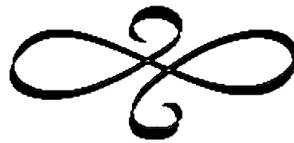


Brand Electronics

Digital Power
Meters



The ONE Meter
Multi-Channel Capable
Digital Power Meters

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Introduction

The ONE Meter, multi-channel, digital, power meter, was designed to address a wide spectrum of needs for data acquisition and display from multiple electrical circuits and analog inputs. The ONE Meter can be supplied as a single channel unit (AC or DC) or with as many as 128 channels.

The ONE Meter is designed to allow custom configuration to meet specific customer requirements by using a number of standard modules. There are a large number of possible combinations of meter configurations, sensitivity ranges and connection types.

ONE Meters are supplied in two packaging groups: units packaged with all circuit boards mounted in a single enclosure and units using separate boxes to house the "Master" and generally accompanied by one or more Data Units and one or more power supplies.

ONE Meter System Nomenclature

Analog inputs - ONE Meters are designed to gather and transmit analog data in addition to their primary electrical power measuring missions. Common analog inputs include: wind speed and direction, water level in a well, Temperature and Solar Irradiance. These values are delivered with other power measurements to a PC or other data gathering center.

Cabling - ONE Meter modules communicate via the supplied cable (ordinary CAT-5 LAN computer cable). Cable lengths up to 2000 ft. may be used.

Channel - a single power monitoring circuit; either AC or DC.

Connections - Depending upon instrument configuration there are up to 7 types of instrument connections.

- C AC current sense (Snap on Current Transducers)
- C AC power ; 115 vac (A 5 vdc 'wall wart' power supply)
- C AC volt sense (0-240 vac)
- C Analog signal inputs
- C DC Current Sensor - Toroid Hall Effect Sensor
- C DC Voltage
- C PC Connection

Data Units - Data units gather data and communicate with a Master. They are sometimes referred to as Power Measuring Units. Data units can have 1 or 2 channels each of AC or DC inputs. Data units can be daisy-chained to allow a single Master to monitor many channels.

Isolation - All AC connections are isolated. DC Ground (Negative) connections are not isolated and become common to the ONE Meter ground and also common with the PC ground if not protected with a optical isolator. See further discussion regarding need for optical isolation when connecting a PC.

Master - The Master unit is the unit that houses the master Central Processing Unit (CPU). It processes information from Data units and prepares values for display or export to a PC or other outbound device. A Master unit generally has a local display; a 4 x 20 LCD on the same box. However, because Master units can drive Remote Displays, some customers choose not to have a local display installed on the Master. The Master however, is the only unit capable of connectivity with a PC and is referred to as "Unit 1." The Master unit can be configured as a Data unit as well.

Remote Display - A 4 x 20 LCD generally mounted on a Bakelite back plane and trimmed with an oak surround. They are generally used in home or office settings where they can be mounted in a triple gang box on the wall to conveniently display energy usage information. When a single enclosure system is supplied, a Remote Display is usually mounted on the exterior surface.

Sense Connections - connections to circuits that carry voltage or current information from the sensory pickup to a Data or Master Unit.

Wall Wart - A small boxed unit (5 VDC power supply) that plugs into a 115VAC outlet. The unit is connected to the Master (may be provided with connection to a Data unit if ordered in this configuration) and supplies the meter with low voltage operating power; it draws a nominal 100 ma.

Check for shipping damage IMMEDIATELY. All Brand Electronics products are shipped FOB factory, whether or not the freight was paid by the customer or Brand Electronics. If the unit was damaged in shipment, it is very important that a freight claim be filed, by the purchaser, with the carrier immediately.

WARNING: Ensure the voltage and current sense connections are correct; failure to do so could result in immediate and permanent meter damage

CAUTION! EXTREME CARE MUST BE TAKEN. IT IS RECOMMENDED THAT THE POWER SYSTEM BE DE-ENERGIZED, OR THAT A LICENSED ELECTRICIAN INSTALL THE ONE METER CONNECTIONS.

General Connection Notes:

AC volt sense: Each AC channel to be monitored has a separate, non polarized, voltage sense connection.

117Vac Connection: Attach the White wire to Neutral or Ground; attach the Gray wire to the Hot lead.

NOTE: This is the general application configuration ; to reverse the power indication reverse the White and Gray connections.

220Vac Connection: Attach the White wire to L1 and the Gray wire to L2.

NOTE: Direction of power is effected by the attachment of the White and Gray wires to L1 or L2. In some instances where it is desired to reverse the “sign” of the measurement, reverse these connections.

AC current sense: The CT can be placed around either the neutral or hot leg to the specific source/load to be monitored. The placement and direction of the CT affect the power reading. See discussion under AC volt sense.

CAUTION: In a multi-channel application, be certain that the CT installed corresponds with the appropriate voltage sense wires.

DC current sense: Install the toroid Hall Effect Current Transducer on either the Negative or Positive DC cable. Power direction will be as marked on the CT.

DC voltage sense: Connect the voltage sense to DC Positive & Negative: Gray to POS, White to NEG.

SYSTEM CONNECTION:

1. Plan the layout and locations of the instrument modules; taking into account the convenient placement of the Master, Remote Displays and the respective Data units as appropriate for your system. Data units should be located in reasonable proximity to the loads they monitor.

IMPORTANT: ENSURE THE VOLTAGE AND CURRENT SENSE CONNECTIONS ARE CORRECT; FAILURE TO DO SO COULD RESULT IN IMMEDIATE AND PERMANENT METER DAMAGE WHICH WILL NOT BE COVERED BY WARRANTY!!! THE VOLT SENSE CONNECTIONS ARE HIGHLIGHTED ORANGE

TERMINAL BLOCKS ON THE DATA MODULE AND ARE CONNECTED TO THE LABELED AC WIRES.

COMPUTER CONNECTION WARNING: When using an RS-232 equipped version of the ONE Meter in a system having a floating battery negative (not tied to the same ground system as the AC power system), remember that a connector coming out of the ONE Meter is connected to the battery negative; either directly or through a DC Data unit.

This normally causes no problem when used with laptop computers. However, if you plug the RS 232 connector output into a computer with a metal chassis, then the battery negative will be connected to the chassis of the computer.

THIS EXPOSED BATTERY NEGATIVE MAY BE HAZARDOUS, AND POSSIBLY FATAL IF YOU HAVE A HIGH SIDE BATTERY FAULT.

We strongly recommend that when using a computer to log data from a system monitoring DC power parameters that you minimize the hazard by installing an RS-232 Opto-Isolation Module.

Channel or Circuit numbering - Channel numbers are marked on the Data Units. These channel numbers are shown on the 4 x 20 LCD on the Master or Remote Displays. Specific systems may have the channels "named" (ie Invertor, Grid, etc).

2. Connect all sensor wires to the proper terminals on their respective Data Units and circuit monitoring points. See General Connection Notes above for guidelines.
3. Connect any analog inputs to the ONE Meter analog input terminals.
4. Connect ONE Meter modules: Master, Remote Displays and Data units using the CAT-5 cable supplied or customized in the field.
5. Connect and plug in the 'Wall Wart' to energize the ONE Meter.
6. Display - Controls: Upon initialization, the meter display should show "Brand Electronics, ONE Meter, Rev "X" briefly, then go to the default display, Screen 1.
NOTE: These are general display notes. Some customized units may differ.
NOTE: Screen numbers refer to the type of data displayed. You may have to flip through a number of "displays" to see all channel information for a particular Screen. Example: In a 6 channel system, Screen1, Display 3 would show information from channels 5 and 6.
 - a. Screen 1 - shows two lines of information per channel:
 - i. line 1: shows: Channel number, Energy (Watt-hours, or Kilo-Watt-hours). The kw-hr display can be reset by pressing both the MODE and DOWN buttons at the same time, and following the instructions on the screen. This procedure will reset kw-hr on all channels. If reset of kw-hr is desired for only one, or selected channels, it must be done through the PC interface.
 - ii. line 2 - shows: amps, volts and power (Watts). Pressing the UP button will show the same information for all channels in the system, two channels per display. When all channels have been displayed, pressing the UP button again will advance to the next screen.

- b. Screen 2- Log status screen, shows the capture interval set, bytes saved, date and time. Check the Log display upon power up. The date and time should be correct, the interval should say 0. If not, go to the PC setup instructions. Pressing the UP button again will show the next screen, or if no Analog inputs are installed, the display will return to the first display: Screen 1, Display 1.
 - c. Screen 3 - Only on select models/configurations. Analog inputs (from Data). Pressing the DOWN button once will go back to the previous displays. .
7. Ensure the power direction, the “sign” of the measured power value is as desired. If not, for AC ONLY reverse or swap the voltage sense connections on the applicable channel; for AC or DC reverse the CT direction or line installation.

PC connection:

Your ONE Meter is supplied with several simple BASIC Programs. Install the Liberty Basic program on your system (supplied on the included floppy disc). NOTE that most programs assume Com1, you may need to change the code if other than this. We supply the source code. Please call with any questions!

The ONE meter communicates with a PC via a serial port using the supplied adapter. Connect the meter to the PC. Bring up a terminal program, such as Hyper Terminal, and set for 19200 bps, 8N1. Connect the terminal program. Key the PC Enter key, the meter should return with some (irrelevant) message.

To set the date/time:

Input the date/time exactly as shown in the example below:

USE ALL CAPS: U1 SET CLK11-02-2000 14:34:00 <ENTER>

The meter should return with a similar message.

To check the date/time type U1 GET CLK <ENTER>

Commands:

- U1 RESET Stops logging, resets memory back to the beginning. NOTE: memory is not erased. Beginning another logging session, after a RESET will overwrite previous data entries.
- U1 LOG starts logging
- U1 SET INTxxx, sets capture interval where xxx is 1-254 minutes, or 255 for daily
- DUMP returns one log entry per ENTER
- STOP stops log dump
- FILE dumps the entire logger memory until done. Note: It will take upwards of 5 minutes to upload all data. This process can be truncated by: pushing the reset button on the Master, or unplug the Master, or unplug the PC connection.

Warranty

Brand Electronics products are warranted to be free from defects in materials and workmanship for one year from the date of purchase. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS. At its option, Brand Electronics will repair or replace, or refund the purchase price of any product which fails to conform with this warranty under normal use and service.

Should a Brand Digital Power Meter fail after the one year Warranty period, the purchaser may return the meter directly to Brand Electronics for repair or replacement for a nominal charge. This charge may be waived in the event Brand Electronics determines a component failed prematurely.

IN NO EVENT SHALL BRAND ELECTRONICS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGE.

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