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Poultry Housing Tips

Monitoring Poultry House Power Usage

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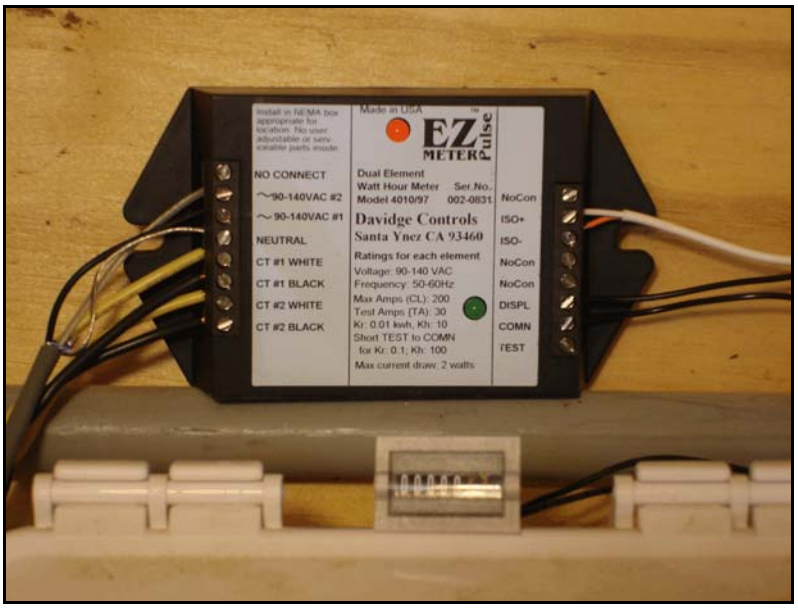


Figure 1. Power (Kw*hr) meter with optional mechanical display.

With rising electrical rates, as well as the trend toward increased tunnel fan capacity to keep large broilers cool during hot weather, poultry producers are more concerned than ever about keeping their power bills to a minimum. One of the keys in managing poultry house power usage is knowing precisely how much power a house is using on any given day. The fact is that producers often make incorrect assumptions when it comes power usage because they have no information on how much they are using on a daily, weekly or flock basis and as a result miss out on power savings opportunities. For instance, it is often assumed that during brooding power usage is not something to be concerned about because exhaust fan runtime is at a minimum. But in fact, if a house is equipped with 100-watt incandescent light bulbs for brooding they the light bulbs be use the same amount of power as operating three or more 48" fans. So a producer may be using more electricity during the first week than during the third or possibly fourth week of a flock and not even be aware of it. With access to information on daily power usage the effect equipment operation as well as management practices have on daily power usage is easily seen and corrections can be made.

Though of course useful when it comes to evaluating poultry farm energy usage, a monthly power bill makes it difficult to truly understand poultry house power usage for a number of reasons. First, the bill provides a monthly and not daily total so it is hard to figure out how much power is being used over the course of the flock. Secondly, a power bill doesn't provide a good record of how much power was used for an entire flock because the monthly bills rarely correspond with the placing and catching of a flock. Last but not least, it is impossible to separate out individual houses, farm shop, well or even dwelling house from what a specific house or group of houses has used. Until recently

the only way for most producers to obtain daily/weekly farm power usage was to read their farm's electrical meter once a day/week at the same time each day. This is not only time consuming, but once again, a producer cannot separate out individual houses for comparison.

There is a new product on the market which makes monitoring poultry house power usage as simple as monitoring house water usage. The Davidge Controls EZ Meter (www.ezmeter.com), when wired into a poultry house's electrical panel, will produce a "pulse" for each 0.01 Kw*hr of power used that can be read by either a houses environmental controller or by a simple inexpensive mechanical display. Most modern poultry house environmental controllers can display the power used since midnight and provide a record of daily total power usage just as they do with bird water consumption. The cost of powering a house can be determined by simply multiply the total Kw*hr's used each day/week/flock by your average electricity rate (typically between $0.08 and $0.12 during the summer).

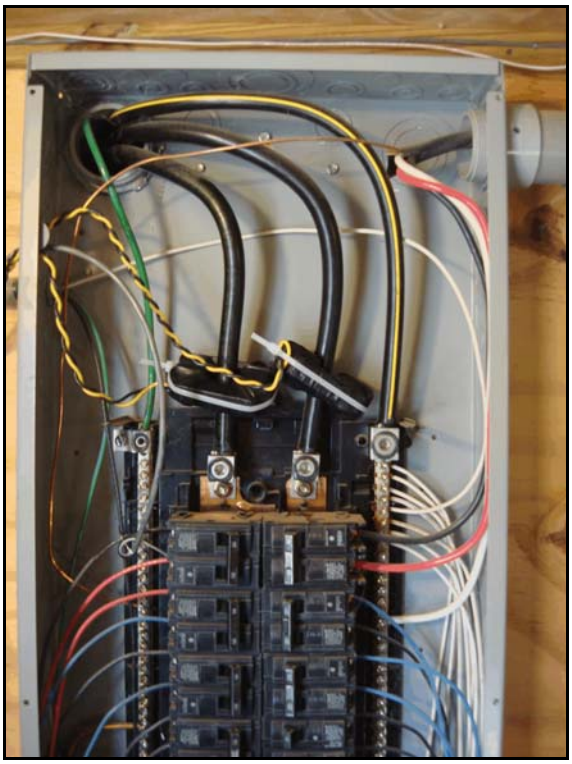


Figure 2. Installed split-core current transformers

Figure 3.Split-core current transformer

The EZ Meter model 4010/97 can handle the typical 200 amp 120/240 volt electrical panel. There are other meters available for higher/lower amperage electrical panels as well as three phase panels. Though the installation of the meter is fairly straightforward, it should only be done by a licenced electrician! The simplest, but most expensive ($400), option is to purchase a meter with spilt core current transformers (Figure 2). Using split-core transformers doesn't require detaching the main electrical cables from the house's electrical panel (Figure 3). A second option is to purchase a power meter with solid core transformers. Though the main electrical cables have to detached from the service panel to install the solid core current transformers, the advantage is that they reduce the cost of the unit to approximately $200. Once the current transformers are installed, the EZ Meter then needs to be connected to each leg of power as well as the house's neutral. The last step is to connect the EZ Meter with the houses poultry house environmental controller so that it can count the pulses produced by the power meter (make sure you check with your poultry house controller's manufacturer to see if it can handle additional digital inputs). The entire installation process typically takes less than 20 minutes. A mechanical display that keeps a running total of power usage can be added to the EZ Meter for approximately $20 (Figure 4). The mechanical display also makes it possible to easily monitor power usage in houses without a modern environmental controller.

Figure 4. Optional mechanical Kw*hr display.

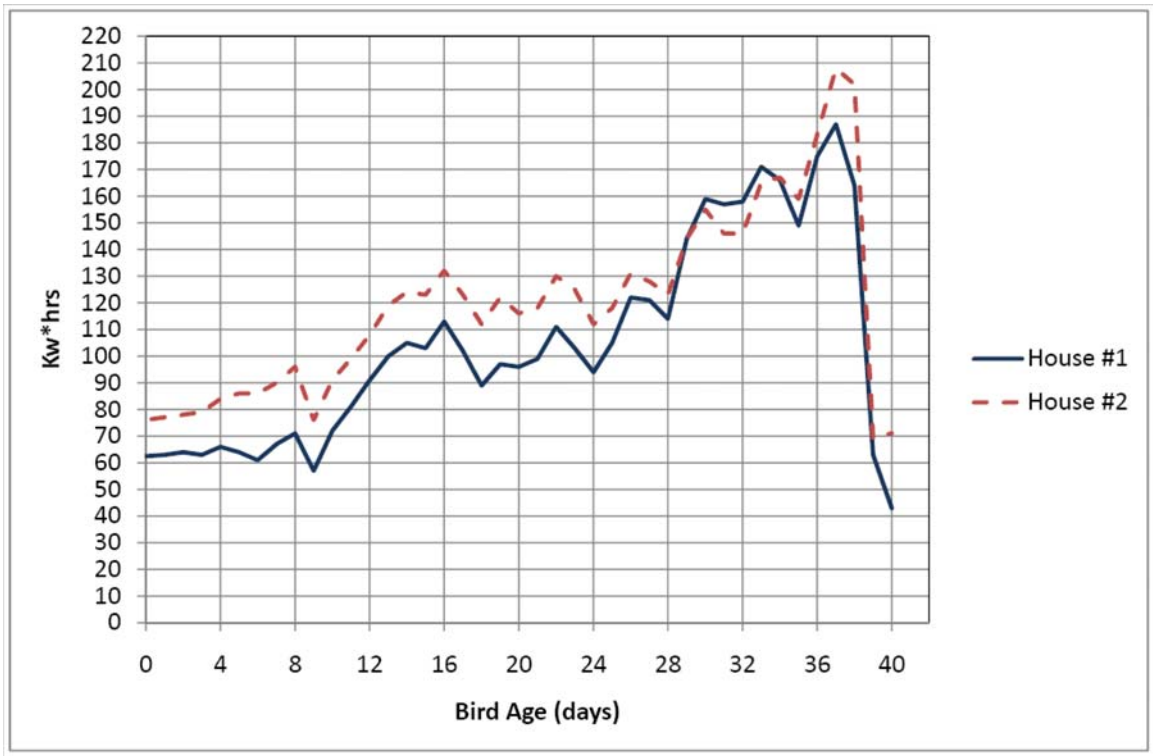
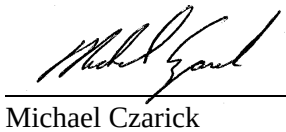


Figure 5. Daily power usage for two tunnel-ventilated broiler houses.

Figure 5 provides an example of how power meters can be used to better understand poultry house power usage. Power meters were installed on two identical 40' X 500' tunnel-ventilated broiler houses. Total power used for House #1 and #2 over a summertime flock was 4,567 and 5,224 Kw*hrs, respectively. Since the summertime power rate on this particular farm was approximately $0.09 per Kw*hr, this meant that the total cost of power for the flock was $411 for House #1and $470 for House #2. The difference in electricity usage early on in the flock of approximately $2 per day was attributed to the fact that a small office was wired into the electrical panel of House #2. The difference in power usage between the two houses was essentially eliminated from day 29 to 36 when the producer lowered the temperature settings of a few tunnel fan in House #1 to increase bird cooling, which resulted in an increase in electricity usage in House #1. From data provided by the power meters the producer not only learned how much electricity the farm's office used but also discovered the relatively minimal cost associated with lowering tunnel fan temperature settings to increase bird cooling.

Since the EZ Meter allows a producer to determine power usage in hundredths of a Kw*hr, it is fairly easy to use the EZ Meter determine how much electricity a single device or group of devices uses. For instance, between flocks a producer could turn off all electrical breakers except for those related to a house's lighting system. The producer would then write down the starting kw*hrs from the power meter's mechanical display, wait 15 minutes, then note the final reading. The difference between the two readings would then be multiplied by four and the hourly power usage of the lighting system would then be known. This procedure could be repeated for different lighting system configurations (brooding lights, growout lights, or even with different dimmer settings if a producer dimmed their incandescent lights) or to determine hourly electricity usage of tunnel fans or side wall fans. It should be noted that it is best to purchase the optional mechanical display if you want to determine power usage, of individual devices because if a houses environmental controller is used to display power usage the power meter will also be measuring the environmental controller's power usage in addition to the device(s) of interest.

The ability to know how much electricity a house is using on a continuous basis is very important to a producer's bottom line. Devices such as the EZ Meter when installed on one or two houses on a farm can provide a producer with variety of information related to house electricity usage that will not only allow a producer to determine how much electricity a house is using on a daily basis, but how much power each device is using and how management practices affect overall electricity usage.



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