Current Sensing for Smart Grid Applications – Micro-Metering

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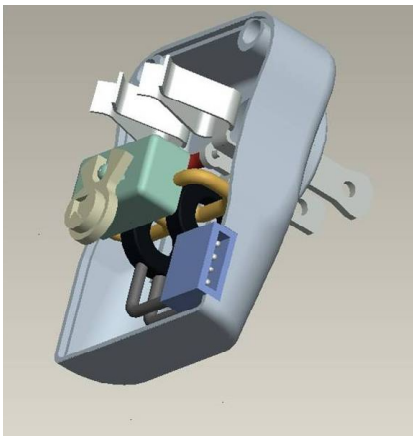
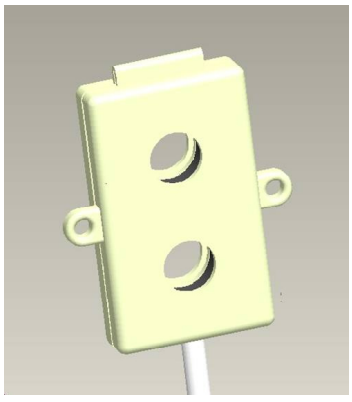
Smart Grid applications are beginning to demand the ability to pinpoint how much current is being consumed at multiple points within the home. A multitude of communication standards remain available to the OEM, but a quantifiable measure of a product's specific electrical current usage, or micro-metering, is rapidly becoming a necessity for Smart Grid and energy monitoring applications. Before embarking on the development of these applications, a few key measurement attributes need to be defined.



First, the application engineer or product specialist must understand what type of power needs to be measured - apparent power (VA) or real power (W). Apparent power measurement is simple to implement with a current transformer (CT). Choosing a current transformer requires the degree of accuracy and full scale value required of the measurement be defined. Data can be digitalized and communicated by wireless protocols, or passed along to sense/communication circuitry as conditioned analog data. Consideration must also be given to the packaging for manufacturing, application, environment, and end user. More sophisticated applications may require measuring real power. This power measurement requires an interface to power lines and current circuitry, and yields the most accurate data of energy units consumed.

Secondly, the application engineer or product specialist must determine the preferred method of measuring power usage within the product, i.e. resistive, current transformer, hall effect, or electronic current sensor. The resistive measurement approach is low cost, but requires a trade off between insertion loss and noise tolerance/heat. Current transformers are available in two designs. A split core, or clamp style, offers a retrofit capability to be clamped onto existing system wiring. A ring or toroid type design offers higher accuracy than a split core, but requires the wire to be threaded through the toroid. A hall effect sensor design offers a higher degree of accuracy and options for installation, but comes with a higher cost. An electronic current sensor usually consists of components (IC) mounted on a PCB, and requires integration with the system. Such a design offers superior performance over current transformers, and may offer a smaller footprint than a CT.



These are only a few of the important considerations facing the designer wishing to incorporate micro-metering into an application. Additional questions which need to be addressed include determining where to process the signal, what decision/action to implement resulting from the measurement, how to implement the desired decision/action, and ultimately what to display or present to the consumer about what this measurement means to them.

For more information about how we can help you implement your micro-metering application, contact us or call Defond North America, LLC at 919-881-0889.