User Manual

Light Sensor
## Model: Z311G

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1. Introduction

Netvox Z311G, a ZigBee light 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. Z311G detects and reports the surrounding light level periodically to the ZigBee network for automation controlling applications. Z311G's operating temperature is -10℃~50℃. It is suitable to be installed at the location which users have difficulty to stay for a long time such as walk-in cooler, so that people could monitor the light level in these places easier.

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)

Light Sensor

Battery Cover

Binding Key

Auxiliary Key
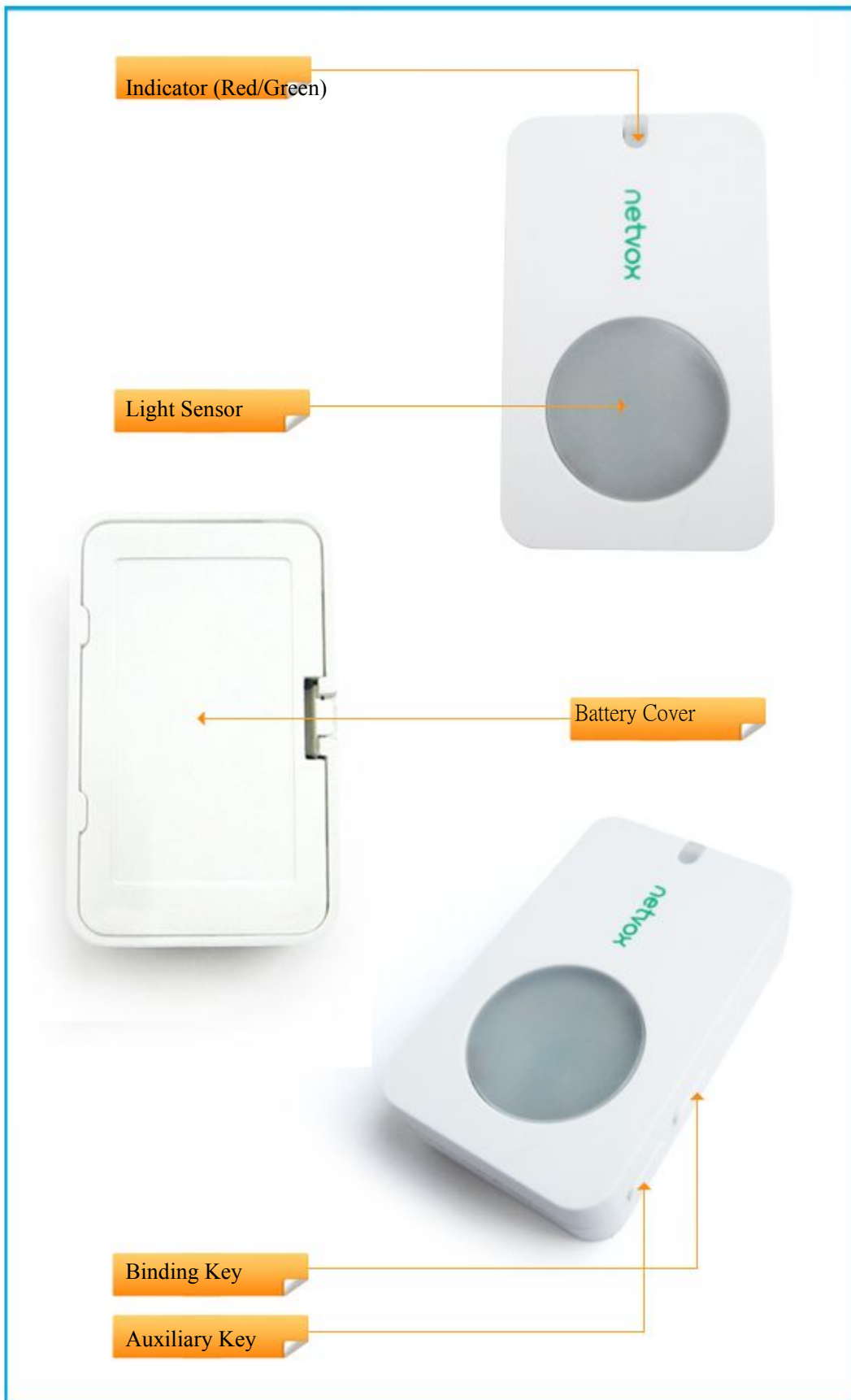
3. Specification

- 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: $\leq$ 43mA

- Standby consumption: $\leq$ 0.8uA

- Sensing level range: 1~3000 lux

- Sensing accuracy: Natural light: $\pm$5%@1~600 lux; $\pm$10%@600~1000 lux

  Energy saving lamp: $\pm$10%@1~1000 lux

  Filament lamp: $\pm$5%@1~600 lux; $\pm$11%@600~1000 lux

  At a certain calibration environment, it can not adapt to another environment. Under different

  light sources, it is required to be calibrated

- Up to 220 meters wireless transmission range in non-obstacle space
- Easy installation and configuration

  Battery life may vary based on operating conditions.

4. Installation

- Remove the battery cover, insert the batteries, and then mount the cover to complete the installation.

- Z311G is not waterproof. It is suitable for indoor installation.

5. Setting up Z311G

5-1. Turn On/ Turn Off Z311G

Under the circumstances Z311G is first time used or after resetting, when it is powered on and cannot successfully search a network, Z311G will go into turn-off mode.

To manually turn on or turn off Z311G, please use the following instructions:

A. **Turn it on:** Press the *Binding Key* once. The indicators will flash **red** **once**, and the device is ready to be used.

B. **Turn it off:** Press the *Binding Key*. The indicator will flash 10 times within 5 seconds. Press the *Binding Key* again **within the 10 flashes** to turn the device off.

5-2. Join the ZigBee Network

After Z311G is turned on, it will search for an existing ZigBee network and send a request to join the network automatically. While Z311G is under the coverage from a coordinator or a router whose **permit-join feature is enabled**, Z311G will be permitted to join the network.

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 Z311G. It will start to search and join the network.

Step3. The indicator will flash **green** **once** when it finds out a network to join.

Step4. The indicator will flash **green** **5 times** after it is joined successfully. Otherwise, the indicator will not flash.

5-3. Sleeping Mode

Z311G is designed to go into sleeping mode for power-saving in some situations:

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. When it doesn't find a network to join → Z311G will go to sleeping mode. It will wake up every 15 minutes to search a network to join.

C. Once Z311G was joined to a network and by any chance the network is no longer existed or the device is out of the network → Z311G 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.

5-4. Wake up Z311G

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 *Binding Key* and *Auxiliary Key*.
Step2. Until the indicator flashes **red twice,** release both buttons.
Step3. The indicator will flash **5 times** while broadcasting.

5-5. Battery

When the operating voltage is lower than 2.1V, the indicator will flash **red once** per hour. Z311G will send a low-power report to the ZigBee network.

5-6. Change the Light Source Mode

Users could change the Light Source Mode via ZiG-BUTLER to enhance the light sensing accuracy. It includes:
1. Natural Light
2. Energy Saving Lamp
3. Filament Lamp
4. User-defined

5-7. Calibration

Users could change the calibration setting via ZiG-BUTLER while the default Light Source Mode does not suit your needs.

5-8. Light Level Report

Z311G detects the light level every 5 minutes by default after binding. To assign the reporting conditions, users can modify the settings via netvox ZigBee application ZiG-BUTLER (please refer to Chapter 7).

5-9. Restore to Factory Setting

To restore it to factory setting, please follow the steps:

Step1. Press and hold both *Binding Key* and *Auxiliary Key* for 5 seconds.

Step2. Release the button after the indicator shows fast **red** flashes.

Step3. The indicator will flash **red** **20 times**, and the restore is completed.

5-10. Report Configuration

10 seconds after powering on, Z311B 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≥ Reportable Change	Change rate＜ Reportable Change
1-65534	1-65534	≠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	≠0	To report instantly	To report per Maximum interval
		0	To report per second	To report per second
1-65534	0	≠0	To report per Minimum interval	No report
		0	To report per Minimum interval	To report per Minimum interval
0	0	≠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 Z311G

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 Z311G.

    1.End Point(s)：0x01

    2.Device ID：Light Sensor（0x0106）

    3.EndPoint Cluster ID

Cluster ID for Z311G	
Server side	**Client side**
EP 0x01 (Device ID: Light Sensor（0x0106）)	
Basic(0x0000)	None
Identify(0x0003)	
Commissioning(0x0015)	
Illuminance Measurement (0x0400)	
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	*ZCLVersion*	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x03	M
0x0001	*ApplicationVersion*	Unsigned 8-bit integer	0x00 – 0xff	Read only	20	O
0x0002	*StackVersion*	Unsigned 8-bit integer	0x00 – 0xff	Read only	51	O
0x0003	*HWVersion*	Unsigned 8-bit integer	0x00 – 0xff	Read only	0x0B	O
0x0004	*ManufacturerName*	Character string	0 – 32 bytes	Read only	netvox	O
0x0005	*ModelIdentifier*	Character string	0 – 32 bytes	Read only	Z311GE3ED	O

| 0x0006	*DateCode*	Character string	0 – 16 bytes	Read only	20131227	O
0x0007	*PowerSource*	8-bit Enumeration	0x00 – 0xff	Read only	0x03	M
0x0010	*LocationDescription*	Character string	0 – 16 bytes	Read/write		O
0x0011	*PhysicalEnvironment*	8-bit Enumeration	0x00 – 0xff	Read/write	0x00	O
0x0012	*DeviceEnab*	Boolean	0x00 – 0x01	Read/write	0x01	M

7.Netvox APP Control Interface

1. After the device is added in Netvox App system, IEEE address will show up at device management interface in APP. Z311B shows an EP which is Light Sensor as below figure:
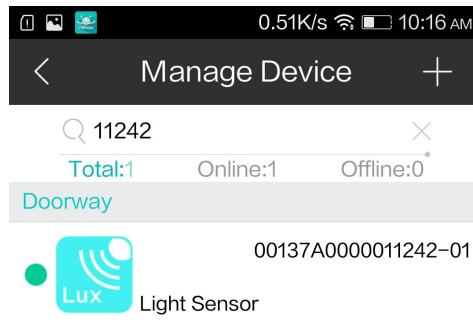
2. Select EP1（Light Sensor）into configuration interface. In the setting interface, users are able to configurate respectively, as shown below:
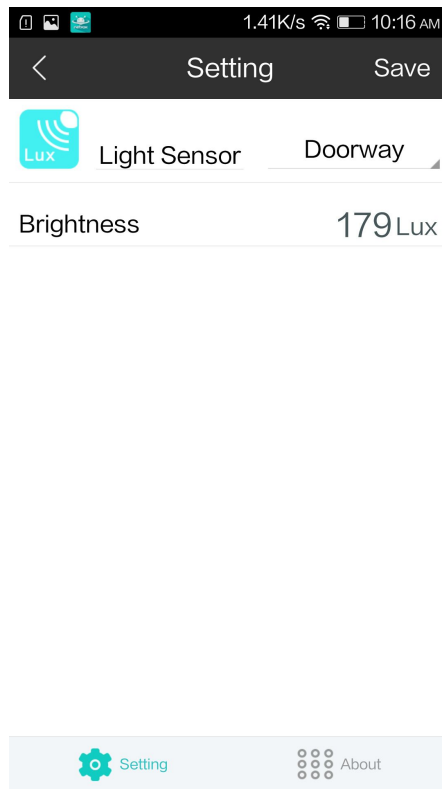
3. In the control center interface, it displays the luminance value of current environment and the light sensor operation options of Z311G. As shown below:
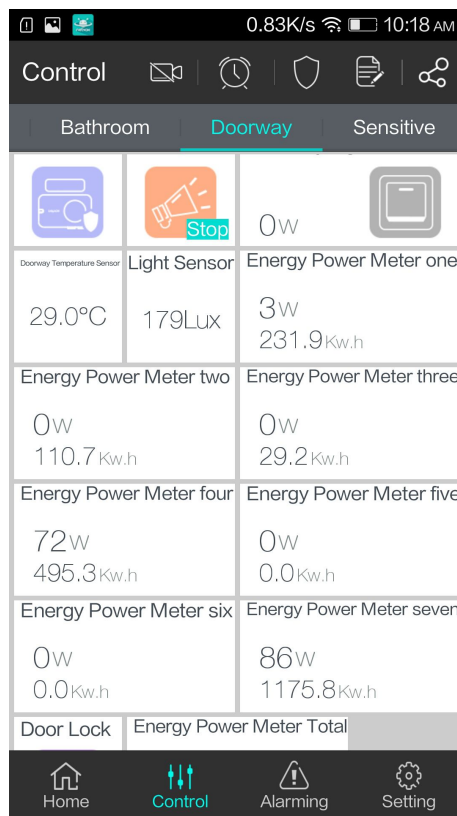
4. Click EP1 into the basic information interface, by clicking on the bottom of the "Basic Information" "Settings" "About Device" interface to switch interfaces to check detail information of the device. As shown below.
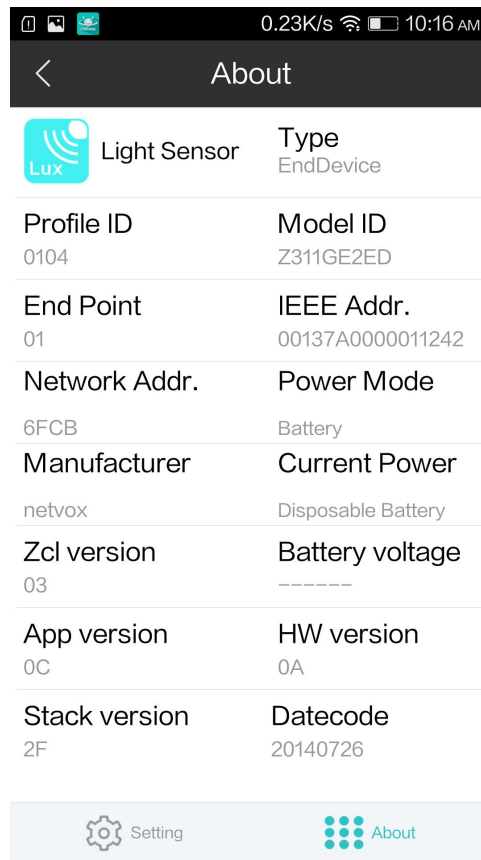
8. Important Maintenance Instructions

- 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.
- Indoor use only.

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