

E2

WIRELESS
ELECTRICITY
MONITOR

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FCC NOTE:

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. The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

IC NOTE:

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.



INSTRUCTION MANUAL



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INTRODUCTION



Energy metering and monitoring are at the heart of energy management, understanding when and where your energy is consumed is key to saving money.

The **e2** wireless electricity monitor shows the amount of energy that a household is consuming at the time the display is read. The display can also give the user a reading showing usage in financial terms. You can walk around the home with your monitor device, switching appliances on and off, to see the difference that each one makes. With a few small changes in your consumption behaviour the e2 can help you reduce your energy costs.

IMPORTANT SAFETY INFORMATION



It is important that you take some simple precautions before using this product. Incorrect use or poor safety practices can result in injury or fatality. Whenever possible, turn off the main breaker, outside your home feeding power to your electric panel.

When installing the **efergy** monitor you should find that everything is straight-forward. However, there are a number of important health and safety issues which you need to be aware of:

- CT sensor clip fits onto the internal live feed cable inside the electricity meter, which delivers the live supply to your home.
- Please read and act upon the important information on the following pages. Remember the device is not intrusive and does not require rewiring; no wires or cables need to be cut, removed or modified to perform this installation.
- **efergy** energy monitoring systems are considered **plug and play** devices that meet all regulatory requirements for installation in Canada and the United States.
- In some countries (i.e Australia) the live cable can only be accessed by qualified electricians.
- If you notice anything unusual about the electricity supply such as loose wires, exposed cabling, burn marks, holes in the insulating materials or damage to the electric wires in the service panel or where the CT sensors are to be attached, stop immediately and report the findings to your supply company.

Do not force or bend the cables at any point during installation. If you are worried or have any concerns about the installation, please contact a qualified electrician immediately.

The user does not need to remove the sensor throughout the working life of the unit. Battery changes are performed on the transmitter and on the display. There are no batteries to change in the sensor.

Even with the main breaker in the off position, the connection lugs where the main wires terminate at the main breaker may still be live with potentially lethal voltage. Stay clear of these connections during the installation of the CT sensors (Page 9 Fig. 1 & 2).

The CT sensors themselves are insulated so do not be concerned if they slide down the main wire to the breaker after being secured around the insulated wire. A plastic tie wrap (with 2" of the tie not cut off) secured to the main wire under the desired location for the CT sensor may be used to keep the CT sensor from sliding down the wire.

Millions of these systems have been installed world wide without incident but please follow safe work practices as outlined during the installation.

IN THE BOX

Your **e2** Pack contains the following elements:

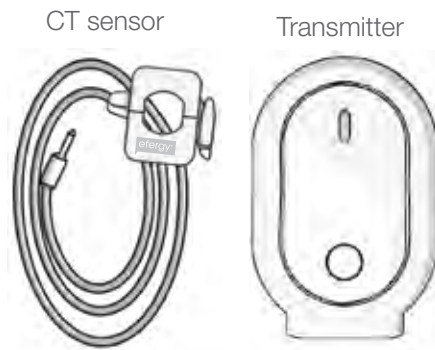
- 2 x XL CT Sensors
- 1 x Transmitter
- 1 x **e2** Wireless Energy Monitor
- 3 x AA Batteries
- 3 x AAA Batteries

You will need to attach the sensor to the live feed cable which connects the meter to the monitor. Any power you use in your home will pass through this cable. The clip on sensor acts as a CT sensor, and relays the amount of current being drawn in the home to the transmitter. From there it is sent wirelessly to the energy monitor, which shows how much power is being consumed.

You can upload your energy data from your **e2** monitor onto your PC/Mac using elink software.

It also includes:

- 1 x USB Cable
- 1 x **elink** Software CD
- 1 x **elink** Software Guide
- 1 x Instruction Manual
- 1 x Quick start guide



HARDWARE INSTALLATION



PRIOR TO INSTALLATION

The **efergy e2** is installed by clipping the CT sensors around the feed wires of your electric panel. In Canada and the United States, the residential voltage is 120V for small appliances and lighting and 240V for major appliances and equipment, such as central air conditioner, electric water heater and oven.

Note - For a 120/240V panel (typical residential electric panel) power is measured using two CT sensors. Set the reference point voltage during **Monitor Setup** to 120V or 130V for most rural installations. For professional installation please consult the **Technical Notes for Electrician** (see page 22).

Installation for Three Phase Panels

The **e2** is installed by clipping the CT sensors around the feed wires of your electric panel. In the case of a commercial or industrial three phase panel or service, you must use three CT sensors to measure all three phases. Simply order an additional CT sensor from your dealer. Identify the three power wires providing service to your electric panel. Open and place one CT sensor around each of the three main feed wires.

Installing Transmitter for Three Phase

Plug the three CT sensor cables into the transmitter. Mount the transmitter on the wall next to the electric panel. This will make it easier to replace the batteries. Readings for a three phase system may not be accurate depending on connection and loading system.

HARDWARE INSTALLATION

MOUNTING INDIVIDUAL OR MULTIPLE CIRCUITS

Many buildings have separate apartments or efficiency apartments being served by the main electric panel with only one electric utility meter. The e2 allows you to measure the usage for these separate apartments, so you can determine how much electricity is being consumed by the tenants. In Canada this is for information purposes only as efergy monitors are not sold or intended to be used for revenue purposes.

If you wish to monitor various 120V and 240V circuits from the same panel, you can identify which phase (or bus) these circuits are being fed from. Separate the wires for the circuits by phase or bus.

Note - 1 A 120/240V residential panel has 2 busbars, each providing 120V power to the loads/appliances. Some 120V circuit breakers are fed from one bus (bus A) and other circuits are fed from the other bus (bus B).

Note - 2 Commercial and industrial electric panels may be served by two or three phases, (normally designated as phases A, B & C). Some circuit breakers are one phase, others two phases and some major equipment or loads may use three phases.

You can clip a CT sensor around the wire for each of the phases you wish to measure power. This will measure the combined current flow in all of these wires (phases).

You can also place a CT sensor around a number of wires on the same phase to measure the total amount of power traveling through the wires on that phase.

HARDWARE INSTALLATION



Locate Your Electrical Panel

You can normally find your main electrical panel inside your home on the other side of the wall from your electric utility meter. You may also follow the conduit from your utility meter. In many cases it is located in the garage, utility room, laundry room or hallway inside your home.

If you live in an apartment, it may be in the kitchen, a utility closet or hallway. Also in the case of an apartment, your voltage may be 120/208V. Hardware installation follows the same steps in this case as with an 120/240V panel.

Find the Main Feed Wires for Your Home

Remove the outside cover from your electrical panel and locate the main feed wires. Sometimes, there will be an additional cover inside. These will be the wires that go to the main breaker in your service panel, typically rated at 100 or 200A.

Mounting the Transmitter

Plug the CT sensor cables into the transmitter. Then mount the transmitter on the wall next to or above the electric panel. This will make it easier to replace the batteries (although the batteries will last for a long time). If the panel is in a finished area, you may mount the transmitter inside the electrical panel. This may reduce transmission distance.

HARDWARE INSTALLATION

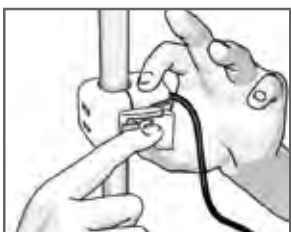
MONITOR INSTALLATION CONSIDERATIONS

The display for your **efergy** monitor may be wall mounted at a convenient location. It may also be taken in hand throughout your home to determine how much different electrical loads consume. All **efergy** monitors update every ten seconds so you can apply any new load and watch for the change in the reading on your display.

1. Pull the clasp to open the CT sensor



2. Place the CT sensor around the cable



3. Push the clasp to close securely

Fig. 1 CT Sensor Installation

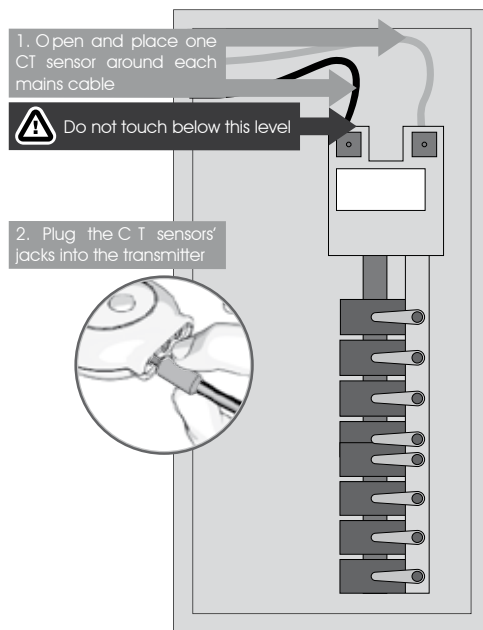


Fig. 2 Typical Service Panel

HARDWARE INSTALLATION

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INSTALLING THE CT SENSORS

IMPORTANT - Always make safety your first priority, see **Important Safety Information** (page 3). Do not touch any metallic connections during the installation of the CT sensors. Do not carry out this installation if under the influence of alcohol or drugs.

Remove a standard 1/2" knock out from the panel. Feed the CT sensors' leads from inside the panel out through the raw knock out hole, leaving the protective rubber tip on the jacks in place. Open and place one CT sensor, around each main feed wire (Fig. 1). The bushing is then pushed on to the CT wires outside the panel and then snapped into the hole. Replace the panel cover(s) when finished installing the CT sensors.

Please note the metal lugs where the main service wires attach to the main breaker. Keep your fingers well away from these lugs unless you are able to turn off the inbound power from your utility source outside. Wiring configurations and types of main panels will vary greatly.

If in doubt, contact an electrician or other qualified person to assist you with the installation of the CT sensors.

You should find up to four feed wires entering your 120/240V or 120/208V main electrical panel: two black wires, one white wire and one green wire. (There may not always be a green or bare ground wire) The two black wires (or sometimes one black and one red) are the live wires feeding the panel. These are the wires used to measure the power being used in your home or business.

The CT sensors will be installed on the black wires or the black and red wires. Two CT sensors are required for monitoring a 120/240V residential panel or 240V appliances or equipment. One CT sensor is required for monitoring a 120V panel or 120V circuits or appliances.

MONITOR SETUP

LINKING THE TRANSMITTER AND MONITOR

Step 1 - Ensure three AA batteries are inserted in the transmitter and three AAA batteries are inserted in the wireless energy monitor. Observe polarity when installing batteries.

Step 2 - Push the **link** button on the reverse of the monitor for two seconds. The transmission signal symbol will flash for one minute.

Step 3 - While the transmission signal in the display flashes push the **link** button on the front of the transmitter and wait until the transmission signal symbol becomes solid.

Note - The default value for the transmission frequency is ten seconds. This means the transmitter is sending information every ten seconds. You can change the frequency from 10s (red flashing light) to 15s (orange flashing light) and to 20s (green light) by pushing and holding the transmitter button.



Wireless energy monitor **link** button



Transmitter **link** button

If the **link** is completed you will clearly see the transmission signal



Transmission Signal

If the **link** is not completed you will see dashes on the display



MONITOR SETUP

SETTING THE TIME AND DATE

The **e2**monitor needs to know the time and date in order to provide you with the correct information. Set the time and date as follows:

Step 1

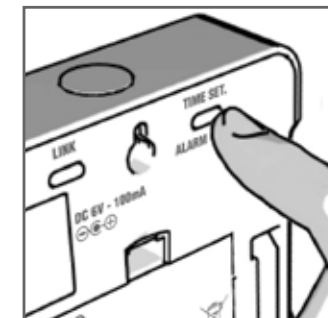
On the reverse of the display you will find the **time set** button. Press and hold for two seconds. Time set up will flash in the display.

Step 2

Set the hour to the correct time by using **backward** and **forward** buttons. Press **unit set** button once to save the hours. Repeat for minutes, using the **unit set** button to confirm.

Step 3

Set the month by using the **backward** and **forward** buttons. Press **unit set** button to confirm and move to date set up. Repeat the process to set the year. Once the correct time and date have been set, push **unit set** button to save and exit.



Hold for 2 seconds



press time period button to exit

MONITOR SETUP

SETUP INSTRUCTIONS

IMPORTANT - Throughout the setup process, push the **time period** button at any time, your settings will be saved & you will exit the function setting mode.

The **efergy** monitor needs to know the unit cost per kWh charged by your electricity supplier, along with voltage and alarm settings. The following steps will move through each of these settings (See page 15 for Dual Tariff Settings).

Press and hold down the **unit set** button for two seconds, this will enable you to enter the setting mode.

Note - Twenty seconds of inactivity in setting mode will return the unit to normal display mode without saving changes.

Step 1 - Voltage

Press and hold **unit set** button for two seconds. Default voltage is set at 120V. Use **backward** and **forward** buttons to change the voltage. Press **unit set** button to save your setting and move into currency selection setting.

Step 2 - Currency Selection

Select the currency using **backward** and **forward** buttons. Default currency will be \$. Push **unit set** button to confirm and to move onto tariff selection set up.



MONITOR SETUP

Step 3 - Single Tariff Set Up

On release you will see the symbol **tariff period 1** will be highlighted. If you are charged one single tariff push **unit set** button to confirm. If you have dual tariff rate, please see the following page.

Step 4 - Electricity Cost

Default cost is set at 0.100 \$/kWh. This is the average price per kWh electricity that suppliers charge. Use the **backward** and **forward** buttons to set the cost per kWh. Press **unit set** button to save your setting and to move onto carbon emission ratio setting.

Step 5 - Carbon Emissions Ratio

Now set your carbon emissions ratio. This value can be increased or decreased using **backward** and **forward**. Press the **unit set** button to store the value. The North American average is 1.04 kg. CO2/kWh, this is the default value. Press **unit set** button to save your setting and move on to alarm setting.

Step 6 - Alarm

The default **alarm** is set at 20kW. If the alarm function is switched on, and you are using more than 20kW, the alarm will sound. This value can be increased or decreased using **forward** and **backward** buttons. Press **unit set** button to store the value and exit the **function** mode. To activate and deactivate the alarm at any time press the alarm on/off button on the back of the unit.



MONITOR SETUP

DUAL TARIFF MODE

If you have a dual or multiple tariff rate meter you may want to setup the dual tariff function.

Step 1 - Activation Of Dual/Multiple Tariff

Press and hold **unit set** button for two seconds. On release you will see the voltage setting flash. Press **unit set** button twice and you will move onto the tariff selection setting. Now you will see the symbol TARIFF 1 flash. Press **backward** or **forward** buttons to select dual or multiple tariff set up (you can select up to four tariffs). Push **unit set** button to confirm. Now you have to set START and END time periods for each tariff.



hold for 2 seconds



Step 2 - Set Start & End Time For Tariff 1

Set the start time for TARIFF 1 first using **backward** or **forward** buttons. Set the hours and press **unit set** button to save and move to minute set up. Set minutes using **backward** or **forward** buttons and pushing **unit set** button to confirm. Repeat the process for other tariffs (if you have multiple tariff settings). You will always set one period of settings less than the number of tariffs you have selected as the remaining period will be saved automatically.

MONITOR SETUP

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Step 3 - Set Tariff 1 Rate

Use **forward** and **backward** buttons to input the cost per kWh. Press **unit set** button to save your setting. Tariff 2 set up will flash.

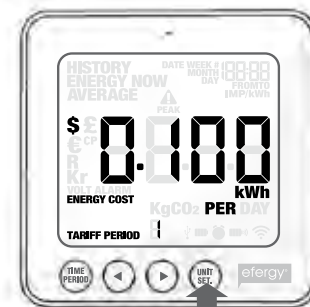
Step 4 - Set Tariff 2 Rate

Use **backward** and **forward** buttons to input the cost per kWh. Press **unit set** button to save your setting.

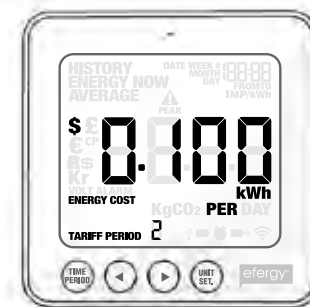
Step 5 - Set Tariff 3 & 4 Rate

Use **backward** and **forward** buttons to input the cost per kWh. Press **unit set** button to save your setting. Repeat the process for Tariff 4.

Example - If you are on a tariff which starts at 1:00am and finishes at 8am, set start time at 01:00 and end time at 08:00. Push the **unit set** button to confirm. Select and set the cost per kWh you pay for each tariff, for night and day time rates respectively.



hold for 2 seconds



When in ENERGY NOW mode, this symbol appears when the most expensive tariff is in use.

MONITOR SETUP

HOW TO CHANGE FUNCTIONS

Step 1 - Function

Press the top **function** button to change the information displayed from **ENERGY NOW** to **AVERAGE** and to **HISTORY**.

Step 2 - Energy Now

The **efergy e2** monitor shows instant power(kWh), estimated electricity costs per day and carbon emissions per day.

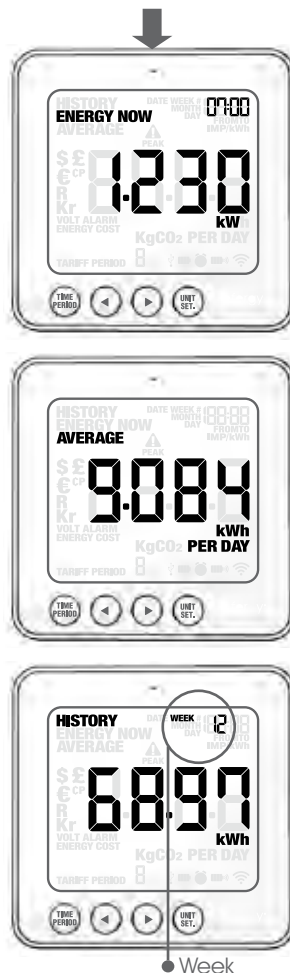
Step 3 - Average

The information shown is the average calculated since the monitor was switched on for the first time. It shows daily, weekly and monthly average consumption in kWh, \$ and kg.CO2.

Step 4 - History

In this mode the monitor shows consumption of the last 7 days, last 7 weeks and last 24 months in kWh, \$ and kg.CO2. Press **time period** button to switch between day, week and month.

Note - Hourly data is stored in the **e2** for 240 days. This can be viewed when the data is transferred onto your computer using the **elink** software.



MONITOR SETUP

HOW TO CHANGE MODES

Step 1 - Mode

Press **unit set** button to change the unit displayed.

Step 2 - Power

Shows the power of your whole house at any instant, in kW.

Step 3 - Energy

During the AVERAGE and HISTORY modes the display shows energy consumption, in kWh.

Step 4 - Cost Per Day

Estimates the electricity cost of your home at that current moment in time, in \$/day.

Step 5 - Carbon Emissions

Estimates the indirect carbon footprint for electricity consumption at that current moment in time, in kg.CO2/day.

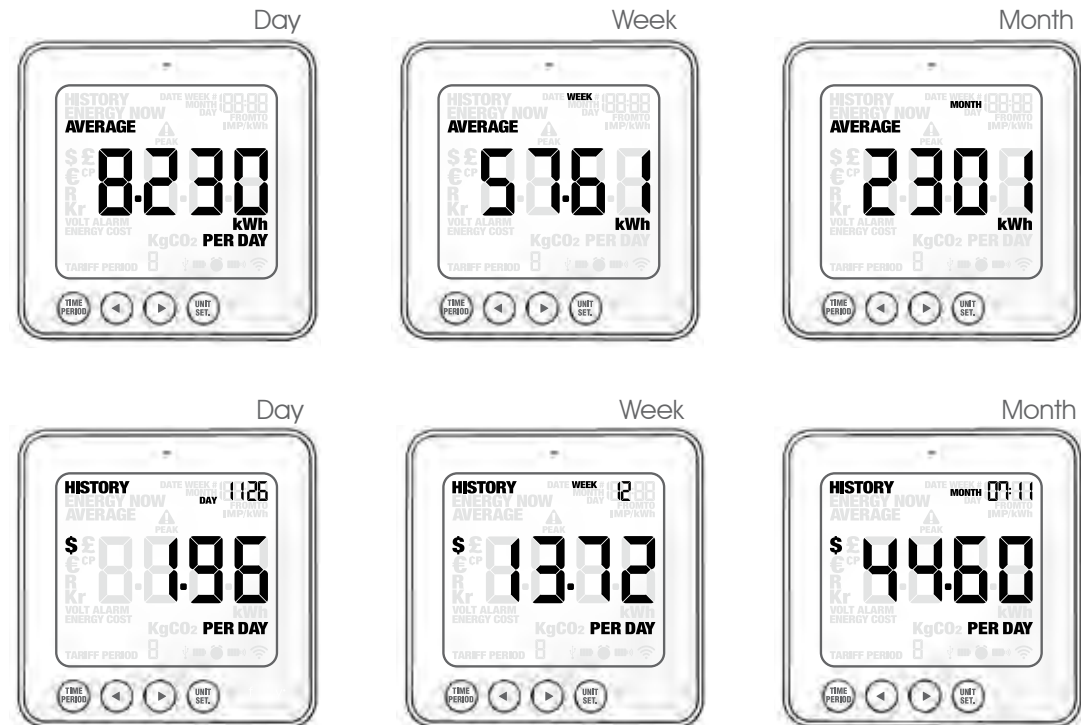


MONITOR SETUP

HOW TO CHANGE MODES CONTINUED

Step 6 - Time Period Button

Press **time period** button to change from daily, to weekly and to monthly data during AVERAGE or HISTORY mode. During HISTORY mode the **backward** and **forward** buttons are used to scroll between date, weeks and months.



FAQS



If I remove the batteries will I lose the information on the display?

The display has an internal memory, so if you need to change or remove the batteries the information stored on the display will not be lost.

How do I reset the display (clear the data and start again)?

Press **time period** and **unit set** buttons simultaneously and hold for two seconds CLR will be displayed on the screen.

How far does the device transmit?

Transmitters work up to around 230ft/40m within the home. The 433.5MHz range is well suited for home use. This can cover three floors, and also well suited to buildings where electricity meters are outside the main building.

I have dashes (- - -) showing on the display. What does this mean?

Move the display closer to the transmitter and press the **link** button. If the dashes remain on the display this would indicate the transmitter and receiver are not communicating. Please contact **efergy** Customer Service to help locate the problem.

Backlight appears to work sometimes, and not other times. Is my display broken?

No. The backlight is on a timer to save battery life. The display should work at darker periods of the day, when any buttons are pressed. The LED backlight will be activated from 18:00Hrs to 6:00Hrs.

TECHNICAL INFORMATION

Model Name	efergy e2
Frequency	433.5MHz
Transmission Time	10, 15 or 20 Sec
Transmission Range	230 - 328ft
Sensor Voltage Range	110 - 400V
Measuring Current	50mA - 200A

INSTALLATION NOTES

Date	
Location Installed	
Installed By	
Number of CTs	
Voltage Set Point	
Tariff Settings	

TECHNICAL NOTES FOR ELECTRICIANS



ELECTRICITY SYSTEM	VOLT SETTING
120/240 Volts, 3 Wire, Single Phase (Typical Residential Service in US & Canada)	120
240V, 3 Wire, Single Phase	240
120/ 208V, 3 Wire, 2 Phases of a 3 Phase 120/208V Three wires phase 1 live, phase 2 live, Grid 120V is live to neutral and 208 is phase to phase. Assume unbalanced load. 2 CT Sensors	120
120/ 208V, 4 Wire, 3 Phases, Balanced Load Three phase live, phase 2 live - Neutral, where 120V is phase to neutral and 208V is phase to phase. 1 CT Sensor	208
120/ 208V, 4 Wire, 3 Phases, Unbalanced Load The display does not recognize unbalanced loads in this configuration. The degree of accuracy will be relative to the amount of unbalanced current. 3 CT Sensors	120
208V, 3 Phase Delta Balanced Load	208
277/ 480V, 4 Wire, 3 Phases, Balanced Load Three phase live + neutral, where 277V is phase to neutral and 480V is phase to phase. 1CT Sensor	480
277/ 480V, 4 Wire, 3 Phases, Unbalanced Load Three phase live + neutral, where 277V is phase to neutral and 480V is phase to phase. The display does not recognize unbalanced loads in this configuration. The degree of accuracy will be relative to the amount of unbalanced current. 3 CT Sensors	277
230/ 400V, 4 Wire, 3 Phases, Balanced Load Three phase live + neutral, where 230V is phase to neutral and 400V is phase to phase. 1CT Sensor	400
347/ 575V, 3 Phase, Balanced Load. 1CT Sensor	580
347/ 575V, 3 Phase, Unbalanced Load. The display does not recognize unbalanced loads in this configuration. The degree of accuracy will be relative to the amount of unbalanced current. 3 CT Sensors	350