FLUKE®

Energy logging for HVAC just got so much easier

Meet the energy logger designed for you

Application Note

Most HVAC professionals understand that energy is wasted by inefficient systems or by operating non-critical loads at peak utility rate periods. The questions aren't whether, but how much, energy is going to waste, where, and at what cost?

Fluke 1739/Basic Three-Phase Energy Logger

Whether you're an outside contractor submitting bids to building operators, or the building operator, power and energy logging can help you answer these questions about energy efficiency and how ROI is affected.

In the past, getting an accurate picture of energy use was complex and costly. You could use a low-end general-purpose logger but you wouldn't get accurate results. Or you could use an expensive power quality analyzer that required an engineer with advanced training. The Fluke 1730 Three-Phase Energy Logger provides a new solution. It's optimized for energy logging in industrial plants and commercial/institutional buildings.

Three reasons to log power and energy use

1.

Manage energy costs and realize savings opportunities

While energy expenditures are a significant portion of overall operational cost, many companies don't really know where their energy dollars are being spent, since all they get is one overall monthly bill, with no indication of whether that use was standard or excessive compared to operations that month.

By logging power use at the main service entrance and then at large loads and secondary supplies, facilities can see how much power is being used when, by what, and at what hourly cost. Without fail, the data will turn up several energy wastes that can be rectified by operational changes alone, such as turning off certain loads, reducing loads during peak rate periods, or adjusting the schedule so that loads operate during non-peak rate periods.

2.

Rebates and financial incentives

Utility companies offer incentives and rebates as a way to encourage their customers to decrease energy use. The goal is to serve more customers with the same existing power supply, since building new power generation plants is prohibitive. Many incentives and rebates are available for retrofitting existing buildings, for example with energy-efficient lighting and high-efficiency motors, as well as by replacing motor starters with variable frequency drives.

To receive the financial incentive, the utility company will often require verification of the energy use—an ideal scenario for a load study. A pre-retrofit load study will document the existing energy use to provide baseline data, while a post-retrofit load study verifies the energy savings achieved upon completion of the modifications.

3.

Accuracy of electrical bill

Owners of large and medium-sized facilities often install electrical submetering to bill tenants for their specific electricity usage. However, these submeters are commonly installed improperly, putting that billing into question. Installation issues vary, and include current transducers installed backward, current transducers on the wrong phase, and errors in configuring the submeter.

A good business practice is to double-check the reading with a portable energy logger. Logger data provides a rough order of magnitude comparison of what is being billed versus what is actually used. A significant deviation between the amount charged for electricity usage and the logger data would signal the need to investigate the sub-meter setup.

Over time, HVAC systems can become inefficient. Energy logging at the highest loads can help identify wasted energy and potential savings.

Not just another energy logger

The Fluke 1730 Three-Phase Energy Logger not only provides professional-level data measuring; it gives you those capabilities in an intuitive, easy-to-use, very portable tool that:

- **Is easy to set up.** We spent months researching the most common setup errors and applied what we learned to completely re-engineered connectors; digital check and auto correct of all connections.
- **Fits inside most electrical cabinets.** The Fluke 1730 can draw power directly from the circuit under test, allowing the panel doors to be closed. The power supply is detachable to allow the unit to fit in tighter spaces.
- **Carries the highest safety rating in the industry.** The 1730 is 600 V CAT IV/1000 V CAT III rated for use at the service entrance and downstream.
- **Is easy to use, even with gloves.** The touch screen and large buttons are easy to manipulate with heavy gloves on. And the specialized screen technology is reactive to touch yet safe for live-energy work. The logical user interface presents choices, steps, and values in the order you need them, which makes the 1730 a breeze to use even if you don't use it often.
- **Lets you see data in real time.** Rather than have to wait until you download the logged data to review it, you can view data on the 1730 display during logging. You can also download logged data to a USB stick in the field and leave the logger to continue its job. It can store more than 20 separate logging sessions.
- **Connects with temperature and pressure accessories for multi-stream logging.**

You can use the 1730 to discover hidden energy waste in lighting and air conditioning systems, and in other large loads that you may be able to switch off when not in use.

Energy logging in a building's ventilation system

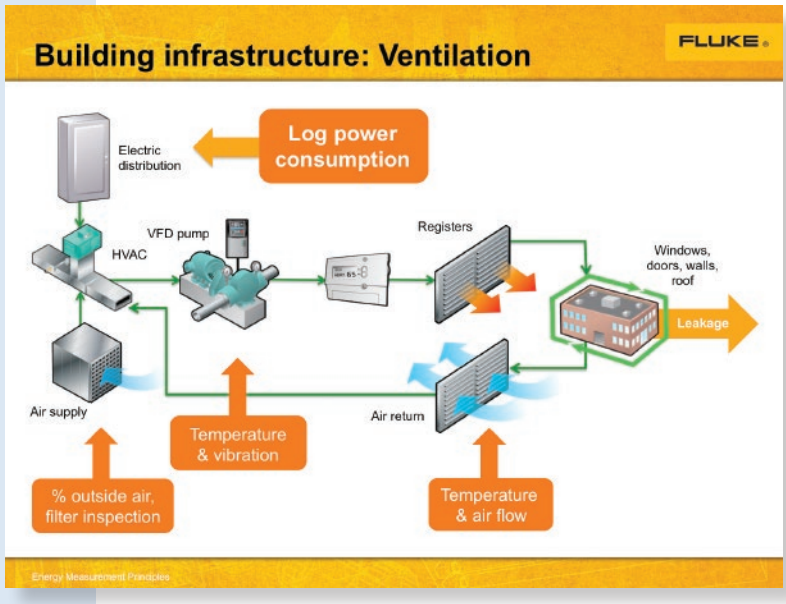
It's important to remember that the purpose of having an HVAC system in the first place is to regulate the temperature, humidity, freshness, and movement of air in buildings. Most facilities over-ventilate and over-condition. A big savings point is the efficiency of the equipment used to run your HVAC system—the motors, chillers, boilers, etc. Profile your HVAC system—how many motors and chillers? What size, with any controls? Then log energy consumption (kW, kWH, and power factor) at main panels and the main loads over business cycles. Conduct load studies and energy assessments to verify system capacity, energy consumption, equipment power factor, harmonics, and voltage events.

Use data you collected in the pre-work phase and conduct additional specific tests on equpment:

- Can variable frequency drives (VFDs) be applied to any of the biggest loads?
- Does your logged energy consumption data, compared to manufacturer's standards, show they are operating efficiently?
- Do ROI calculations support upgrading any of the largest motors, chillers, or air handlers to high efficiency models?
- Can either the chiller or the boiler/furnace be turned down or off in some seasons?
- Is the heat exchanger operating efficiently? (Conduct a pressure test on the tubes and check the outlet air and water temperature.)
- How is the cooling tower operating? Measure the outside air temperature, humidity, and the temperature of the condensing water supply and compare against manufacturer specifications.

More tests specifically for fans and air handlers:

- If you haven't yet, do an electrical log at your fan(s) and compare to manufacturer's specs. Is it operating efficiently?
- Take temperatures at air handlers, compare against sensors, and calibrate as needed.
- Check pressure drops across filter banks and heating/cooling coils. Large drops mean dirty filters, which require a lot more energy for air to move through.
- To consider resizing exhaust and other fans, you'll need to verify what the actual airflow demand is, compared to the output of the fan. If you occasionally do need the full output, then consider adding a VFD. If you never need the full output, consult a manufacturer for better-sized unit options.



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Printed in U.S.A. 1/2014 6001411_EN

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