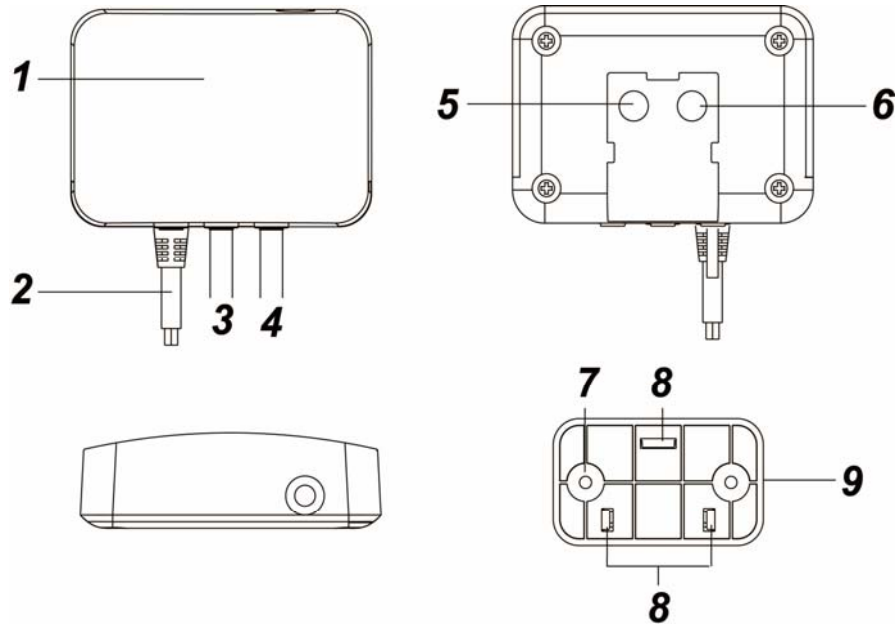


# Clamp Meter (CLMT-1ZBS)

CL-Meter-ZBS is a ZigBee Clamp Meter aim to monitor and report the total amount of electricity uses in your facility by connecting the clamp onto the power cable.

The Clamp Meter utilizes ZigBee technology for wireless signal transmission. ZigBee is a wireless communication protocol that is reliable and has low power consumption and high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission.

The Clamp Meter serves as an end device in the ZigBee network. It can be included in the ZigBee network to transmit signal upon activation, but cannot permit any other ZigBee device to join the network through the Clamp Meter.



## Parts Identification

### 1. Red LED

Flash twice quickly:

The Clamp Meter has successfully joined a ZigBee network.

Flashes once:

When Clamp Meter is reset.

Flash once every 20 minutes:

The Clamp Meter has lost its connection to its current ZigBee network.

### 2. AC Input cable

### 3. Current Transformer Cable (CT1)

### 4. Current Transformer Cable (CT2)

### 5. Function Button

-Press the button once to report the value of the meter to the ZigBee network.

-Press and hold the button for 10 seconds then release to reset the Clamp Meter.

### 6. Reserved

### 7. Mounting Hole

### 8. Mounting Hooks

### 9. Mounting Bracket

# Installation

## ● Wiring

### WARNING

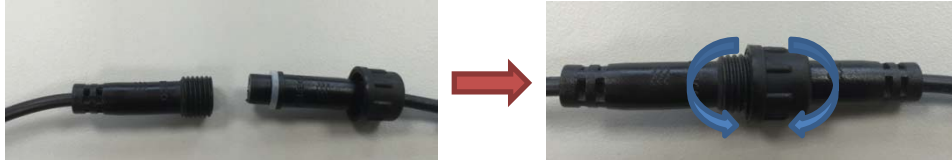
Wiring of the device should only be performed by a licensed electrician. The circuit box's main breaker should be turned off to perform installation.

The insertion hole wire specification is AWG18 or  $\varnothing 1.02$  (mm<sup>2</sup>).

The Clamp specification is 60A  $\varnothing 10$ mm

Please make sure the main power in your facility is also off before installing. Follow the steps below:

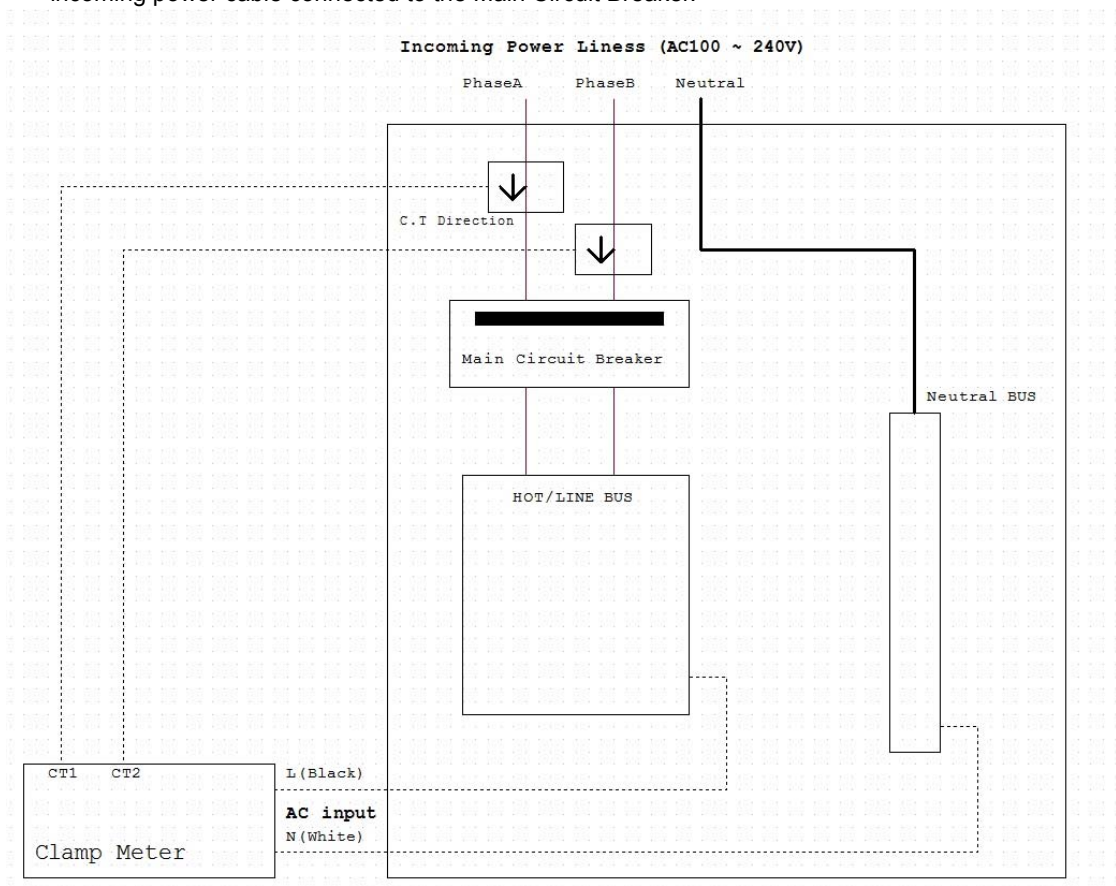
1. Connect AC Input cable to a socket near the Electrical Box to power on the Clamp Meter.
2. Attach both ends of the Current Transformer Cables first as picture shown below. Once you have attached the Current Transformer Cable, start spinning the waterproof latch clock-wise until you have tighten and secure both ends of the Current Transformer Cable.



3. Open the clamp as indicated by below picture. The clamp should be applied onto an electric cable. The arrow direction on the clamp need to point at the correct direction of the electricity current flows (**K→L**). If arrow is faced in reverse direction, the reading will display negative value (-) however it will not influence the readings.



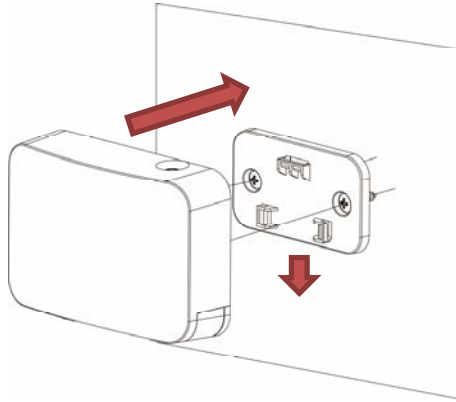
4. Follow the schematics below as an example; clip the clamps on the electricity cables on the 2 the incoming power cable connected to the Main Circuit Breaker.



## ● Mounting

The Clamp Meter has a mounting bracket for mounting purposes.

1. Use the mounting bracket as template to mark the two holes on the wall for installing screws.
2. Screw the mounting bracket onto the wall according to marked location. Install wall plugs if necessary.
3. Locate the hooks of the mounting bracket and line up the hooks with the mounting holes on the Clamp Meter. Fit the hooks into the mounting holes as picture below. Installation is now complete.



## ZigBee Network Setup

### ● **ZigBee Device Guideline**

ZigBee is a wireless communication protocol that is reliable and has low power consumption and high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission.

Due to the fundamental structure of ZigBee network, ZigBee device will actively seek and join network after powering on. Since performing a task in connecting network may consume some power, it is required to follow the instructions to avoid draining battery of a ZigBee device

- Ensure your ZigBee network router or coordinator is powered on before inserting battery into the ZigBee device.
- Ensure the ZigBee network router or coordinator is powered on and within range while a ZigBee device is in use.
- Do not remove a ZigBee device from the ZigBee network router or coordinator without removing the battery from a ZigBee device.

### ● **Joining the ZigBee Network**

As a ZigBee device, the Clamp Meter needs to join a ZigBee network to be able to read the meter. Please follow the steps below to join the Clamp Meter into ZigBee network.

The Clamp Meter has 2 ZigBee Endpoints representing 2 current transformers. When joining ZigBee network, it will be recognized as **2 separate ZigBee devices** and will occupy **2 zones** in your ZigBee network coordinator.

1. Plug in the AC Input cable into the socket to power on the Clamp Meter.
2. Press and hold the function button for 10 seconds and release to search for existing ZigBee network. Please make sure the permit-to-join feature on the router or coordinator of your ZigBee network is enabled.
3. After joining the ZigBee network, the Clamp Meter will be registered in the network automatically. Please check the ZigBee coordinator, security system control panel or CIE (Control and Indicating Equipment) to confirm if joining and registration is successful.
4. Under normal operation, if the Clamp Meter loses connection to its current ZigBee network, the LED indicator will flash every 20 minutes to indicate the situation. Please check your ZigBee network condition and Clamp Meter signal range to correct the situation.

### ● **Removing Device from ZigBee Network (Factory Reset)**

To remove the device from current ZigBee network, the Clamp Meter must be put to Factory Reset to complete device removal. Factory Reset function will clear the Clamp Meter of its stored setting information and prompt the device to search for new ZigBee network.

**Before removing device, make sure the Clamp Meter is within current ZigBee network signal range**

1. Delete the Clamp Meter from current control panel / CIE.
2. Press and hold the function button for 10 seconds, then release the button to reset device.
3. Upon reset, the Clamp Meter will clear current ZigBee network setting and transmit signal to ZigBee coordinator to remove itself from current ZigBee network. It will then actively search for available ZigBee network again and join the network automatically.

## ● **Energy Consumption Monitor**

- The Clamp Meter will transmit a signal from the clamp itself with its power consumption data every 10 minutes to the ZigBee network coordinator.
  - Reading from clamp on Current Transformer Cable **CT-1** is reported to ZigBee Endpoint **0x01**.
  - Reading from clamp on Current Transformer Cable **CT-2** is reported to ZigBee Endpoint **0x02**.
- Whenever the Clamp's energy output changes by +/- 2W, the Clamp Meter will automatically transmit a signal with power consumption data to the ZigBee network coordinator for update.
- The Clamp Meter transmits a signal with power data to coordinator whenever accumulated power usage of the clamp increases by 0.1kW/hr.
- The Clamp has an accuracy of +/- 5%.
- To clear the clamp of its accumulated power consumption data, follow steps below:
  1. Un-plug AC cable to power down Clamp Meter.
  2. Press and hold the function button, while holding the button, power on the Clamp Meter by re-plug in the AC cable.
  3. Release the function button when red LED starts to quickly flash.
  4. Un-plug and re-plug AC cable again, clearing is complete.

## ● **Maximum Operation Load**

- 110V: 6600W and 60A
- 230V: 13800W and 60A.

## Appendix (For developers only)

### ● **Scene Selector Cluster ID**

|                                                        |                    |
|--------------------------------------------------------|--------------------|
| <b>Device ID: Consumption Awareness Device :0x000D</b> |                    |
| <b>Endpoint: 0x01</b>                                  |                    |
| <b>Server Side</b>                                     | <b>Client Side</b> |
| <b>Mandatory</b>                                       |                    |
| Basic (0x0000)                                         | Identify (0x0003)  |
| Identify(0x0003)                                       |                    |
| Metering (0x0702)                                      |                    |
| <b>Optional</b>                                        |                    |
| <i>None</i>                                            | <i>None</i>        |

|                                                        |                    |
|--------------------------------------------------------|--------------------|
| <b>Device ID: Consumption Awareness Device :0x000D</b> |                    |
| <b>Endpoint: 0x02</b>                                  |                    |
| <b>Server Side</b>                                     | <b>Client Side</b> |
| <b>Mandatory</b>                                       |                    |
| Basic (0x0000)                                         | Identify (0x0003)  |
| Identify(0x0003)                                       |                    |
| Metering (0x0702)                                      |                    |
| <b>Optional</b>                                        |                    |
| <i>None</i>                                            | <i>None</i>        |

### ● **Attribute of Basic Cluster Information**

| <b>Identifier</b> | <b>Name</b>               | <b>Type</b>            | <b>Range</b> | <b>Access</b> | <b>Default</b>    | <b>Mandatory / Optional</b> |
|-------------------|---------------------------|------------------------|--------------|---------------|-------------------|-----------------------------|
| 0x0000            | <i>ZCLVersion</i>         | Unsigned 8-bit integer | 0x00 –0xff   | Read only     | 0x01              | M                           |
| 0x0001            | <i>ApplicationVersion</i> | Unsigned 8-bit integer | 0x00 – 0xff  | Read only     | 0x00              | O                           |
| 0x0003            | <i>HWVersion</i>          | Unsigned 8-bit integer | 0x00 –0xff   | Read only     | 0                 | O                           |
| 0x0004            | <i>ManufacturerName</i>   | Character String       | 0 – 32 bytes | Read only     | Climax Technology | O                           |
| 0x0005            | <i>ModelIdentifier</i>    | Character String       | 0 – 32 bytes | Read only     | (Model Number)    | O                           |
| 0x0006            | <i>DateCode</i>           | Character String       | 0 – 16 bytes | Read only     | 20160620          | O                           |
| 0x0007            | <i>PowerSource</i>        | 8-bit                  | 0x00 –0xff   | Read          |                   | M                           |

|        |                            |                   |              |              |      |   |
|--------|----------------------------|-------------------|--------------|--------------|------|---|
|        |                            | Enumeration       |              | only         |      |   |
| 0x0010 | <i>LocationDescription</i> | Character String  | 0 – 32 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 |

• **Attribute of Identify Cluster Information**

| Identifier | Name                | Type                    | Range        | Access       | Default | Mandatory / Optional |
|------------|---------------------|-------------------------|--------------|--------------|---------|----------------------|
| 0x0000     | <i>IdentifyTime</i> | Unsigned 16-bit integer | 0x00 –0xffff | Read / Write | 0x0000  | M                    |

• **Attribute of the Metering Cluster Information**

| Identifier | Name         | Type                    | Range         | Access       | Default | Mandatory / Optional |
|------------|--------------|-------------------------|---------------|--------------|---------|----------------------|
| 0x0000     | IdentifyTime | Unsigned 16-bit integer | 0x00 - 0xffff | Read / Write | 0x0000  | M                    |

• **Attribute of the Metering Cluster Information**

| Identifier | Name                       | Type                    | Range                                 | Access    | Default | Mandatory / Optional |
|------------|----------------------------|-------------------------|---------------------------------------|-----------|---------|----------------------|
| 0x00       | CurrentSummation Delivered | Unsigned 48-bit integer | 0x00000000000000 to 0xFFFFFFFFFFFFFFF | Read Only | 0x00    | M                    |

• **Attributes of the Metering cluster Information**

| Identifier | Name               | Type                    | Range                  | Access    | Default | Mandatory / Optional |
|------------|--------------------|-------------------------|------------------------|-----------|---------|----------------------|
| 0x00       | UnitofMeasure      | 8-bit Enumeration       | 0x00 to 0xFF           | Read Only | 0x00    | M                    |
| 0x01       | Multiplier         | Unsigned 24-bit Integer | 0x000000 to 0xFFFFFFFF | Read Only | 1       | O                    |
| 0x02       | Divisor            | Unsigned 24-bit Integer | 0x000000 to 0xFFFFFFFF | Read Only | 0xF9    | M                    |
| 0x03       | SummationFormating | 8-bit BitMap            | 0x00 to 0xFF           | Read Only | 0xF9    | M                    |
| 0x04       | DemandFormating    | 8-bit BitMap            | 0x00 to 0xFF           | Read Only | 0x94    | O                    |
| 0x06       | MeteringDeviceType | 8-bitMap                | 0x00 to 0xFF           | Read Only | 0x00    | M                    |

• **Attributes of the Metering cluster Information**

| Identifier | Name                | Type                  | Range                   | Access    | Default | Mandatory / Optional |
|------------|---------------------|-----------------------|-------------------------|-----------|---------|----------------------|
| 0x00       | InstantaneousDemand | Signed 24-bit Integer | -8,388,607 to 8,388,607 | Read Only | 0x00    | O                    |

## **Federal Communication Commission Interference Statement**

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 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.

***FCC Caution:*** To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

## ***FCC Radiation Exposure Statement***

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

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.