Wireless Load Control 2T with power/energy/current/voltage meter and LCD

Z810B User Manual

Table of Contents

1. Introduction

Z810B device acts as a simple metering device that provides the user with current consumption (load current, load voltage, power, and energy) Z810B can report its readings to a display device or a PC. This device can be switched through paired switch wirelessly or through the manual switch button.

What is ZigBee?

ZigBee is a short-range wireless transmission technology defined for minimum complexity, low power consumption, low data rate, and cost-effective wireless solution. ZigBee lies in between wireless markup technology and Bluetooth. ZigBee is based on the IEEE802.15.4 standard, the mutual coordination between thousands of sensors to exchange data. Sensor-to-sensor or node-to-node communication is achieved through relays of control data between devices with only a fraction of energy use which is denoted for high transmission efficiency.

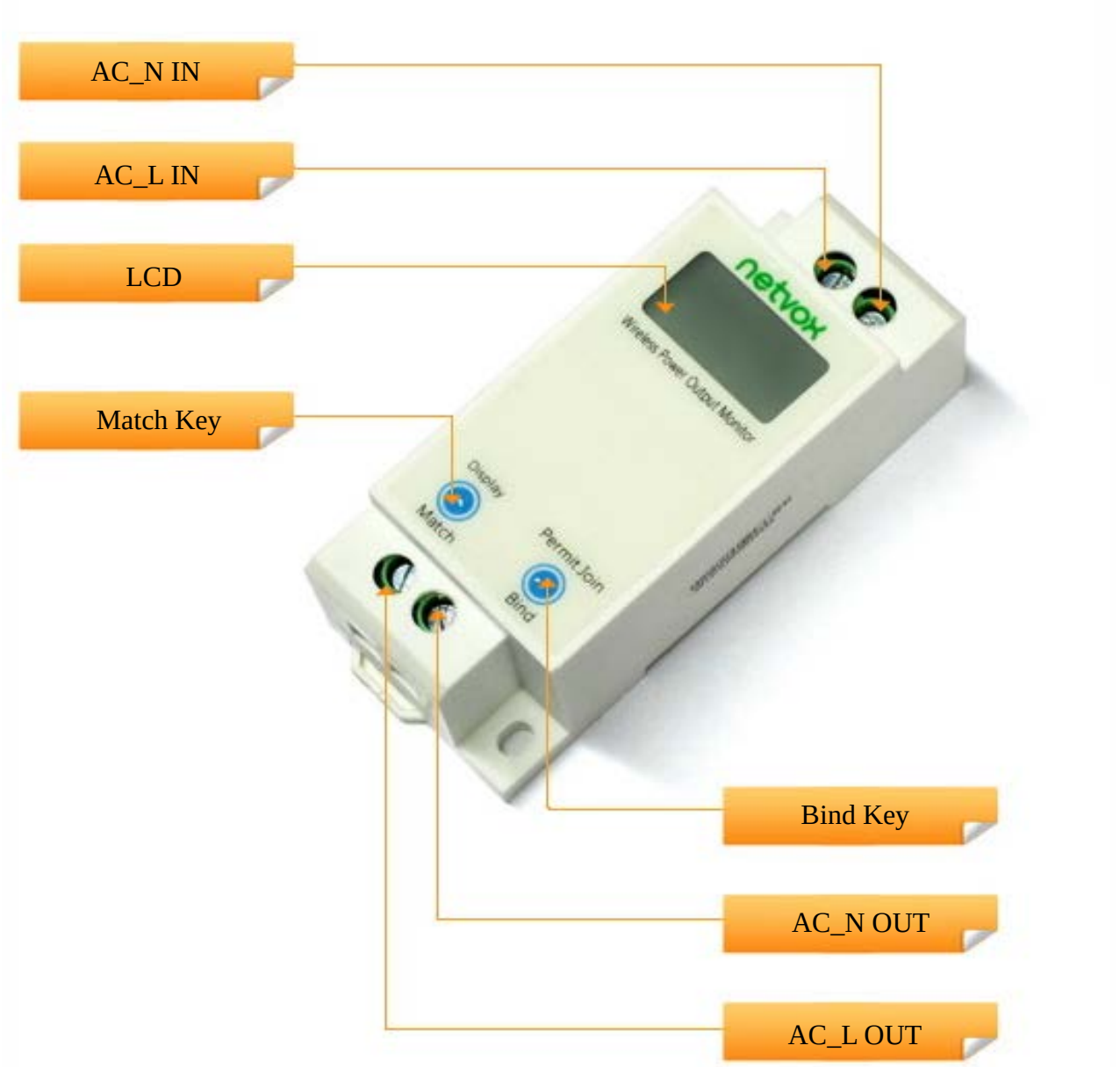
Note:

Wireless communication, in some real use cases, can be limited by the signal blockage. Please consult your service provider or place of purchase.

2. Product Specification

- ✓ Fully IEEE 802.15.4 compliant (ZigBee Pro)
- ✓ Utilizes 2.4GHz ISM band, up to 16 channels.
- ✓ 100-240VAC (50/60Hz) input power
- ✓ Up to 150 meters of non-obstacle wireless transmission distance
- ✓ Simple operation and device configuration

3. Appearance



4. Operating Instructions

4.1 Power On

Connect the Z810B device to an AC 100-240V power supply, power on the device, and the LCD backlight will light up.

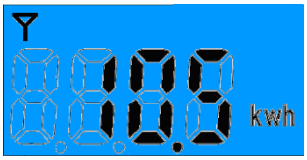
4.2 Network Joining

In order to enable Z810B to connect with other devices under the Zigbee network, Z810B needs to be added to the Zigbee network, and the network addition operation is as follows:

(a) Turn on the "allow network addition function" of the coordinator or router device in the same channel as Z810B in the network.

(b) If Z810B is used as a router in the network, it will actively search for the network after power-on and will keep flashing before it joins the network, and the value area will display power information.

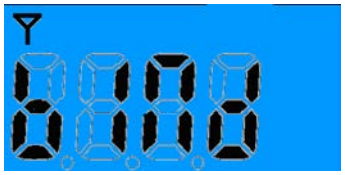
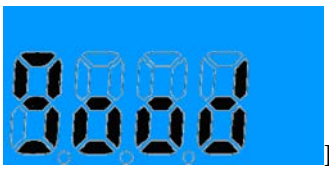
(c) If the network is added successfully, the light will remain on and the LCD value area will display the power information. As shown below:

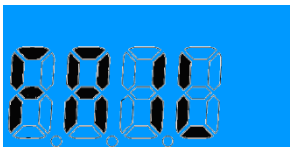


Display power consumption 10.5 kW.

4.3 End Device Binding

For the objects that Z810B can be bound to, the client side has on/off Cluster control device binding, such as Z503/Z501 of netvox, the binding operation is as follows:

(a) Press and hold the binding key for 3 seconds, the ! icon will flash once, at this time the LCD value area will display the bind information as shown in the figure:  ,and the device will send a binding request. Then operate the control device within 16 seconds to make it also send a binding request. If the binding is successful, the LCD will display "GOOD" as shown in the figure:  It will flash for 3 seconds and then return to the main screen.

If the binding fails, the LCD will display fail as shown in the figure:  It will flash for 3 seconds and then return to the main screen. After the binding is successful, you can control the device Z810B to change the switch and level.

(b) Unbind: If the binding operation is performed on the already bound device, it will be unbound.

Note: The device supports 16 Banding tables, 16 Group tables and 16 Scenes tables.

4.4 Controlled

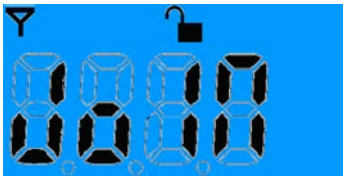
Binding control: Send switch/level commands through the bound control device to control the switch loaded on the Z810B.

4.5 Direct control

The LCD will display the  icon when the relay is working, otherwise it will not display.

4.6 Allow joining the network function

As a router in the network, Z810B has the function of allowing other devices to join the network as its sub-devices. Simultaneously press the binding key and the function key for 1 second, the icon ! will flash once, after releasing the key, the LCD value area will display JOIN, and return to the power display screen after 1 second, and the unlock icon will start flashing , and flashes 60 times. As shown in the picture:

 It is allowed to join the network for 1 minute. The device can connect up to 14 End Devices.

4.7 Electric energy, power, voltage, current switching display

On the energy display interface, short press the Energy Key button to switch to voltage (in volts), current (in amps), power (in watts), and electric energy (in kWh).

Note: The device can also automatically refresh the power interface, which is refreshed every 5 seconds.

4.8 Data reporting time

When the binding request is successful, the device sends data to the device in the binding request.

In the case of no configuration time, the default minimum time of Z810B's 0x0505\0x0508\0x050B attribute is 180 seconds, the maximum time is 300 seconds, and the reportable change is 100.

0x0510 attribute default minimum time is 180 seconds, the maximum time is 300 seconds, and the reportable change is 100.

Z810B's 0x0000, 0xE000, 0xE001, 0xE002, 0xE003 attributes default minimum time and maximum time are 0xFFFF, and reportable change is 100, which means no report by default.

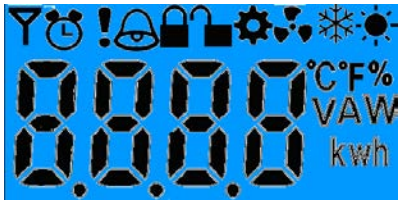
Min Interval / Max Interval setting:

Min Interval	**Max Interval**	**ReportChange**	**When data< ReportChange**	**When data≥ ReportChange**
0x0001-0xFFFE	0x0001-0xFFFE	>0	Max Interval report	Min Interval report
0x0000	0x0001-0xFFFE		Max Interval report	Immediately
0x0001-0xFFFE	0x0000		Do Not Report	Min Interval report
0x0000	0x0000		Do Not Report	Immediately
0x0001-0xFFFE	0xFFFF		Turn off the report of this attribute	Turn off the report of this attribute

*When the reportable change value is 0, the report will be sent according to the Min interval.

*The Reportable change of each attribute can be configured according to the specific load power consumption situation.

4.9 Factory reset

After Z810B joins the network, it will save its assigned network address. If you want to join a new network, you need to restore the original factory settings first. After pressing and holding the binding key for 15 seconds, the ! icon will flash (During the period, the ! icon will flash 3 times, including once every 3 seconds, once every 10 seconds, and once every 15 seconds), and then release the binding key. After releasing the button, short press the function button within 2 seconds to restore the factory settings, and the LCD value area will display: 

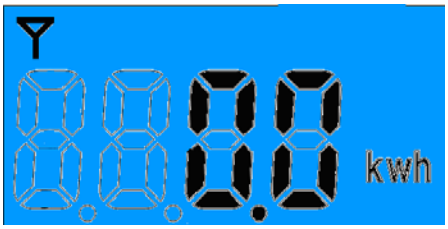
It means that the original factory settings are restored successfully, the device will automatically restart and can rejoin the network.

4.10 Erase power information

The energy information detected by Z810B will be stored in the EEPROM memory, and the energy information will not be erased when the factory value is restored, and the energy information can be erased by the following methods:

(a) After pressing and holding the bound key for 20 seconds, the ! icon will flash once (4 times during the period, including once in 3 seconds, once in 10 seconds, once in 15 seconds, and once in 20 seconds) then release the bound key.

(b) Short press the function key within 2 seconds after releasing it to make Z810B erase the power information, and the LCD value area will display the power information as 0, as shown in the figure:



4.11 Clusters of Home Automation for Z810B

1. End Point(s): 0x01
2. Device ID: Mains Power Outlet (0x0009)
3. Cluster ID supported by EndPoint

Cluster ID for Z810B	
Server Side	**Client Side**
EP 0x01 (Device ID: Mains Power Outlet (0009))	
Basic (0x0000)	None
Identify (0x0003)	
Groups (0x0004)	
Scenes (0x0005)	
On/Off (0x0006)	
Commission (0x0015)	
Diagnostics (0x0B05)	
Simple Metering (0x0702)	
Electrical Measurement (0x0B04)	

* Simple Metering (0x0702):

  Current (unit mA), Voltage (unit V), Power (unit W) and Energy (unit KWh).

4. The relevant attribute definitions of each Cluster

(1) Attributes of the Basic Device Information attribute set

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*ZCLVersion*	8-bit Unsigned integer	0x00–0xff	Read Only	0x03	M
0x0001	*ApplicationVersion*	8-bit Unsigned integer	0x00–0xff	Read Only	0x1F	O

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0002	*StackVersion*	8-bit Unsigned integer	0x00–0xff	Read Only	0x35	O
0x0003	*HWVersion*	8-bit Unsigned 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	Z810BE3R	O
0x0006	*DateCode*	Character string	0 – 16 Bytes	Read Only	20140706	O
0x0007	*PowerSource*	8-bit Enumeration	0x00–0xff	Read Only	0x01	M
0x0010	*LocationDescription*	Character string	0 – 16 Bytes	Read /Write	Empty string	O
0x0011	*PhysicalEnvironment*	8-bit Enumeration	0x00–0xff	Read /Write	0x00	O
0x0012	*DeviceEnabled*	Boolean	0x00–0x01	Read /Write	0x01	O

(2) Attributes of the identify server cluster

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*IdentifyTime*	16-bit Unsigned integer	0x0000–0xffff	Read	0x0000	M

(3) Attributes of the Group server cluster

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*NameSupport*	8-bit bitmap	x0000000	Read Only	10000000	M

(4) Attributes of the Scene server cluster

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*SceneCount*	Unsigned 8-bit integer	0x00 – 0xff	Read Only	0x00	M

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0001	*CurrentScene*	Unsigned 8-bit integer	0x00 – 0xff	Read Only	0x00	M
0x0002	*CurrentGroup*	Unsigned 16-bit integer	0x0000 – 0xfff7	Read Only	0x00	M
0x0003	*SceneValid*	Boolean	0x00 – 0x01	Read Only	0x00	M
0x0004	*NameSupport*	8-bit bitmap	x0000000	Read Only	10000000	M

(5) Attributes of the On/Off server cluster

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*OnOff*	Boolean	0x00–0x01	Read Only	0x00	M

(6)Attributes of the Commissioning Information

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*Short address*	Unsigned 16-bit integer	0x0000 – 0xfff7	Read /Write	0	O
0x0001	*Extended pan id*	IEEE_ADDRESS	0x0000000000000000 -- 0xfffffffffffffffe	Read /Write	FFFFFFFFFFFFFFF	M
0x0002	*Pan id*	Unsigned 16-bit integer	0x0000– 0xFFFF	Read /Write	0xFFFF	O
0x0003	*Channel mask*	BITMAP32	Any valid IEEE 802.15.4 channel mask	Read /Write	0x07FFF800	M
0x0006	*Startup control*	8-bit Enumeration	0x00 - 0x03	Read /Write	0x03	M

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0010	*Trust center address*	IEEE_ADDRESS	Any valid IEEE Address	Read /Write	0x0000000000000000	M
0x0011	*Trust center master key*	SECURITY_KEY	Any 128-bit value	Read /Write	0000000000	M
0x0012	*Network key*	SECURITY_KEY	Any 128-bit value	Read /Write	5A 69 67 42 65 65 41 6C 6C 69 61 6E 63 65 30 39	M
0x0013	*Use insecure join*	BOOLEAN	FALSE /TRUE	Read /Write	0x1	M
0x0014	*Preconfigured link key*	SECURITY_KEY	Any 128-bit value	Read /Write	5A 69 67 42 65 65 41 6C 6C 69 61 6E 63 65 30 39	M
0x0015	*Network key sequence number*	Unsigned 8-bit integer	0x00-0xFF	Read /Write	0x00	M
0x0016	*Network key type*	8-bit Enumeration	Any valid key type value	Read /Write	0x05	M
0x0017	*Network mananger address*	Unsigned 16-bit integer	Any valid network address	Read /Write	0x0000	M
0x0020	*Scan attempts*	Unsigned 8-bit integer	0x01-0xFF	Read /Write	0x05	M
0x0021	*Time between scans*	Unsigned 16-bit integer	0x0001–0xFFFF	Read /Write	0x0064	M
0x0022	*Rejoin interval*	Unsigned 16-bit integer	0x0001 - MaxRejoinInterval	Read /Write	0x003C	M
0x0023	*Max rejoin interval*	Unsigned 16-bit integer	0x0001–0xFFFF	Read /Write	0x0E10	M
0x0030	*Indirect poll rate*	Unsigned 16-bit integer	0x0000–0xFFFF	Read /Write	0x0000	M

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0031	*Parent retry threshold*	Unsigned 8-bit integer	0x00-0xFF	Read /Write	0x00	M
0x0040	*Concentrator flag*	BOOLEAN	FALSE/TRUE	Read /Write	0x00	M
0x0041	*Concentrator radius*	Unsigned 8-bit integer	0x00-0xFF	Read /Write	0x0F	M
0x0042	*Concentrator discovery time*	Unsigned 8-bit integer	0x00-0xFF	Read /Write	0x00	M

(7) Attributes of the Simple Metering Cluster server cluster

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*CurrentSummation-Delivered*	Unsigned 48-bits Integer	0x000000000000 - 0xFFFFFFFFFFFF	Read Only	0x000000000000	O
0x0200	*Status*	8-bit Enumeration	0x00 - 0xFF	Read Only	0x00	M
0x0300	*unit of measure*	8-bit Enumeration	0x00 - 0xFF	Read Only	0x.00	M
0x0301	*multiplier*	Unsigned 24bit Integer	0x000000 - 0xFFFFFF	Read Only	0x0001	O
0x0302	*divisor*	Unsigned 24bit Integer	0x000000 - 0xFFFFFF	Read Only	0x03e8	O
0x0303	*summation formatting*	8 bit BitMap	0x00 - 0xFF	Read Only	0xfb	M
0x0306	*metering device type*	8 bit BitMap	0x00 - 0xFF	Read Only	0x00	O
0xE000	*Current*	Unsigned 16-bit integer	0x0000 - 0xFFFF	Read Only	0x0000	O

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0xE001	*Voltage*	Unsigned 16-bit integer	0x0000 - 0xFFFF	Read Only	0x0000	O
0xE002	*Power*	Unsigned 16-bit integer	0x0000 - 0xFFFF	Read Only	0x0000	O
0xE003	*Energy*	Unsigned 32-Bit integer	0x00000000 - 0xFFFFFFFF	Read Only	0x00000000	O

(8) Attribute of Electrical Measurement

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	*MesurementType*	32-bit bitmap	0x00000000 - 0xFFFFFFFF	Read Only	0x0000000F	O
0x0505	*RMSVoltage*	Unsigned 16-bit integer	0x0000 - 0xFFFF	Read Only	0xFFFF	O
0x0508	*RMSCurrent*	Unsigned 16-bit integer	0x0000 - 0xFFFF	Read Only	0xFFFF	O
0x050B	*ActivePower*	Signed 16-bit integer	-32768 - 32767	Read Only	0xFFFF	O
0x050E	*ReactivePower*	Signed 16-bit integer	-32768 - 32767	Read Only	0xFFFF	O
0x050F	*ApparentPower*	Unsigned 16-bit integer	0x0000 - 0xFFFF	Read Only	0xFFFF	O
0x0510	*PowerFactor*	Signed 8-bit integer	-100 to +100	Read Only	0x00	O
0x0600	*ACVoltageMultiplier*	Unsigned 16-bit integer	0x0001 - 0xFFFF	Read Only	0x0001	O
0x0601	*ACVoltageDivisor*	Unsigned 16-bit integer	0x0001 - 0xFFFF	Read Only	0x0001	O

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0602	*ACCurrentMultiplier*	Unsigned 16-bit integer	0x0001 - 0xFFFF	Read Only	0x0001	O
0x0603	*ACCurrentDivisor*	Unsigned 16-bit integer	0x0001 - 0xFFFF	Read Only	0x03E8	O
0x0604	*ACPowerMultiplier*	Unsigned 16-bit integer	0x0001 - 0xFFFF	Read Only	0x0001	O
0x0605	*ACPowerDivisor*	Unsigned 16-bit integer	0x0001 - 0xFFFF	Read Only	0x0001	O
0x0800	*ACAlarmsMask*	Bitmap 16	0000 xxxx	Read /Write	0000 0000	O
0x0801	*ACVoltage Overload*	Signed 16-bit integer	-32768 - 32767	Read Only	0x00FA	O
0x0802	*ACCurrent Overload*	Signed 16-bit integer	-32768 - 32767	Read Only	0x7530	O
0x0803	*ACActive PowerOverload*	Signed 16-bit integer	-32768 - 32767	Read Only	0x1D4C	O

(9) Attribute of the Diagnostics server cluster

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x011C	*LastMessageLQI*	Int8u	0x00-0xff	Read Only	0x00	O
0x011D	*LastMessageRSSI*	Int8s	0x00-0xff	Read Only	0x00	O

4.12 Product attributes and custom instruction description

1. The Cluster used by Z810B refers to the Cluster ID (0x0702) and Electrical Measurement Cluster ID (0x0B04) used by Simple Metering in SE, and in the Cluster ID (0x0702), NETVOX has customized the attributes of current, voltage, power, and electric energy.

Cluster ID (0x0B04):

(1) The Attribute ID used for the current attribute is: 0x0508, and the voltage attribute is 0x0505.

(2) The power attribute uses Attribute ID: 0x050B, and the power factor attribute is 0x0510.

Cluster ID (0x0702):

(1) The custom current attribute uses Attribute ID: 0xE000, and the custom voltage attribute is 0xE001.

(2) The custom power attribute uses Attribute ID: 0xE002, and the custom electric energy attribute is 0xE003.

(3) The attribute CurrentSummationDeliver whose AttributeID is 0x0000 corresponds to the electric energy attribute 0xE003.

(4) Electric energy ATTRID = 0xE003 (or 0x0000), the unit is wh. power ATTRID = 0xE002, the unit is w. Current ATTRID = 0xE000, the unit is mA; Voltage ATTRID = 0xE001, the unit is V

2. Custom directive

The command to erase the current power information is: 0xE0. The command format is:

Bits: 8	16	8	8	8
Frame control	Manufacturer code	Transaction Sequence number	Command identifer	Frame payload
				Action
0x05	0x109F		0xE0	0x00

(clustered: 0x0702, Action: 0x00)

5. Load Characteristics

Rated Load (AC)	Max. Load with LEDs	Max. Inductive Load (cosφ=0.4)	Max. Load with Electric Motors	Overload Protection with Auto Power Cutoff
20A / 250V	100W / 1 LED	5A / 250V	2HP / 250V	Yes

6. Installation Method

This product does not have a waterproof function. After the network configuration is completed, please place it indoors

Notice:

1. When the detected current exceeds the measurement range (20A), the device will automatically disconnect the load within 2 seconds after the detection, and check whether the Bit1 (Current OverLoad) of the attribute ACAlarmsMask is 1. If it is 1, the device will sent an alarm, 0 for no alarm.
   AlarmCluster = 0x0B04, AlarmCode = 0xF0; network light (using red light) flashes 10 times (10,250,250)

2. If the storage chip of Z810B is AT2401, it will save it every 30 seconds, if it is AT2402, it will save it every 10s, and other high-capacity storage such as AT2404/08 will save it every 1 second, so the data within 30/10/1 second will be lost due to power failure.

7. Important Maintenance Instruction

As the device is not water proof it is recommended to keep the device in a dry place. Liquid and heavy moisture contains minerals that may oxidize the electronic circuitry. In case of liquid spill, please leave the device to completely dry before storing or using.

- Do not use or store the device in a dusty area. Dust may cause electronic parts to destroy.
- Do not use or store the device in an over heated place. Store in a hotter temperature than the suggested maximum temperature may shorten the life span of the device; and may damage the battery and causing the housing to deform.
- Do not use or store the device in a very cold place than the suggested minimum temperature. The water can be condensed inside the device when moving to an area that is higher in temperature. This can severely damage the PCB board and circuitry. This may shorten the life span of the device; damage the battery and cause the housing to deform.
- Do not throw or strongly vibrate the device. This may damage connectivity of the electronic parts and other sensitive components on the PCB board.
- Do not use any strong chemical or washing to cleanse the device.
- Do not use any coloring materials on any removable parts which my cause poor connections and may keep the device from function properly.

All the above applies to the purchased products, battery and other packaged items. If any unusable or damaged items are found please return the product to your nearest authorized repairing center.