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Topic: Functions of the PL-100

Functions of the Plug Load Analyzer

The PL-100 Plug Load Analyzer is a low-cost power monitor and energy logger. It combines true RMS measurement capabilities with energy usage monitoring and occupancy logging. The PL-100 can be used as a quick diagnostic tool to analyze and monitor power quality and when used with an occupancy sensor, the PL-100 will track energy usage to project the potential energy savings of using occupancy based control of plug loads.

The Plug Load Analyzer was designed to measure the following:

- **Instantaneous Voltage (V), Load Current (A), and Load Wattage (W)**

These are true RMS measurements, which means that even if the voltage is severely distorted and has no sine wave, the calculations will still be accurate.

- **Instantaneous Apparent Power (VA), and True Power Factor (PF)**

Apparent Power is the current multiplied by the voltage. The Power Factor measurement takes into consideration the fact that sometimes the voltage and current are not in sync and the sine wave does not look the same. Switching power supplies (e.g. motorized units) are one example. The voltage and current of a lamp would be equivalent. This is important because the customer is billed for the watts consumed. If the power is bad ($PF < 1$) then the customer is being undercharged by the power company. This also causes an extreme amount of stress on the transformers in the building, and could potentially be a safety hazard.

- **Current Crest Factor**

The Crest Factor is a convenient way to see how the current looks. It is the peak divided by the RMS value. Motorized units that have a coiled wire causes the current sine wave to lag to the right of the voltage. This is also a cause of a Power Factor less than one.

- **Minimum and Maximum Voltage (VRMS)**

Brief sags and surges in the voltage can be noted. This information is captured thirty times per second.

- **Minimum and Maximum Current (ARMS)**
Minimum and maximum values of the amperage consumed by the plug loads are noted.
- **Minimum and Maximum Power (Watt)**
Minimum and maximum values of the wattage consumed by the plug loads are noted.
- **True Energy Usage (kWh)**
By taking the kWh and multiplying the electrical rate, the dollars spent on operating the plug load can be determined.
- **Apparent Energy Usage (kVAh)**
This shows the amount of energy the attached plug load has consumed (since the time of reset).
- **Total Elapsed Logging Time (Tot)**
This shows the auditor how long the Plug Load Analyzer has been logging data. It is noted in days + hours : minutes : seconds
- **True Energy While Vacant (kWh)**
This measurement is only available when used with a Personal Sensor (PL-100-S). The display shows the kWhs consumed while the monitored space was vacant.
- **Total Vacancy Time.**
This measurement is only available when used with a Personal Sensor (PL-100-S). It shows the elapsed time that the monitored space was vacant.
- **Savings Per Year**
This measurement is only available when used with a Personal Sensor (PL-100-S). The PL-100 calculates the estimated number of kWhs of energy that would be saved per year if the monitored plug load were controlled by Watt Stopper occupancy sensors. If the plug load has not been monitored for a long enough time to make a valuable calculation, the PL will read “?????” in the display window.

Note: The Plug Load Analyzer allows the auditor to reset the memory of the unit.

What makes the Plug Load Analyzer different from other metering devices?

There are many metering devices on the market that take a multitude of measurements. We have found that the companies that make such devices do not offer versions that measure the desired readings. It is a simple case of all or nothing. Most of these devices are extremely expensive (~\$1000+). There are “cheap” meters (~\$300+) from other companies which measure instantaneous

measurements, but they do not measure kwh (the energy used over time). This measurement is vital in determining savings with an occupancy sensor. The Plug Load Analyzer has a more focused selection of readings that can provide the auditor with exactly the information needed.

In addition, the Plug Load Analyzer is extremely accurate (+/-1% of full-scale and +/-2% in the low-order digits). We have not found many “cheap” devices that can claim this level of accuracy. The PL-100 is completely self-contained and portable. It installs easily and does not require clip leads or current transformers – it just plugs directly into an outlet. It features an LED indicator light to confirm if a branch outlet is live and wired correctly (i.e. hot and neutral are not reversed, and ground is present). Accessories include mounting brackets with the Velcro preinstalled for easy operation and portability.

With the rising use of electronic equipment in the office, the need to save energy and ensure power quality has become a necessity. The PL-100's energy logging feature is a powerful means of identifying the energy waste. When used in conjunction with an occupancy sensor during a logging session, it clearly demonstrates where desktop, occupancy based control will bring about significant energy savings.

Contact The Watt Stopper Technical Support at 1-800-879-8585 for more information.