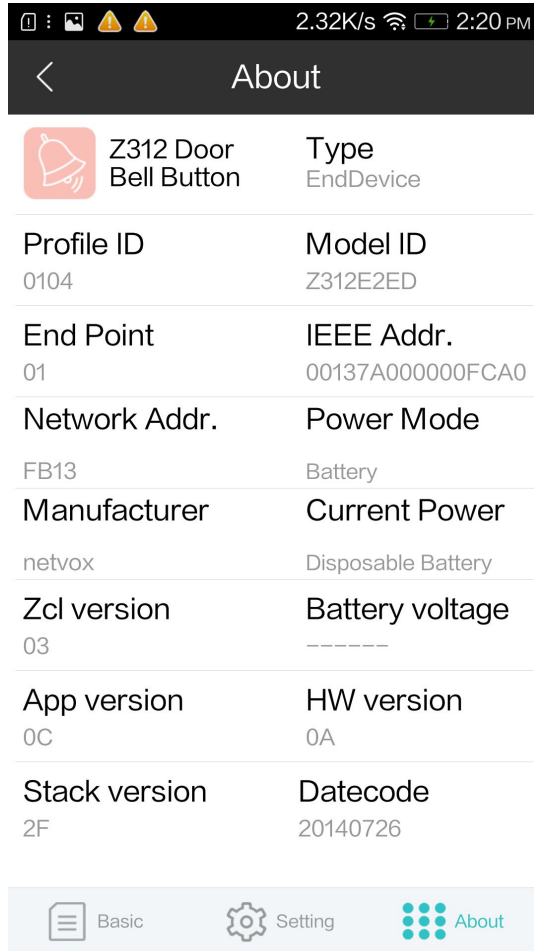
2. Select EP1 (Remote Control) to enter setting interface. In the setting interface of Z312, respectively, users can configurate other selection as shown below:



3. In the basic information interface: will show status of Z312 which is currently registered to CIE (security control center) including default Heart Beat (cardiac cycle) value, security equipment type, the current power supply type of Z312, alarm (alarm) status. As shown below:



4. Click EP1 into the basic information interface, by clicking on the bottom of the "Basic Information" "Settings" "About Device" interface to switch interfaces to check detail information of the device. As shown below.



## 8. 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.