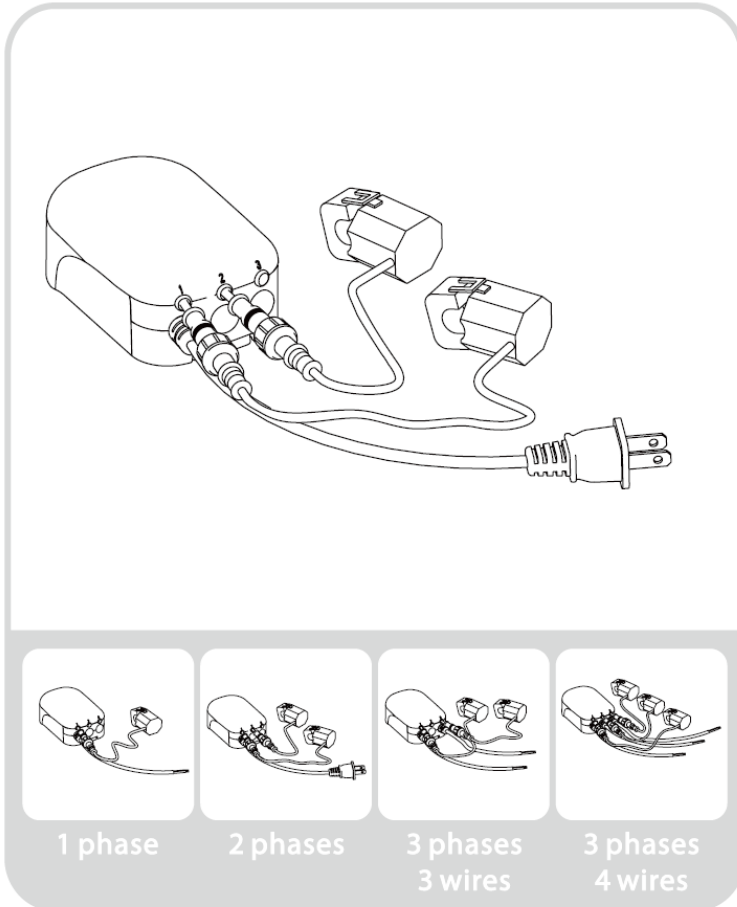# Home Energy Meter Gen5 (User Guide)

Modified on: Thu, 8 Dec, 2016 at 11:29 PM

Aeotec by Aeon Labs Home Energy Meter.

You hear a lot about energy use these days. About how if you reduce the amount of energy you use you'll both save money and the environment. But saving money by using less electricity is only possible if you understand when and how you are using it. That's what Aeotec's Home Energy Meters provide you with: understanding, for your whole home.

Installed in an electricity box, your new energy meter will monitor the total amount of electricity your home uses with accuracy and speed. Using a wireless Z-Wave® connection, it'll then feed the data it records back to your smart home's gateway. In near real-time you'll have a full understanding of how much electricity you use and when you use it.

Familiarize yourself with your Home Energy Meter.

Your Home Energy Meter from Aeotec by Aeon Labs is comprised of two parts: the Main Body and Clamps. Once installed, the meter will sit near your home's main circuit box, while the clamps are attached to it.
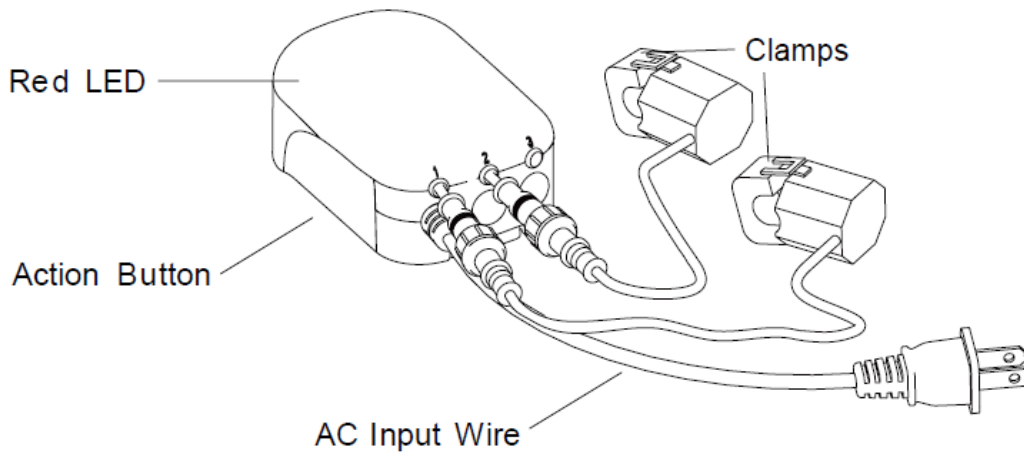
Quick start.

The installation of your Home Energy Meter has two major parts: the installation of it into your home's main circuit box and the syncing of it to your Z-Wave network. What follows are the instructions for both parts. Please note that only a licensed electrician, with knowledge and understanding of electrical systems and electrical safety, should perform the electrical installation of your meter into your home's circuit box. The syncing of your Home Energy Meter with your Z-Wave network can be performed by you.
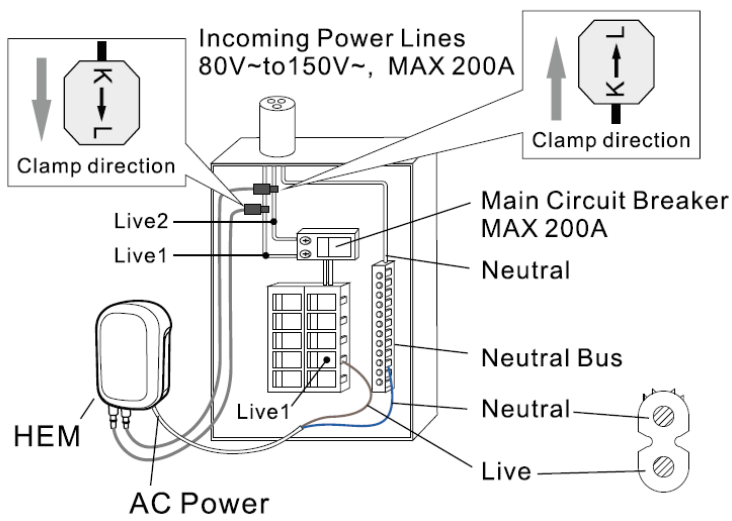
Installing the meter into a circuit box.
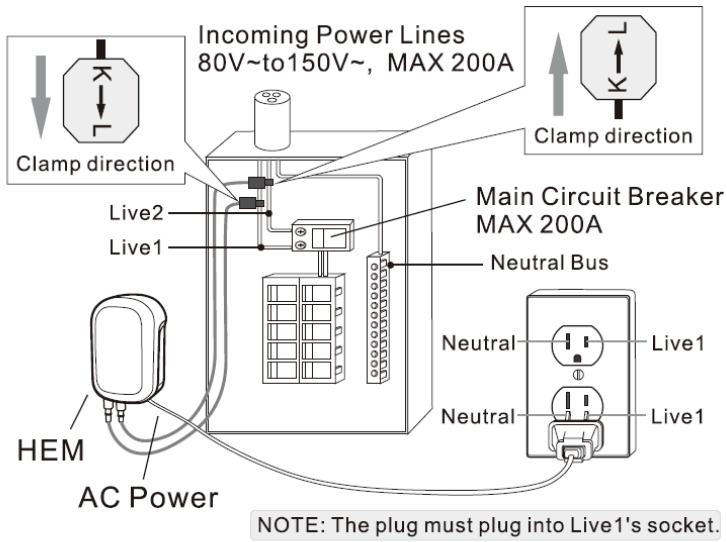

Important: Only a licensed electrician should perform these steps.

Important: The circuit box's main breaker should be turned off to perform these installation steps.

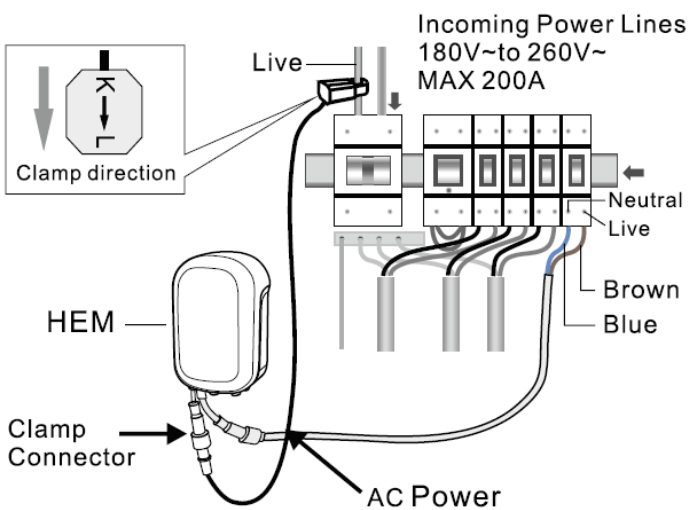The following diagrams highlight how the Home Energy Meter should be installed dependent on the region you are in;

In the United States, it is always a 2-phase installation;

Diagram of USA Version(2 Phases):

Incoming Power Lines
80V~to150V~, MAX 200A

Clamp direction

Clamp direction

Live2

Live1

Main Circuit Breaker
MAX 200A

Neutral Bus

Neutral — Live1

Neutral — Live1

HEM

AC Power

NOTE: The plug must plug into Live1's socket.

Incoming Power Lines
80V~to150V~, MAX 200A

Clamp direction

Clamp direction

Live2

Live1

Main Circuit Breaker
MAX 200A

Neutral

Neutral Bus

Live1

Neutral

HEM

Live

AC Power

In 230 volt countries with a 1 phase installation;

Diagram of EU/AU Version(1 Phase):

Live

Incoming Power Lines
180V~to 260V~
MAX 200A

Clamp direction

Neutral
Live

HEM

Brown
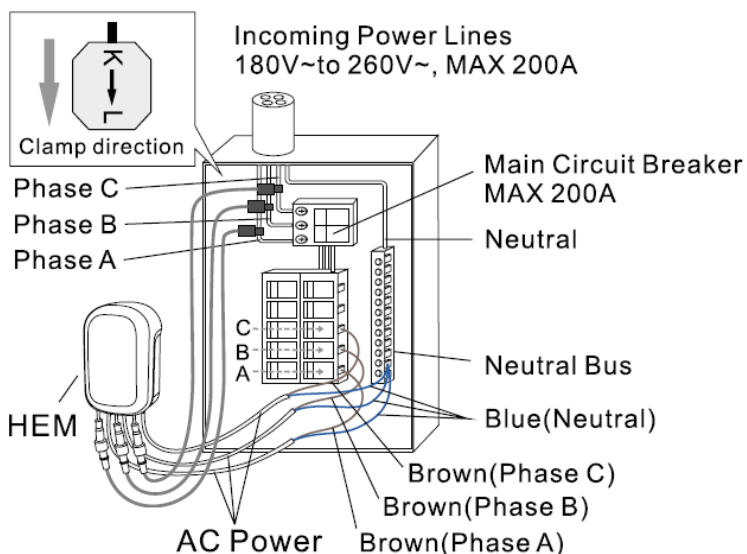Blue

Clamp
Connector

AC Power

In 230 volt countries with a 3 phases and 3 wires installation;

Diagram of EU/AU Version(3 Phases,3 Wires):
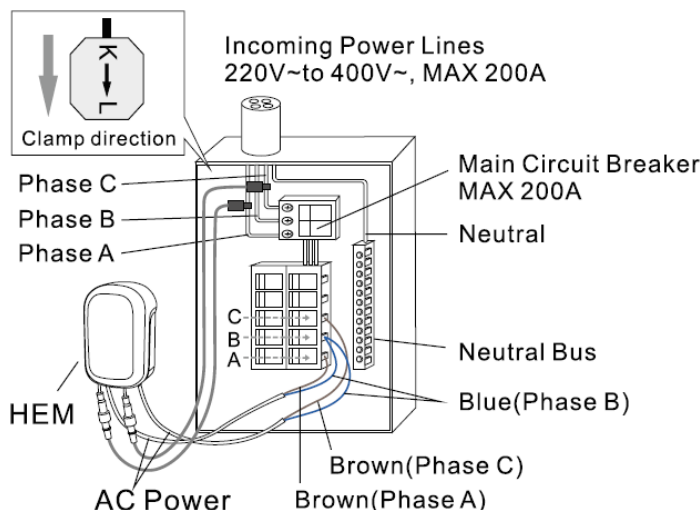
In 230 volt countries with a 3 phases and 4 wires installation;

Diagram of EU/AU Version(3 Phases,4 Wires):

To perform the electrical installation for your Home Energy Meter (HEM), utilize the previous images to determine the phase version of the HEM and to also illustrate the following steps 3 through 7.

1. Turn off the home's main electricity breaker and open the main circuit box panel.
2. Connect each clamp to the HEM using the clamp connector and screw them tight.
3. Clip the clamps of the HEM around the incoming electricity cables that connect to the main circuit breaker.

4. Connect AC Wire to the meter using the AC Wire Connector.

5. Insert the HEM's neutral AC Wire into the main circuit breaker's neutral bus terminal.

6. Insert the HEM's live AC Wire into the main circuit breaker's live terminal.

7. Replace the main circuit box panel.

8. Turn the main breaker back on.

It is now time to permanently affix the Home Energy Meter to a surface. Within each meter is a low-frequency radio antenna that's used for wireless communication. This must be taken into consideration when selecting a final location for the meter. Thick concrete walls, metals, or motor devices will affect the signal strength of the controller and the meter.

If the home's circuit box is made of a metal, it is recommended that the Main Body of the meter be installed outside of the circuit box. Placing the meter inside the circuit box could degrade the quality of the radio signal and negatively impact its wireless range. To assist with such an installation, each meter is weatherized to the IP44 international standard. This makes it resistant to rain and snow when installed vertically.

To place the Home Energy Meter (HEM):
1. Remove the backing plate from the back of the HEM.
2. Affix the plate to the selected wall space using the provided screws. The plate should be installed vertically and aligned so that the wires of the HEM are at the bottom.
3. Attach the HEM to the backing plate.

Linking your meter to an existing Z-Wave network.

The electrical installation of your Home Energy Meter (HEM) is now complete. You must now wirelessly link it to your Z-Wave network.

1. Put your primary Z-Wave controller, usually a gateway or hub, into inclusion mode. If you are not sure how to do this, please refer to your controller's user manual.
2. Press the Action Button on your HEM. If it has been successfully linked to your network, its LED will remain illuminated. If the linking was unsuccessful, your HEM's LED will continue to blink.

The installation of your Home Energy Meter is now complete. The next step is to set up your Home Energy Meter within the interface of your primary Z-Wave controller. This will allow you to visualize and utilize the energy consumption data that your meter collects.

Your Home Energy Meter can report wattage energy usage or KWH energy usage to your primary controller. As each controller is different, please refer to your controller's user manual for further information on monitoring and visualizing this data. The Z-Wave commands supporting energy monitoring are the Meter Command Classes.

Advanced functions.

Removing your meter from a Z-Wave network.
Your Home Energy Meter (HEM) can be removed from your Z-Wave network at any time. You'll need to use your Z-Wave network's primary to do this.

1. Put your main controller into its device removal mode. If you are unsure how to do this, please refer to your controller's

user manual.   12/13/16, 12:53 PM

2. Press the Action Button on your HEM. If it has been successfully removed from your network, its LED will blink. If the removal was unsuccessful, its LED will be solid and it will be then repeated again.

Resetting your Home Energy Meter.

Your Home Energy Meter can be reset to default factory settings with ease.

1. Press and hold the Action Button for 10 seconds.
2. If successful, the LED on the HEM should begin to blink slowly.

Associating your Home Energy Meter to Report Automatically.

Your Home Energy Meter can send Wattage and KWH usage reports to associated devices. To enable this, please refer to your controller's manual on how to configure settings on Z-Wave devices linked to your controller. Initially, the meter is set up to report Watt and KWH reports.

Some gateways/controllers will automatically configure devices enabling you to take full advantage of the Home Energy Meter's features. Others may not perform any automatic configuration. In such a case you can choose to manually configure your meter to output the data that you wish to view.

Setting automatic report flags.

Parameter 101-103 [4 byte dec] can be configured through your gateway in case that the default settings of your meter are not what you desire.

You may also download the configuration sheet that can be used to easily choose and automatically calculate the value that you are looking for:
Download Excel HEM Gen5 Calculator Here (https://aeotec.freshdesk.com/helpdesk/attachments/6039852024)
 -Requirements: Excel Program

Byte #	Decimal Value	Output	Clamp #
byte 4	1	kWh	Total Readings
byte 4	2	Watt	Total Readings
byte 4	4	Voltage	Total Readings
byte 4	8	Amperage	Total Readings
byte 4	16	kVarh	Total Readings
byte 4	32	kVar	Total Readings
byte 4	64	Reserved	
byte 4	128	Reserved	
byte 3	256	Watt	Clamp 1
byte 3	512	Watt	Clamp 2
byte 3	1024	Watt	Clamp 3
byte 3	2048	kWh	Clamp 1
byte 3	4096	kWh	Clamp 2
byte 3	8192	kWh	Clamp 3
byte 3	16384	Reserved	
byte 3	32768	Reserved	
byte 2	65536	Voltage	Clamp 1
byte 2	131072	Voltage	Clamp 2

byte 2	262144	Voltage	Clamp 3
byte 2	524288	Amperage	Clamp 1
byte 2	1048576	Amperage	Clamp 2
byte 2	2097152	Amperage	Clamp 3
byte 2	4194304	Reserved	
byte 2	8388608	Reserved	
byte 1	16777216	kVah	Clamp 1
byte 1	33554432	kVah	Clamp 2
byte 1	67108864	kVah	Clamp 3
byte 1	134217728	kVar	Clamp 1
byte 1	268435456	kVar	Clamp 2
byte 1	536870912	kVar	Clamp 3
byte 1	1073741824	Reserved	
byte 1	2147483648	Reserved	

The table above shows a decimal representation of all flags that can be set on parameter 101-103 to report specific data.

Example use of the Report Table.

For example, if you want to report only the total KWH consumption, and the Wattage for clamp 3, you would add 1 + 1024 and set the sum (1025) to parameter 101, 102, or 103.

As another example, if you want to report Wattage and KWH power consumption for all clamps, you would add 256 + 512 + 1024 + 2048 + 4096 + 8192, then set the sum (16128) to parameter 101, 102, or 103.

And if you want to report everything, you would add the whole table together and set it to 101, and set 102 and 103 to 0 values.

Setting an automatic report interval.

Parameter 111-113 [4 byte dec] can be configured through your gateway in case the default settings of your HEM is not what you desire.

Parameter 111 will set the interval for Group 1 (parameter 101), parameter 112 will set the interval for Group 2 (parameter 102), and parameter 113 will set the interval for Group 3 (parameter 103).

As an example, you have set parameter 101 to report the total KWH consumption and the wattage for clamp 3, and you want to report it every 500 seconds. Set Parameter 111 [4 byte dec] to 500.

Utilizing different groups.

Your Home Energy Meter has 3 different groups that you may setup, from the settings and examples above, you may configure each group to report different clamps and total reports to report at different interval. Group 1 uses Parameter 101 and 111, group 2 uses parameter 102 and 112, and group 3 uses parameter 103 and 113.

⑤ Technical specifications.

Model number: ZW095

Input: 120V~, 60Hz, 20mA (USA version, 2P)

230V~, 50Hz, 10mA (EU/AU version, 1P/3P4)

380V~, 50Hz, 18mA (EU/AU version, 3P3)

Measure range of voltage:

80V~ to 150V~ (USA version, 2P)

180V~ to 260V~ (EU/AU version, 1P/3P4)

220V~ to 400V~ (EU/AU version, 3P3)

Measure range of current: 0A to 200A.

Operating distance: Up to 300 feet/100 metres outdoors.

Operating temperature: -10 to 50 .

Relative humidity: 8% to 80%.