

# Insights Into Starting-up Electronic Meters

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Use of electronic meters is widespread today for many good reasons, but few users realize these meters should undergo a startup process. Here are some insights from a field engineer's perspective as to what may be needed in order to have a successful installation.

Electronic meters are available in many degrees of complexity, varying from those which mimic single function electro-mechanical meters to those with advanced options that allow for power quality monitoring, waveform capturing, and digital fault recording to name a few. The insights shared here, though pertinent to all of them, can never replace the specific manufacturer's recommended set-up procedure. Our main objective is to emphasize that these meters require a higher level of due diligence in the set-up phase to ensure accurate data, and what that set-up procedure is likely to consist of. Details of the meter should be retained for future reference, including model, serial number, and options included. This information can be captured from the invoice or the meter nameplate information. The actual power system details related to the meter should also be recorded including CT and PT configuration, ratios and polarities, system phase and grounding ratings and configurations. Every Meter comes with instruction guides and or quick startup guides that will provide detailed information to get started. Many manufacturers have this literature available on the web in case this documentation is lost or missing. Following is the link to the GE website where meter or relay manuals can be obtained: <http://www.geindustrial.com/multilin/catalog/indexa.htm>.

Utilities require revenue class meters be tested and recertified for accuracy either annually or biannually. This ensures that a meter hasn't drifted over time. A datasheet should be created immediately with all the nameplate information, available options, and test data. Certification documentation should be also be maintained and updated including the testing vendor and the make, model, serial number of the qualified test equipment. This data will serve as a reference point for future test results, and may therefore be a good practice for all meters.

The manual will identify the various types of methods that are available to interrogate the meter for configuration. This could be a touchpad panel, a touch screen panel, or a laptop PC that requires a special cable and connector and utilize factory software. In some cases it may take a special file that only the factory can provide in order to configure the meter. Free software may be available for such purposes, as with the PQM meter which can be obtained and inspected at this link: [http://www.geindustrial.com/cwc/products?pnlid=6&famid=20&catid=60&id=pqmii&ypeld=7&lang=en\\_US](http://www.geindustrial.com/cwc/products?pnlid=6&famid=20&catid=60&id=pqmii&ypeld=7&lang=en_US).

Most meter parameters come factory preset to fail-safe settings or disabled requiring field activation to ensure proper operation. It's therefore usually necessary to program CT and PT ratios and their configurations in order to read any accurate current or voltage based data, including I, V, kW, kVA, kVAR, PF. To access the required set-up screens most meters today incorporate security password requirements. If so, a factory set password is usually provided in the operations manual. This password should be modified if security is a concern, recorded in the meter detail data and filed in a safe location.

The meter's date and time clock must be set when provided since time based functions such as data logging, event recordings, and disturbances need to be time stamped. Some products will require that the date and time be set before the rest of the parameters can be configured or put into operational mode. The manual will identify the required steps necessary to complete this task. It may also be necessary to set the billing demand interval for any demand-based functions.

Additional functions will reside in more advanced meters. When this is the case, they must be activated and set to be functional. For example, the simultaneous trending of multiple parameters such as rolling window, continuous recording or data-logging may be possible: the functions must be identified and sampling time rate selected; waveform capture, alarms, setpoint triggers: functions and setpoints must be identified and sometimes rate-of-rise; trace values: details must be defined; programmable controls: must be linked to desired function and operating set-points defined; data archiving: details must be defined, as well as out-of-limit logs, modem configuration and operational commands. Many other functions may also be available including I/O modules, communication capabilities, e-mail/paging commands, and flexible control logic configurations. These must all be activated and configured if they are to be made functional.

Most meters will have a configuration mode and an operate mode. Consult the manual for the steps necessary to place the device into each. The manual may also present a flowchart and menu tree to simplify their navigation. Following set-up, the operational mode should be activated and the proper operation of the meter confirmed. This can be done with a test set or simply by applying a portable meter with clamp-on CT's. Utility or revenue accuracy applications will require more precise test equipment and witnessed results.

Specifying the functionality and capabilities of a meter is only the first step in providing the end user with a worthwhile tool that can assist him in many worthwhile ways. Proper startup of that meter is as important as any other element of the electrical distribution gear. Its oversight will be highly apparent following an outage and investigation of its cause. When effectively activated, proper metering can help to quickly diagnose the cause, when it occurred, how and to what degree. To help accomplish such an ideal application the project specifications should be upgraded to require a system study that recommends the appropriate settings for the meters, and that these settings be incorporated as part of the startup procedure.