

## Why Doesn't E-Mon use CT's Like Everyone Else?

The current transformer, commonly referred to as a "CT", has been used by the electrical industry for many years to measure electrical current. It operates by converting (transforming) the high current being monitored to a lower current that is more compatible with different types of instrumentation; the usual conversion is to a 5 amp secondary output. CTs are designated by a ratio, which describes the reduction factor. As an example, a designation of 1600:5 labels the CT is transforming 1600 amps from the primary side to 5 amps on the secondary side. Most forms of metering use the 5 amp output as their full-scale response; this includes amp meters, wattmeters, kVA meters, etc. Motor controllers operating at high current or high voltage also rely on CTs to provide the information for overload tripping.

CT's are manufactured in different accuracy ranges and various costs, for specific uses; however, all are operationally interchangeable and care must be used in their application. All instrumentation is only as accurate as the signal it receives. The accuracy of CT can range from 0.1% to greater than 5% and it is important to add their accuracy effect to the stated meter accuracy. As an example, a meter rated at 1% accuracy could be performing at only 4% accuracy when installed with a 3% rated CT.

Caution is important when working with CT's, because an open secondary circuit on a CT under load can create high voltages that not only can damage the CT but can be potentially lethal as well. For safety, it is always essential to provide a method of shorting the output of standard 5 amp CT.

The usable distance of the 5-amp CT signal is dependent on the secondary wire size. Normally, #12 gauge AWG gauge wire 16 used for 20 - 25 foot runs. However, a distance of 1000 feet would require a much larger wire size, possibly 300 - 500 MCM for accurate information delivery. Material cost would make long distance extensions of standard CT's extremely impractical.

Because of the shortcomings of CT's, EMon designed special Current Sensors (CS's) to monitor the electrical current. All EMon Class 100, 2000, 3200, 3400 & 5000 meters are supplied with a set of split-core Current Sensors to allow installation without having to power down the monitored loads, in practically all applications.

Current Sensors have a safe (2 A/C volt maximum) output that does not require special precautions, such as shorting the secondary leads during installation on active conductors. Coupled with the split core feature, they can quickly, and safely, be installed on conductor that cannot be shut off, such as computer room feeds and critical hospital circuits.

As part of a complete submetering "system", the Current Sensor/meter combination operates to provide ANSI C12.20 accuracy (plus or minus 0.2% from 1% to 100% of the meter sensor rating). Meter accuracy tested and verified by an independent lab. This eliminates the possible mismatching that can occur with standard CT/meter systems.

By not using a current output, the Current Sensor does not have the distance limitation normally associated with CTs. Class 1000 & 2000 Current Sensors can readily be installed at distances up to 2,000 feet away from the meter. Class 3200, 3400 and 5000 Current Sensors can readily be installed at distances up to 500 feet away from the meter with #22 gauge conductors being perfectly acceptable for this task. This keeps the cost of long distance extension very low, and much more acceptable. In addition, low voltage wiring methods can be used, saving more in installation costs.

The capability of the Current Sensors to be paralleled makes them an ideal way to monitor multiple locations with a single meter. This allows the meter to either add or subtract combinations of circuits, or panels, to provide flexible and accurate readings at lower cost.

Based on a number of obvious advantages, EMon uses the Current Sensor to provide flexibility, cost savings, safety, and accuracy with our line of kWh and kWh/kW Demand submeters..... Our technical staff is available to answer your questions on Current Sensor and metering applications.