

Important Information About Your New E-Mon Product

E-Mon is committed to producing and delivering quality products in appearance and performance. That is why our meters are covered with a limited warranty against defects in workmanship and material. (See below for details.)

Limited Warranty

Subject to the exclusions listed below, E-Mon will either repair or replace (at its option) any product that it manufactures and which contains a defect in material or workmanship.

The following exclusions apply:

1. This limited warranty is only effective for a period of five (5) years following the date of manufacture when installed in accordance with manufacturer's instructions by qualified personnel.
2. E-Mon must be notified of the defect within ninety (90) days after the defect becomes apparent or known.
3. Buyer's remedies shall be limited to repair or replacement of the product or component which failed to conform to E-Mon's express warranty set forth above.
4. Buyer shall be responsible for all freight costs and shall bear all risk of loss or damage to returned goods while in transit.
5. This limited warranty does not cover installation, removal, reinstallation, or labor costs, and excludes normal wear and tear. Buyer shall provide labor for the removal of the defective component or item and installation of its replacement at no charge to E-Mon.
6. This limited warranty does not cover any product if: (i) a product is altered or modified from its original manufactured condition, (ii) any repairs, alterations or other work has been performed by Buyer or others on such item, other than work performed with E-Mon's authorization and according to its approved procedures; (iii) the alleged defect is a result of abuse, misuse, improper maintenance, improper installation, accident or the negligence of any party; (iv) damaged as a result of events beyond E-Mon's control or other force majeure events or (v) used in conjunction with equipment, components, accessories, parts or materials not supplied or approved by E-Mon.
7. This limited warranty is limited to the obligation to repair and replace the manufactured product. This is the sole and exclusive remedy for breach of any warranty. THE TOTAL LIABILITY OF E-MON, FROM ANY CAUSE WHATSOEVER, SHALL BE LIMITED TO THE PRICE PAID FOR THE PRODUCTS OUT OF WHICH SUCH CLAIM AROSE. IN NO EVENT SHALL E-MON BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES (INCLUDING ANY DAMAGE FOR LOST PROFITS) ARISING OUT OF OR IN CONNECTION WITH FURNISHING OF PRODUCTS, PARTS OR SERVICES, OR THE PERFORMANCE, USE OF, OR INABILITY TO USE ANY PRODUCTS, PARTS OR SERVICES, SALE OF OR OTHERWISE, WHETHER BASED IN CONTRACT, WARRANTY, TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, OR ANY OTHER LEGAL OR EQUITABLE THEORY.
8. EXCEPT AS EXPRESSLY PROVIDED HEREIN, E-MON MAKES NO WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED WITH RESPECT TO ANY PRODUCTS, PARTS OR SERVICES PROVIDED BY E-MON INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. PRODUCTS OR COMPONENTS DISTRIBUTED, BUT NOT MANUFACTURED, BY E-MON ARE NOT WARRANTED BY E-MON AND BUYER MUST INSTEAD RELY ON THE REPRESENTATIONS AND WARRANTIES, IF ANY, PROVIDED DIRECTLY TO THE BUYER BY THE MANUFACTURER OF SUCH PRODUCT OR COMPONENT.

Class 1000 Stand-Alone Single-Phase kWh Meter

Installation & Instruction Manual



Dear Valued Customer,

We are pleased that you chose to buy one of our products and want you to be just as pleased with it. To be sure that you are 100% satisfied with our products, we provide toll-free technical and sales support Monday through Friday, 8:00 am to 7:30 pm, eastern time. The toll-free number is (800) 334-3666. You may also reach us via email at info@emon.com.

Before installing your new E-Mon product, please read the information on the following pages carefully.

We believe that you will find the Class 1000 kilowatt-hour meters easy to install and use for monitoring and evaluating your electrical usage.

Be sure to forward this manual to the owner after installation is complete so that they may use it as a reference guide when reading the E-Mon D-Mon meters.

Thank you.

E-Mon[®]

Ordering Information:

Simply state wire configuration, voltage, current rating, and any options required:

Example:

Model: 2120100SA = 2 120 100 SA
CONFIG _____
VOLTAGE _____
CURRENT RATING _____
STAND-ALONE UNIT _____

Voltage Input Configuration:

2-wire, 120-volt, 2-wire, 277-volt,
3-wire, 120/208-240-volt

Current Input:

Up to 200 amps rms AC

Power Factor:

0.5 leading or lagging

Frequency:

50 Hz to 400 Hz

Accuracy:

Certified to ANSI C12.1 & C12.16

Voltage Operating Range:

+/- 25% of rated voltage

Temperature Range:

-20 degrees C to +50 degrees C

Voltage Overload:

+25% continuously

Current Overload:

Can be overloaded 100% without
damaging meter

Display:

Fully electronic, 8-digit LCD display.
Manual reset to zero.

Standard Ranges:

120 volt; 100 or 200 amps
120/208-240 volt; 100 or 200 amps
277 volt; 100 or 200 amps

Chapter 8

Frequently Asked Questions

Q. How accurate are the E-Mon D-Mon[®] meters?

A. E-Mon D-Mon meters are certified to ANSI C12.1 and ANSI C12.16 metering standards (+/- 1% from 1-100% of the rated load).

Q. What are the jacks on the meter boards used for?

A. The jacks on the E-Mon D-Mon meters are used to interface with several options available including pulse output, D/A output, Automatic Meter Reading systems, etc. Contact your local distributor for more information.

Q. How do I find out the cost per kWh?

A. Your local utility bill should list the cost per kWh; if it does not, simply give your utility a call and ask them the cost per kWh.

Q. When providing line voltage to the E-Mon D-Mon meters, can I tap off the same breaker I am monitoring?

A. Yes, the voltage can be pulled from the same breaker being monitored. Each meter draws .025 amps, so the load from the meter will have minimal affect on your readings.

Q. Can the line voltage wires be run in the same conduit as the current sensor leads?

A. Yes, there will be no effect on the meter if the sensor leads are run in the same conduit as the voltage wires. (All wiring must conform to local electrical codes.)

Q. What size wire should I use for the voltage? The current sensor leads? Do the current sensor leads have to be twisted?

A. Voltage wires are normally #14 AWG wire, the current sensor wires are normally #14-22 AWG (consult your local codes for proper sizing) and the sensor leads do not have to be twisted.

Q. I have an existing meter that I would like to interface with my energy management system. Can I field install the pulse output into the E-Mon D-Mon meter?

A. Yes, simply contact your local distributor and order the Pulser option.

Q. I've gone through the troubleshooting guides, and still can't get my meter to work. What should I do?

A. BEFORE removing the meter, contact E-Mon's technical department, toll-free, at (800) 334-3666. They will assist you in getting the meter up and running without having to remove the meter.

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Chapter 1 Pre-Installation Information

The Class 1000 kWh meter is an electronic meter that is used to monitor electric power to individual loads after the utility meter. Installation should be performed by qualified personnel and only according to these instructions and all applicable electrical codes. E-Mon and its representatives assume no responsibility for damage or injury resulting from the improper installation of this meter.

Check the rating and configuration on the meter label to ensure it is suitable for the intended service. Meters listed for use on 120-volt services cannot be used on 277-volt services, and vice versa. Class 1000 meters can only be used in single-phase applications. Verify that the meter rating (amperage) is suitable for the intended load. Compare the color of the arrows on the current sensors to the chart below to find the amperage of the current sensors.

Sensor Arrow Color Code	Sensor Rating
Brown	100 Amp
Red	200 Amp

Mount the meter in the desired location using the mounting flanges located on the top and bottom of the meter enclosure. Class 1000 meters must be installed indoors where they will not be affected by the elements.

Install current sensors around conductors to be monitored.

Note: The modular jacks located on the meter board are to be used only in conjunction with E-Mon peripherals. These jacks contain neutral-accessible circuits. Improper connections to the jacks can damage the meter and void the warranty.

Chapter 7 Troubleshooting Guide

The Class 1000 electronic kWh meter is calibrated and tested at the factory before being packaged and shipped. If installed properly and in accordance with these installation instructions, this E-Mon D-Mon® meter should provide years of trouble-free service. If the meter should not function, the following guide will assist you in troubleshooting the installation.

Note: Depending on the amount of power being used, a period of time will elapse before the meter registers readings. In the case of light loading, this may be as much as 24 hours.

PROBLEM

1. Display is blank.

PROCEDURE TO FOLLOW

- Check wiring to voltage terminals.
- Check circuit breaker or fuses.
- Verify that power is turned on.
- Test source for correct voltage.
- Press RESET button located on the door inside the meter and hold for 5 seconds.

2. Display shows incomplete numbers other than zeros when power is turned on.

- Press RESET button located on the door inside the meter and hold for 5 seconds.
- Press CPU button on door circuit board.

3. Display reading all zeros. (00000000)

- Determine if load is sufficient to update display (a load of at least 1% of the meter rating for a period of 24 hours).
- Check RESET button to be sure there are no wires or other objects pressing against it when the door is closed.
- Check the current sensors for installation and polarity. (See Chapters 2 & 3.)
- Be sure the current and voltage inputs have the proper phase relationship. (See Chapter 4.)
- Check wiring to voltage terminals.
- Check circuit breaker or fuses.
- Test source for correct voltage.

4. Display reads only a fraction of the power consumption.

- Check the supply voltage to be sure that it is on continuously 24 hours a day.
- Check the current sensor installation and polarity. (See Chapters 2, 3 and 4.)
- Check sensor wiring to the terminal strip in meter (color coding W & B).

If you still have questions, call E-Mon, toll-free, at (800) 334-3666 BEFORE removing the meter.

Chapter 6 Reading the Class 1000 kWh Meter

Normal Mode



The kWh display on the face of the meter requires no multiplier and shows kilowatt-hours consumed. The cost per kilowatt-hour can be obtained from the utility electric billing tariffs. By multiplying the figure obtained from the meter display by the cost per kilowatt-hour, the total power cost will be determined.

EXAMPLE: display reading 13413
 cost per kWh \$0.094

$$13413 \times .094 = \$1260.82 \text{ (for power used by metered load)}$$

NOTE: THE FOLLOWING ONLY APPLIES TO METERS USING MORE THAN ONE SET OF CURRENT SENSORS INSTALLED IN PARALLEL. For meters using parallel current sensors you must multiply the kWh display reading by the number of sets of current sensors installed.

Example:

$$250 \text{ (meter display reading)} \times 2 \text{ (sets of sensors in parallel)} = 500 \text{ kWh}$$

$$500 \text{ (kWh)} \times \$0.121 \text{ (utility cost per kWh)} = \$60.50$$

Test Mode

Screen 1



Screen 2



Pressing the CPU button on the meter display board will cycle the display through the test mode. The two screens above will be seen.

The first screen activates all the digits and icons on the display. This is to verify that all segments are functional.

The second screen will show the amp rating of the meter. The first digit (on the left side of the dash) will always be zero on the kWh meter. The four digits on the right side of the dash indicate the amp rating. The above depiction is of a 200-amp kWh meter.

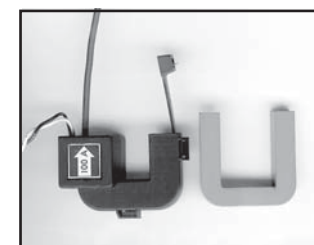
Upon completion of the cycling, the meter will return to the normal display mode.

When the meter is first energized it will automatically cycle through the test screens.

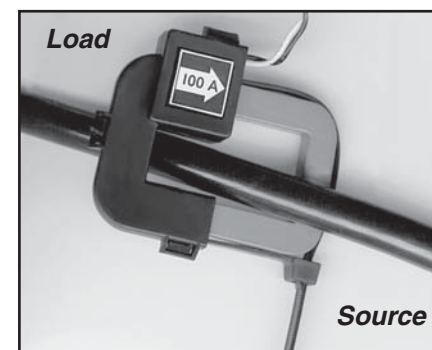
Chapter 2 Current Sensor Assembly

Split-Core Current Sensors

STEP 1: For each phase being monitored you will need one two-piece current sensor assembly (A single-phase, two-wire meter will require one assembly.) Open the two-piece sensor assembly by releasing the nylon clamp using a flathead screwdriver.



STEP 2: Reassemble current sensor assembly around the conductor(s) to be monitored. Be sure that the current sensor halves marked "load" are both facing the load side of the conductor. The colored arrow will be on the source side of the conductor being monitored and **MUST** be pointed in a clockwise direction around the conductor being monitored. Tighten nylon clamp to complete assembly.

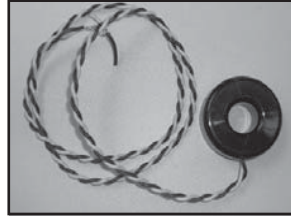


IMPORTANT: When looking from the source side of the conductor(s) being monitored, you should see the arrow on the current sensor assembly, and the arrow should be pointing clockwise around the conductor(s) being monitored.

Chapter 2 Current Sensor Assembly

Solid-Core Current Sensors

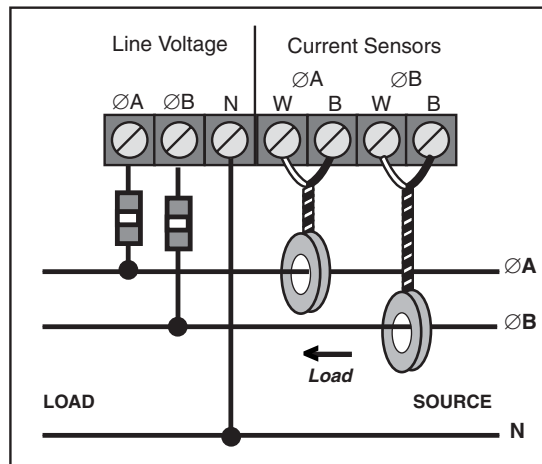
Solid-core current sensors are very compact and accurate. Because you must power down and disconnect the measured circuit to install solid-core sensors, they are better suited for new wiring or for permanent installation.



- STEP 1: Shut down power to conductors being monitored.
- STEP 2: Disconnect conductor from breaker or fuse block.
- STEP 3: Install current sensor over conductor with side marked "X1" facing load.
- STEP 4: Reconnect conductor to breaker or fuse.



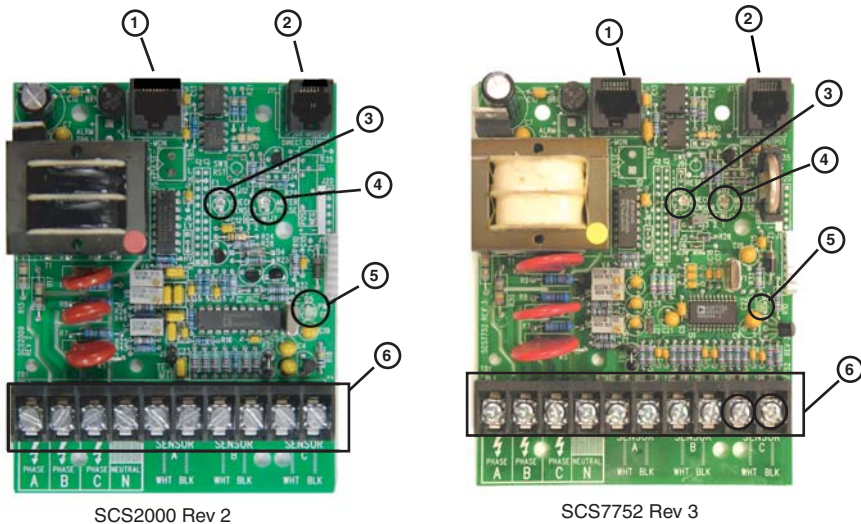
The direction of the load is designated by the arrow. Make sure that the arrows on the sensors are facing the same way as in the diagram below.



Chapter 5 Operating Guide

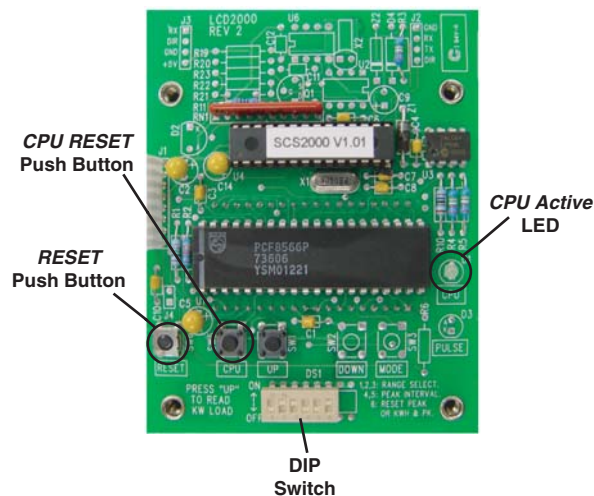
- AMR Jack** 8-pin RJ-45, used to connect kWh meter to RightEnergy™/IDR
- Peripheral Jack** 6-pin RJ-11 jack used to interface meter with peripherals such as the P2 Pulser or the D/A converter
- Check Sensor LED** When lit, indicates that the current sensor is backwards or on the incorrect phase
- Meter Pulse LED** Blinks to show meter load. Blink rate increases with load.
- Power On LED** When lit, indicates power to meter is on
- RESET Pushbutton** Press *RESET* to reset display to zero
- CPU Pushbutton** Press *CPU* to test display. Shows "88888888" then amp rating of meter
- DIP Switch** Meter setup. Used **ONLY** by Hunt Power factory personnel.
- CPU Active LED** One blink per second indicates normal operation.

Main circuit board located inside meter enclosure:



- 1. AMR Jack
- 2. Peripheral Jack
- 3. Check Sensor LED
- 4. Meter Pulse LED
- 5. Power On LED
- 6. Meter Terminal Block (Note: Terminals 9 and 10 not used.)

Circuit board located inside door of meter enclosure:



Current Sensor Connections

STEP 1:

Connect the black and white leads from the current sensor assembly to the meter terminal block. *In Class 1000 meters only A- & B-phase inputs are used.* The current sensor leads can be extended up to 2000 feet using #14-22 AWG wire and do not have to be twisted (consult your local electrical codes for proper sizing). When extending the sensor leads, be sure to note what color lead on the extension is connected to the black lead from the sensor, and what color lead on the extension is connected to the white lead from the sensor. There is no hazardous voltage across the current sensor wires and there will be no damage if the sensor wires are shorted together.

When connecting current sensor leads to the meter terminal block be sure that the white wire is connected to the "W" terminal, and the black wire is connected to the "B" terminal for that phase.

STEP 2:

Proceed to Chapter 4, *Various Wiring Diagrams*, for further information on current sensor connections.

Voltage Connections

STEP 1:

Verify that the voltage supplied to the meter is from the same source as the loads being monitored by the current sensors. Connect the line voltage input wires to the meter terminal block. (Refer to the various installation diagrams in Chapter 4.)

NOTE: LINE VOLTAGE INPUTS MUST CORRESPOND TO THE SAME CONDUCTOR BEING MONITORED BY THE CURRENT SENSOR INPUTS. FOLLOW THE CONFIGURATIONS AS SHOWN OR INACCURATE READINGS WILL RESULT. These wires are normally #14 AWG (consult your local electrical codes for proper sizing). It is recommended that inline fuses with a one-amp (1A) rating be used. Do not connect the voltage wires to the unit while they are live. Push insulating cover down over meter terminal block. Apply voltage to meter only after installation is complete.

IMPORTANT:

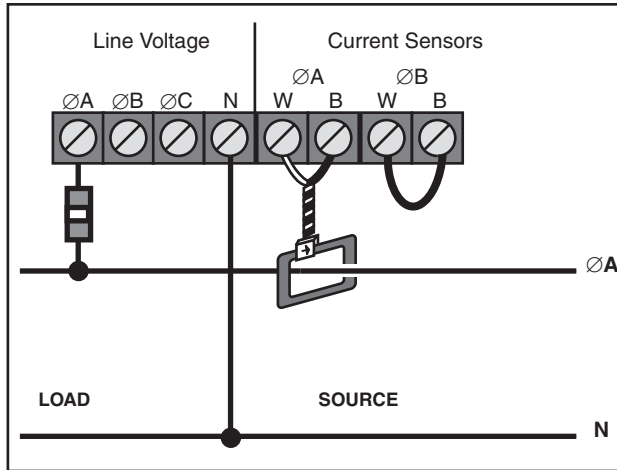
The line voltage and current sensor inputs must correspond. If the phasing between the voltage and the current sensors does not correspond, inaccurate readings will result.

Refer to Chapter 4, *Various Wiring Diagrams*, for further details.

Chapter 4 Various Wiring Diagrams

This chapter provides you with various installation diagrams depending on your monitoring needs. **Note:** Proper phase relationship between the voltage inputs and the current sensors is critical.

1-Phase, 2-Wire Connection 120-Volt or 277-Volt Single-Phase



Note: This diagram applies only to meters whose model numbers begin with 2120 or 2277.

Line voltage connection: #14 AWG

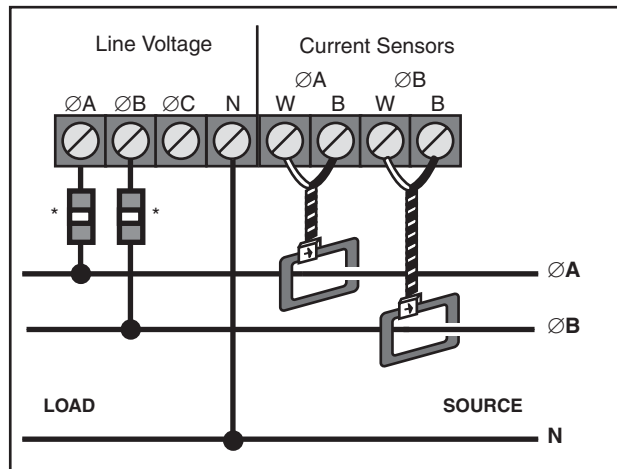
Sensor Connection:
B = Black
W = White

* One-amp inline fuse recommended

Jumper MUST be installed on B-phase current sensor terminals.

C-phase current sensor terminals are not used.

Single-Phase, 3-Wire Connection 120/240-Volt Single-Phase



Note: This diagram applies only to meters whose model numbers begin with 3208.

Line voltage connection: #14 AWG

Sensor Connection:
B = Black
W = White

* One-amp inline fuses recommended

IMPORTANT: Line voltage MUST be present at the A- & B-phase voltage terminals.

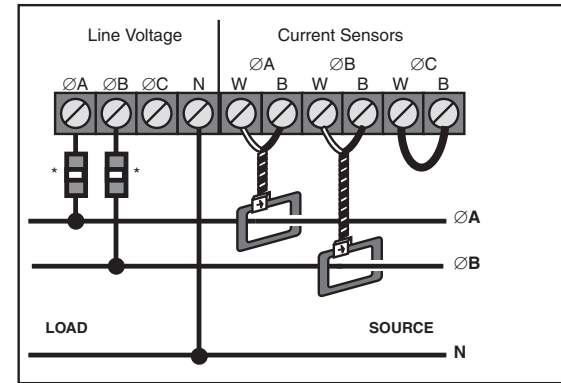
C-phase current sensor terminals are not used.

For other applications, contact E-Mon, toll-free: (800) 334-3666.

Chapter 4 Various Wiring Diagrams

120/208-Volt, Single-Phase, Three-Wire Connection (Derived from three-phase connection.)

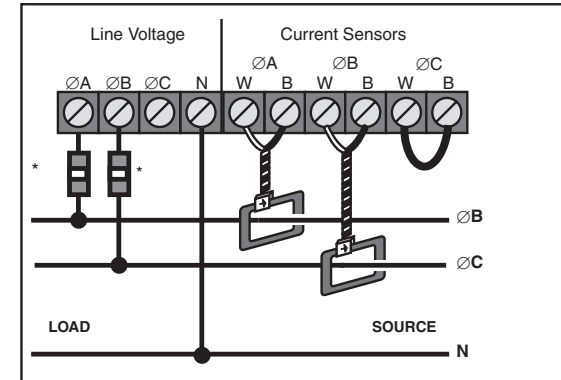
Conductors A-B



Use the diagram that corresponds to the existing circuit(s) being monitored.

Note: The C-phase terminals are NEVER used in the single-phase, three-wire connection. A jumper MUST be installed on these current sensor terminals.

Conductors B-C



Conductors A-C

