

# Load studies: six common mistakes when conducting a load study

## Application Note



Local regulations often require facilities to conduct a load study before adding new loads to an existing panel. Electrical engineers perform similar studies for large scale expansions.

The purpose is the same: measuring existing load levels (three phase current draw) over a complete 30-day usage cycle allows electricians and engineers to determine how much additional capacity is available in an electrical panel.

Most of these professionals have learned the hard way what “not” to do when conducting a load study. The risk: Mistakes during setup lead to erroneous and incomplete data, invalidating the entire 30 day study.

**Here’s a summary of the six most common mistakes to avoid when conducting a load study.**

### **1. Not fully charging the logger prior to the session**

Before performing a load study, confirm the battery in the energy logger is fully charged. As with any product, the battery will lose charge while it is stored—whether it is brand new or simply hasn’t been used for a while. While the logger draws its power from a convenience outlet or the measurement line when recording, it still requires battery power to review settings and data before installation and for backup power in the event of an outage.



## 2. Not installing the logger at the correct disconnect or panel

Although it may sound obvious, the technician installing the logger must verify that he is installing the logger at the correct disconnect or panel. Many locations have multiple disconnects and panels and it may not be clear which one is the target of the load study. When in doubt, contact the person requesting the study and verify the individual load or panel to be monitored.

## 3. Not verifying that the power source is live and that it is not a switched outlet

Load studies are performed at a wide variety of locations, such as apartment buildings, commercial office buildings, industrial facilities and retail stores. With older model loggers, standard procedure is to plug the logger in to a convenient outlet located near the panel under study. The technician installing the logger must verify that the power source is live and is not a switched outlet controlled by a switch, time clock, or photocell. If the outlet is switched ON and OFF on a regular basis the logger's batteries will be drained and the logger will stop recording.

## 4. Not labeling the power cord

The outlet that powers an energy logger may not be located immediately adjacent to the load being monitored, requiring an extension cord from the outlet to the logger. (A logger that is capable of being powered from the measurement circuit is preferred). The extension cord must be installed so it is not subject to physical hardship, does not present a hazard to personnel, and cannot be unplugged inadvertently. Placing a piece of adhesive tape on the wall near the outlet with DO NOT UNPLUG written on it or having a specifically designed sign can prevent the unplugging of the extension cord by janitorial or maintenance staff.

## 5. Incorrectly setting up the logger

Always perform a simple checking routine before starting the logging session, to ensure all the voltage phase connections match. Confirm phase A from the logger goes to phase A conductor and B to B and C to C. Then verify correct polarity for each current probe. The arrow on the current probe should point towards the load. Check each phase to make sure they all point in the

same direction. Finally, verify the instrument is reading correctly: Power is measuring positive (if the load is operating) and power factor shows a reasonable looking value for the type of load. Using an instrument that automatically checks, highlights and corrects connection errors is a definite 'nice to have'.

## 6. Not verifying that recording has begun

Setting up an energy logger to perform a load study is a straightforward task, but the simplest mistake—not turning on the recording function—can still be made. After confirming the appropriate current and voltage leads are connected to the load, select your recording parameters using the buttons and menus on the unit and push the "Start Logging" or "Record" button. You should see both a message and an icon on the logger's screen indicating logging has begun. It is a good practice to wait through the first recording interval and verify the logger has recorded its first value. Then you can be absolutely certain recording has begun and the setup is correct.