AzTech

Intuitive solutions for energy conservation

PRODUCT AND INSTALLATION GUIDE:

Current Energy Monitoring Systems

CONTENTS

INTRODUCTION

OVERVIEW

Aztech Associates Inc. designs and manufactures easy to use electricity monitoring devices that make energy use easy to understand.

We use real-time electricity use data to provide relevant, timely and actionable information. Our devices and web interface provide our customers with the information they need to stop wasting electricity and start saving money.

Thank you for choosing one of Aztech's powerful intuitive solutions for energy conservation. Whether your business is a small commercial enterprise using single phase power, or an industrial enterprise using polyphase power one of our solutions will be right for your business. An Aztech Current Energy Monitoring (CEM) solution is affordable, easy to install and scalable.

An Aztech CEM solution keeps an eye on your electricity consumption and makes this information accessible to you through an online and mobile interface, reports and alerts. The CEM measures electrical current supplied to the building and calculates the power consumed. Data is stored on a remote server 24 hours a day / 7 days a week / 365 days a year. There is no need to worry about losing your data or running out of storage space. Your data is available for review from anywhere you have access to the internet - at home, at work or at the cottage! The easy to use interface allows you to view your current and historical data, daily averages, bill to date and even predict what your total bill will look like.

The Aztech CEM solution is a valuable measuring and monitoring tool. It will help you realize just how much electricity you are wasting every day and how much money you could save on annual basis by daily reduction of that waste. You will soon recognize that changing the way you work; working 'Smarter' will enable you to use less to do more. The Aztech solution is designed to be an integral part of your long-term electricity efficiency retrofit plans. It enables you to monitor and measure *before* and *after* you retrofit; giving you the M&V necessary for your conservation efforts.

In addition to fostering energy use awareness and enabling cost and waste reduction, the Aztech solution provides added business security with its ability to send alerts based on user defined events about information that is vital to operations.

If you have any questions about using your Aztech Electricity Monitoring solution please visit our support.myIHD.com for information, documentation, answers to frequently asked questions, and to give us your feedback.

IMPORTANT SAFETY INFORMATION

It is important that you observe safety precautions when installing this product. The Aztech CEM products are designed to be non-intrusive and easy to install. Typically, there is no need to disconnect any electrical cabling during the installation. However, there are a number of safety issues that should be considered when installing and using the system.

Installation may require the cover of the main electrical panel to be removed while some wires are still electrified. Even when the main breaker has been turned 'OFF' certain areas of the panel may still be dangerous and carry the risk of shock, burn, and electrocution. **Installation should be performed by a qualified electrician. Check with your local authority having jurisdiction for permit and inspection requirements**. **DO NOT** attempt installation unless you know where electrified areas within the panel are.

The **current sensors** clip on to the live service entrance cables which supply electricity to your electrical panel. When installing these sensors:

- **DO NOT** install the sensor onto a cable whose current exceeds the rated current of the sensor.
- **DO NOT** install the sensor onto cabling that is loose, wet, or appears damaged (cracked, burned, bare copper or missing insulation). Contact a qualified electrician and/or your electricity supplier to report your findings.
- **DO NOT** bend or force the service entrance cables during installation.
- **DO NOT** force the sensor onto the cabling if the cable diameter appears to be too large.

Aztech CEM products (all components) are designed for indoor use only and should be installed inside a suitable building or panel. When installing:

- **DO NOT** subject the unit or sensors to excessive temperature, humidity, force, shock, or dust.
- **DO NOT** use or store this product in locations that could adversely affect the product such as rain, snow or desert.
- **DO NOT** immerse the unit in water or other liquids. If liquid is spilled over it, remove power and clean up the spill immediately with a soft, lint-free, cloth and allow all electronics to fully dry before attempting to use.
- **DO NOT** use this product where the use of radio frequency products can cause interference in other critical control equipment (i.e. hospitals).

Please contact Aztech Associates Inc. if any component appears damaged or faulty.

- **DO NOT** open the case of the unit or tamper with any of the internal components. This invalidates the product warranty.
- **DO NOT** attempt to repair the product by yourself.
- **DO NOT** dispose of this product in your business waste. At the end of its serviceable life please ensure product is disposed of according to local electrical and electronics equipment disposal practices.

The following notes apply to the Aztech Wireless CEM products that are supported by this Guide:

This equipment has been tested and found to comply with the limits for a Class A 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 radio or television off and on, and noting the change in reception, 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 radio/TV and receiver.
- Connect the radio/TV an outlet on a circuit other than the circuit which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

BOX CONTENTS (BY PRODUCT)

AZTECH BUSINESS (EB*)

A

B

C

D

	Wired	Wireless	Description
A	1	-	Combo Module
	-	1	Sensor Module
	-	1[1]	Gateway Module
B	2	1 - 3[2]	Current Sensors (200A[3] to 5000A max 600VAC)
C	1	2	Low-voltage Power Adapter
D	10’ / 300cm	3’ / 90cm[1]	Ethernet Cable

[1] Not included in Wireless Expansion products (EBWXS*)

[2] EBEM1 = 3, EBWEM1 = 3, EBWXS3 = 3, EBWXS2 = 2, EBWXS1 = 1

[3] 200A standard product. Substitutions available up to 5000A

HARDWARE INSTALLATION

DO NOT CONTINUE WITH THE INSTALLATION OF THE AZTECH ELECTRICITY MONITORING SYSTEM UNTIL YOU HAVE READ THE SAFETY SECTION OF THIS GUIDE.

INSTALL CURRENT SENSOR

MATERIALS YOU WILL NEED

- ✓ Current Sensors
- ✓ Approved bushing or connector (not included)
- ✓ Labels for wires (optional – not included)

TOOLS YOU WILL NEED

- Flashlight
- Screwdriver
- Pliers

PROCEDURE (SERVICE ENTRANCE MONITORING)

- *Current sensors are **installed on the individual Live/Line wires** inside the panel. Sensors should **never be installed on Neutral or Ground conductors**. Also, sensors should **never be installed on extension cords or sheathed/shielded cables**.*

1. Turn off the power by disengaging the main disconnect switch or turning off the main breaker.

CAUTION: EVEN WITH THE MAIN BREAKER IN THE 'OFF' POSITION, THE SERVICE ENTRANCE WIRES WILL STILL BE ELECTRIFIED (BEFORE THE BREAKER). EXTREME CAUTION SHOULD ALWAYS BE TAKEN WHILE WORKING AROUND ELECTRICITY.

2. Carefully remove panel cover(s) to expose service entrance wires.
3. Carefully remove a 'knockout' on the side of the panel and add an approved bushing or connector to protect the wires that will pass through it.
4. Install one current sensor over **each service entrance line/live wire**.
    a. Push the release clip in and open the sensor.
    b. Carefully place the wire in the top of the sensor.
    c. Carefully close the sensor ensuring sensor faces are aligned flush. A slight ‘click’ sound is heard when the sensor is securely closed.

    - **Do not install sensors on conductors exceeding the maximum rating of the sensor.**

5. Use a label or tape to uniquely identify each sensor at the end of the wire nearest the connector (i.e. "Sensor 1", "Phase A", etc.).
6. Route sensor cables through the bushing/connector so the plug ends are on the exterior of the panel.

7. Repeat steps 5-7 for each sensor.
8. Once all sensors are installed correctly, replace panel cover(s).
9. Turn on the power.

PROCEDURE (BRANCH CIRCUIT/EQUIPMENT SPECIFIC MONITORING)

- *Current sensors are **installed on the individual Live/Line wires** inside the panel. Sensors should **never be installed on Neutral or Ground conductors**. Also, sensors should **never be installed on extension cords or sheathed/shielded cables**.*

1. Locate the desired branch circuit to be monitored. Note: some large appliances such as the HVAC systems, transformers, and machinery will be on dedicated branch circuits and possibly marked on the cover of the panel. If the panel is not clearly marked, it may be necessary to find the desired branch by turning off the breakers (or pulling the fuses) one at a time until the desired appliance is turned off.
2. Turn off the power by disengaging the main disconnect switch or turning off the main breaker.

CAUTION: EVEN WITH THE BREAKER IN THE 'OFF' POSITION, THERE MAY STILL BE ELECTRICTY TO SOME AREAS OF THE PANEL (ON THE LIVE SIDE OF THE BREAKER). EXTREME CAUTION SHOULD ALWAYS BE TAKEN WHILE WORKING AROUND ELECTRICITY.

3. Carefully remove panel cover to expose only the distribution wiring.
4. Carefully remove a 'knockout' on the side of the panel and add an approved bushing or connector to protect the wires that will pass through it.
5. Install one current sensor over the **live/line** wire of each branch distribution circuit to be monitored.
    a. Push the release clip in and open the sensor.
    b. Carefully place the wire in the top of the sensor.
    c. Carefully close the sensor ensuring sensor faces are aligned flush. A slight ‘click’ sound is heard when the sensor is securely closed.

    - **Do not install sensors on conductors exceeding the maximum rating of the sensor.**

6. Optionally, use tape or other label to uniquely identify each sensor at the end of the wire nearest the connector.
7. Route sensor cables through the bushing/connector so the plug ends are on the exterior of the panel.
8. Repeat steps 5-7 for each sensor.
9. Once all sensors are installed correctly, replace all panel covers.
10. Turn on the power.

MEASURE LINE VOLTAGE (OPTIONAL)

MATERIALS YOU WILL NEED

- ✓ None

TOOLS YOU WILL NEED

- Voltmeter or Multimeter

PROCEDURE (TYPICAL SINGLE PHASE – BUSINESS OR SMALL COMMERCIAL INSTALLATION)

MEASURE YOUR BUILDING'S VOLTAGE

CAUTION: Extreme caution should always be taken while working around electricity. Do not attempt this measurement without the proper tools and safeguards.

1. Locate an electrical receptacle as close to the current sensors as possible.
   - There is often a receptacle in the same room as the electrical panel.
2. Set the Multimeter to AC voltage. The markings may appear as VAC, AC V, or a V beneath a sine wave.
3. Choose the AC voltage range closest to the voltage you will measure.
   - These instructions do not cover the method to test a 220V + outlet or three phase circuits.
4. Place one Multimeter probe into each of the two slot terminals of the electrical receptacle. The voltage will be displayed on the meter.
   - Grasp the meter probes by the insulation - NEVER touch the metal probes during testing.
5. The voltage should typically measure in the range of 106 to 126 volts for most circuits. Record this value for later use while configuring your device in the cloud app.
6. Carefully remove the probes, being careful not to touch the metal part of the probes to anything or each other.

ALIGN WIRELESS MODULES (E*W* PRODUCTS ONLY)

Aztech Wireless CEM (E*W*) products have all the same features as the non-wireless version but do not require a network connection near the point where the sensors are installed. The modules will communicate with each other over their own **private wireless network** so that the sensors can be installed where you need them and the gateway module can be located near an available RJ45 network connection.

E*W* products operate on a custom wireless protocol operating on the 2.4GHz frequency band. Operating range varies for each installation depending on distance between and the number (and material) of obstructions the wireless communication must pass through. Typical ranges of 300m (1000') can be expected.

To achieve best performance in wireless installations the following guidelines should be followed:

1. Minimize the number of obstructions between modules where possible (interior/exterior walls, floors, windows, trees, etc.). Line of sight provides best performance.

2. Minimize the number of 2.4GHz radiators in close proximity to the modules (Wi-Fi routers, Wi-Fi___33 devices, Bluetooth devices, microwaves, ZigBee/IEEE 802.15.4 wireless devices).

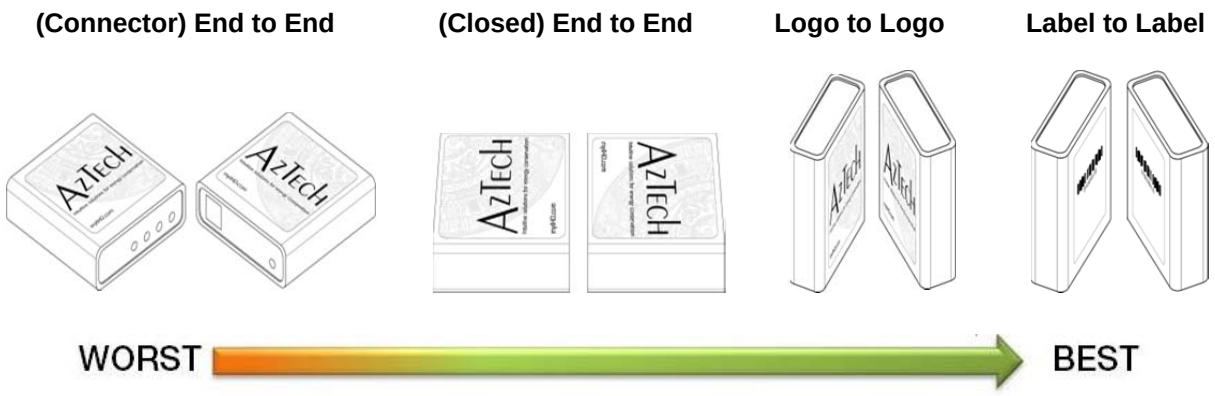
3. Modules should be secured in position with screws, Velcro tape or by other means. They should not be left hanging off of wires; if they are bumped it can affect the signal quality.

4. Keep the area around the module free from metallic objects.

5. Do not lay the module on the metal electrical panel - if unavoidable, put an insulating material, like wood or foam, between the module and the metal.

6. Do not seal in the panel or other metal enclosure.

7. Try to ensure that the modules are positioned in the best possible orientation as shown in the picture below.



MOUNT DEVICE(S)

MATERIALS YOU WILL NEED

- ✓ 2x #6 mounting screws (optional – not included)
- ✓ Double-sided tape (optional – not included)

TOOLS YOU WILL NEED

- Screwdriver

PROCEDURE (VERTICAL MOUNT)

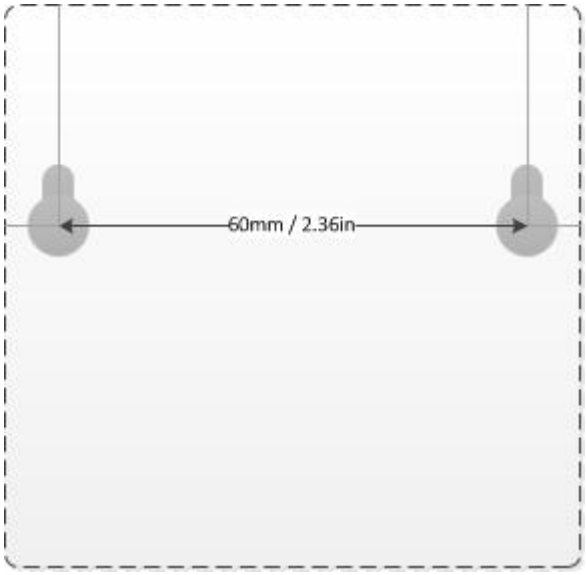
1. Write down the 8-digit serial number from the back of the module. This will be required during software setup.

    - The serial number will be in the format "**123 - 45678**"

2. Find a clear area on the wall beside the electrical panel (or router in the case this is the Wireless Ethernet Module).

    - Make sure all cables will easily reach the module before securing.

3. Secure the module using either:
    a) Screws (recommended method)
        i. Mark locations on the wall for the screws using the module or template below as a reference.
        ii. Drive the 2x #6 screws into wall surface leaving ~3mm (1/8") exposed.
        iii. Align keyholes on back of module with mounting screws.
        iv. **Carefully** push module over screws and slide down to secure in place.
        v. Ensure secure fit.
    b) Double-sided tape
        i. Cut several pieces of double-sided tape and place on back of module.
        ii. Peel tape backing off.
        iii. Press module carefully but firmly against surface to be mounted on.
        iv. Hold in place as per tape instructions.
        v. Ensure module is held securely in place.



Mounting Wall Template (1:1 Scale)

PROCEDURE (HORIZONTAL MOUNT)

Mounting is not required for horizontal installations (i.e. on a desktop or shelf). If added security is desired, follow instructions for vertical mounting using screws or double-sided tape.

CONNECT CABLING

MATERIALS YOU WILL NEED

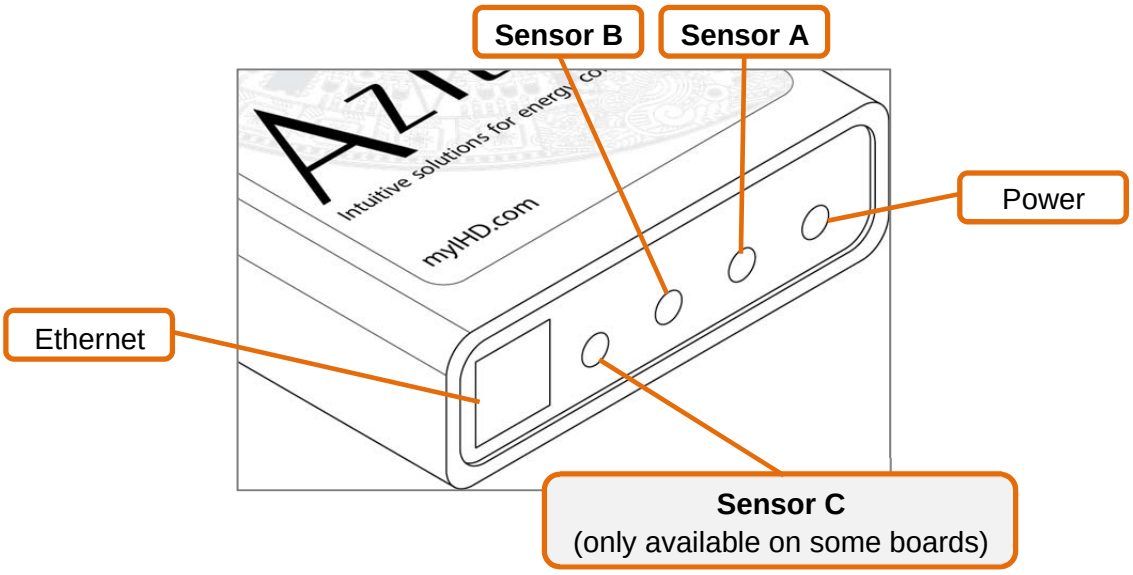
- ✓ Ethernet cable
- ✓ Low-voltage power adapter(s)
- ✓ Tie wraps (optional – not included)

TOOLS YOU WILL NEED

- None

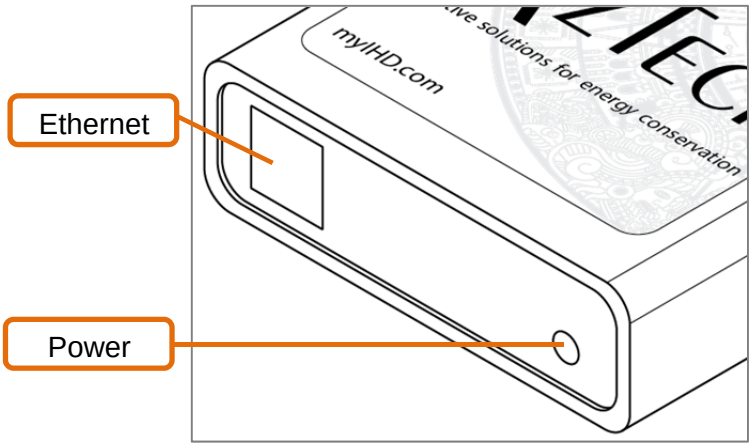
PROCEDURE (WIRED INSTALLATIONS)

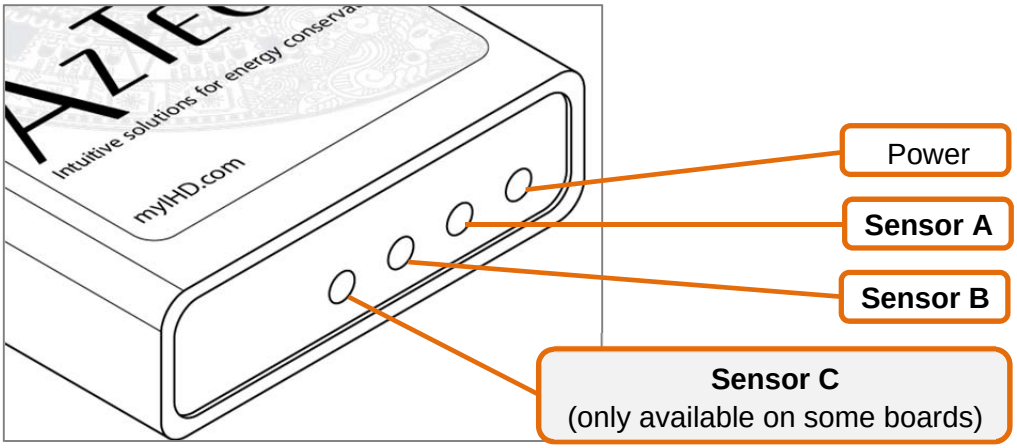
1. Connect sensor cables to the module.
2. Connect one end of Ethernet cable to module.
3. Connect the other end of the Ethernet cable to the router (or Internet access point).
4. Connect the appropriate end of the low-voltage power adapter to the module.
5. Plug the other end of the low-voltage power adapter into a nearby AC wall receptacle.
6. Secure all wiring neatly with tie wraps.



PROCEDURE (WIRELESS INSTALLATIONS)

1. Connect one end of Ethernet cable to Gateway module.
2. Connect the other end of the Ethernet cable to the router (or Internet access point).
3. Connect the appropriate end of the low-voltage power adapter to the Gateway module.
4. Plug other end of low-voltage power adapter into wall receptacle.
5. Connect sensor cables to the Sensor Module.
6. Connect the appropriate end of the low-voltage power adapter to the Sensor Module.
7. Plug the other end of the low-voltage power adapter into a nearby AC wall receptacle.
8. Secure all wiring neatly with tie wraps.





INTERNET CONNECTION

All products supported by this Guide are designed to take advantage of the myIHD.com website. To do so the products need to be connected to an active internet connection at all times. There is a small amount of internal memory to store data in the event of a temporary disruption to your internet service.

For most networks, it only requires that you plug the System into an active Ethernet port with a DHCP server somewhere on your network. A DHCP server is enabled on most routers by default and will provide connected hardware with an IP address so they can communicate via the internet.

In some cases, additional security has been added to the local network (firewall, port filtering, etc.) making some additional configuration necessary. A good test would be to plug a laptop or computer into the same Ethernet port that you intend to use for your Aztech product – if you can open a browser and navigate the web no additional configuration is likely needed.

Important notes:

- Devices require connection to **an active Ethernet port** on your router, switch or hub.
- Devices require **a DHCP server** somewhere on the network.
- If your network does not have a DHCP server, or it is restricted, you may need to reserve an IP address for the device based on the MAC address of the device.
- The **MAC address** of your device will be **60:54:64:XX:YY:ZZ** – where XX:YY:ZZ are the last digits of your module serial number. For example, a module with the serial number 003-12345 will have the MAC address 60:54:64:31:23:45.
- Devices communicate using **port 80 (HTTP)** – all communication to/from the device looks like standard **web traffic**.
- The **wireless** products do **not** communicate using the **Wi-Fi** protocol. They use a custom wireless protocol between modules and the gateway unit plugs into a physical Ethernet port, on your router or switch, to access the internet.

SOFTWARE CONFIGURATION

MYIHD.COM

The **myIHD.com** website is the interface for your Aztech CEM device management and energy use information. It provides users of different Aztech CEM products a portal to view and track day-to-day electricity usage; check your real-time consumption and costs, review historical data, and much more.

1. Go online to: https://myIHD.com/ to create your online account (or login if you have an existing account).
2. From the system configuration screen, enter the serial number of your Aztech module(s) – found on the back of the device(s).

For more information about the myIHD and complete instructions for adding devices, refer to the online documentation and myIHD.com User Guide found at support.myIHD.com

SPECIFICATIONS

HARDWARE SPECIFICATIONS

	Wired	Wireless
Module Power Supply Voltage	5V DC input	
Module Power Supply Current	0 to 0.3A	
Operating Conditions	0 to 50°C (32 to 122°F) 80% relative humidity	
Storage Conditions	-20 to 70°C (-4 to 158°F) 80% relative humidity	
Module Dimensions **(W x H x D)**	77 x 75 x 25 mm (3 x 3 x 1 in)	
Parts Included	1 Combo Module (up to) 3 Current Sensors 1 10ft Ethernet Cable 1 Power Adapter	1 Gateway Module 1 Sensor Module (up to) 3 Current Sensors 1 3ft Ethernet Cable 2 Power Adapters
Weight [approximate]	600g (21oz)	960g (34oz)
Wireless Link	NA	2.405 to 2.480 GHz
Wireless Range	NA	300m (1000ft) ***Typical***

SENSOR SPECIFICATIONS

Sensor	Input	Output	Accuracy	Opening		Cable Length
200A Current **(max 600V[2] – EH*)**	0 to 200A AC 50-60Hz	0 to 7.5V AC	±1% Typical[1]	25.40 mm (1.000 in)		1800 mm (72 in)
The following are available as substitution parts in Aztech Business (EB*) kits (at additional cost)						
600A Current **(max 600V – EB*)**	0 to 600A AC 50-60Hz	0 to 7.5V AC	±1% Typical[1]	31.75 mm (1.25 in sq.)		2400 mm (96 in)
1200A Current **(max 600V – EB*)**	0 to 1200A AC 50-60Hz			50.80 mm (2.0 in sq.)		
3000A Current **(max 600V – EB*)**	0 to 3000A AC 50-60Hz	0 to 5.0V AC		127.00 mm x 76.20 mm) (5.0 x 3.0 in)		

[1]Accuracy noted is for sensor readings at 10% to 90% of rated current. Instantaneous power and power consumption measurements combine sensor measurements with a constant voltage value (defined by user – defaults to 120V). This product also requires a continuous internet connection.

[2]Ensure the signal cable is clearly marked with the appropriate 600V rating prior to installation in applications where the voltage exceeds 300V AC.

COMPLIANCE

This product has been tested and found in compliance to:

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements UL 61010-1 Second Edition, Dated July 12, 2004 (Updated October 28, 2008);

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements CAN/CSA-C22.2 No. 61010-1 Second Edition (IEC 61010-1:2001, Mod), Dated July 12, 2004 (Updated October 28, 2008);

Industry Canada ICES=003, Issue 4 – Interference-Causing Equipment Standard – Digital Apparatus;

EN 61326-1:2006 – Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements, Part 1: General Requirements;

European CISPR 11:2009 +A1:2010 / EN 55011:2009 +A1:2010, Class A, Group 1 – Industrial, Scientific and Medical (ISM) Equipment;

Federal Communications Commission (FCC) CFR 47, Part 15, Subpart B - Class A Unintentional Radiators.

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.

WARRANTY

LIMITED 90 DAY WARRANTY

Aztech Associates Inc. warrants this product for a period of 90 days from date of purchase for all defects in material and workmanship. Defective parts may be repaired or replaced, at the discretion of the manufacturer, free of charge during this period.

Warranty Conditions:

1. The product must be installed and operated in strict accordance to the provided instructions.
2. Warranty will only be recognized where original proof of purchase is provided.
3. Warranty will be void if it is determined that the product has been tampered with or modified in any way.
4. Aztech Associates Inc. will not be liable for any damage or injury resulting from misuse of the product or noncompliance to the given instructions.
5. Aztech Associates Inc. will not be liable for indirect, consequential, or incidental damages resulting from use or misuse of this product.
6. Warranty returns will only be recognized where a Return Material Authorization number has been provided. For warranty claims visit support.myIHD.com to receive an RMA number.

CONTACT INFORMATION

If you have any questions about using your Aztech Electricity Monitoring System please visit our website for documentation, videos, frequently asked questions and contact forms.

Website: myIHD.com

Support: support.myihd.com/