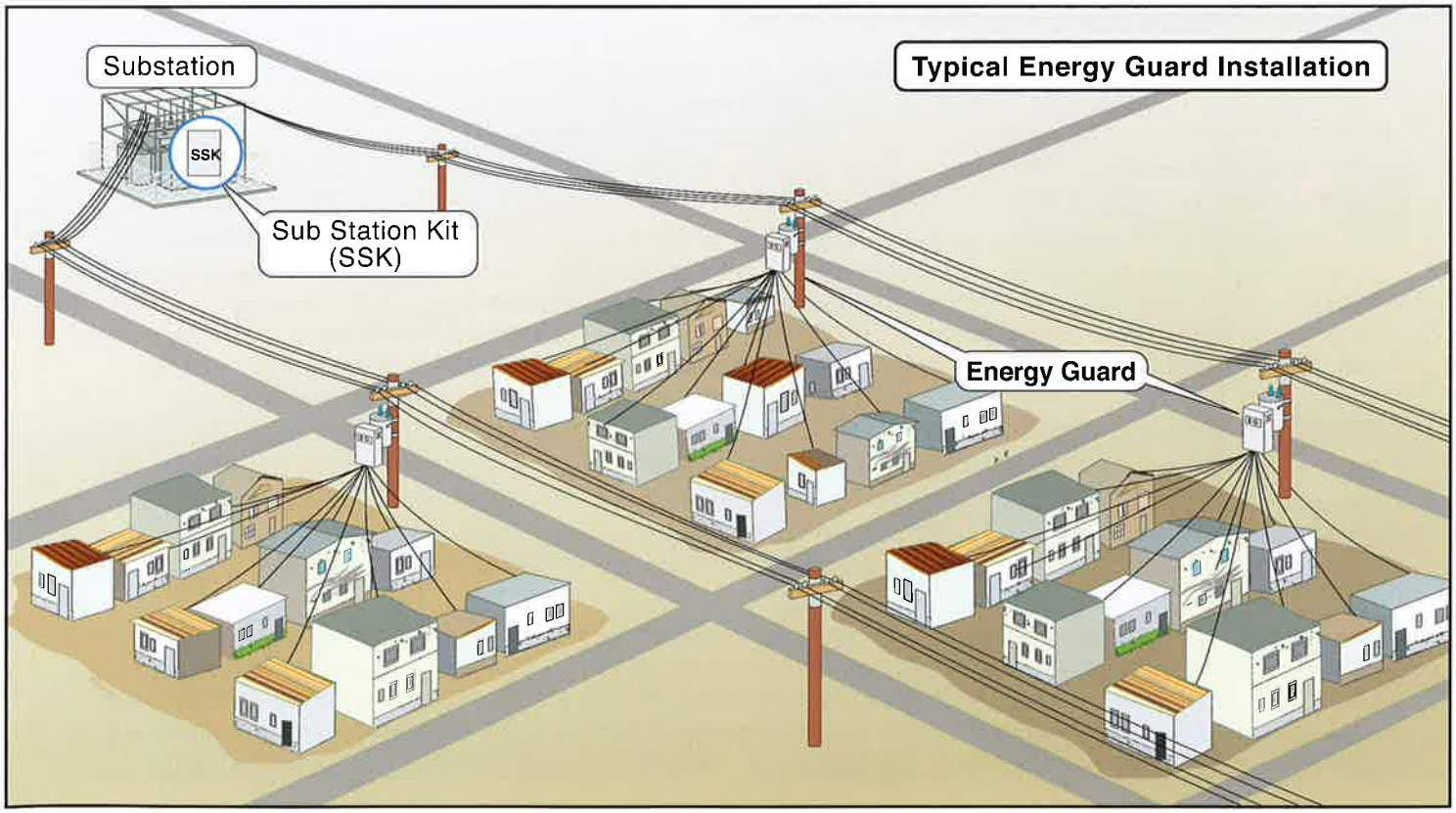
ΣNERGY GUARD™

Quadlogic's New Smart Meter System Controls Non-Technical and Theft-of-Service Losses

Benefits

- Detects and reduces illegal Theft-of-Service connections
- Enables remote service disconnect and re-connect from Central Office
- Eliminates low-tension power wires and installs near the Medium Tension wires for added security
- Communicates over the existing power grid, through transformers, with Quadlogic's PLC System
- Provides remote on-demand meter reading and billing (AMR)
- Prevents tampering with integrated meter and distribution enclosure
- Available in-house portable plug-in Customer Display Unit
- Monitors distribution transformer energy balance
- Offers low cost of installation and maintenance



Quadlogic's new Energy Guard™ Smart Metering System defeats meter tampering, eliminates illegal connections, and enables remote disconnect and re-connect for Theft-of-Service, past-due accounts, or abandoned property. It provides remote meter reading from the utility central office and offers customers an in-house plug-in kWh and information display.

Utilities report greatly reduced non-technical and Theft-of-Service losses, and can quickly amortize their investment in Energy Guard™ Systems, in some cases in less than one year.
The EG System effectively converts energy users into utility customers.

Energy Guard™ System Description:

The Energy Guard™ Smart Metering System uses Quadlogic's patented Power Line Communications (PLC) technology to communicate reliably over the existing utility-owned power grid, to read meters and control customer electric services. PLC is the most cost-effective and robust Automatic Meter Reading (AMR) communication solution since the utility is already connected to all customers. This technology does not depend on RF communication systems, which are not under the control of the utility.

Quadlogic's patented Power Line Communications system has been in use world-wide for 28 years. Designed for reliable bi-directional meter data and control communication through the distribution transformer to the low voltage network, it utilizes QLC's frequency-hopping, multi-band protocol to actively avoid electrical noise. Proprietary encryption and multiple levels of password protection ensure system security.

System Configuration:

The Quadlogic Energy Guard™ System utilizes a Sub Station Kit (SSK) at the substation, using capacitive signal couplers to inject the Power Line Communications signal onto the medium tension lines. Quadlogic's patented Power Line Communication (PLC) technology enables signals to pass through distribution transformers. A Feeder Concentrator Unit (FCU) may be used on high-density and long distance lines to enhance data throughput. Specific system configuration varies with distribution network topology.

The Energy Guard™ is installed on the pole adjacent to the distribution transformer, or within a special transformer-integrated enclosure. The EG™ distributes up to twenty-four (24) phases of 100A service, each phase metered, and controlled by a special power relay designed for continuous 100A service that consumes no power in the open or closed position. The built-in distribution transformer three-phase meter is used to compare the total of the service loads with the total transformer load, by phase, providing yet another cross-check for Theft-of-Service detection. The transformer meter shows phase balance and loading, thus enhancing transformer preventive maintenance.

Each medium tension transformer at the sub-station is equipped with a QLC Sub-Station Kit (SSK), which incorporates a Transponder for bi-directional meter data and service switch communication with all Energy Guard™ units on that branch. Quadlogic's QuadLink™ data gateway, integral to the SSK, provides direct or web-based communication with the utility's central office for remote meter reading, customer service control, and bill generation.

The modular Energy Guard™ can be configured for one, two, or three-phase service or any combination of services. Individual meter and control modules are easily switched-out in the field. The entire enclosure is sealed and, if opened without authorization from the utility central station, automatically disconnects all service switches. Meter/control modules have unique serial numbers and each one must be authorized for service by the utility, thus defeating Theft-of-Service using stolen equipment.

Features and Benefits:

Quadlogic' EG™ enables the utility to read meters, and control service switches remotely, from the Central Office. This eliminates estimated meter readings, reading errors, injuries, and enables meter readers to shift to more productive tasks.

Utilities report that in cases of Theft-of-Service or non-payment issues, the remote service disconnect and re-connect feature has greatly reduced the risk of confrontations with customers in the field.

Each customer is provided with a Customer Display Unit (CDU), which plugs-in to any 120V outlet on the customer premises, and displays only that customer's kWh. The CDU may also be used to display alpha-numeric messages from the central utility office (e.g. electric rates, account status) in any language.

Since the Energy Guard™ is a sealed distribution panel, only the individual customer service lines running between the EG™ and the customer service entrance are exposed. Hence, there is no possibility to connect unauthorized wires to utility distribution-voltage cables.

The Energy Guard™ System can support a Pre-Pay Program with no additional hardware.

The Quadlogic Energy Guard™ System provides a complete, cost-effective, modular, Smart Meter solution, featuring remote meter reading, remote customer service disconnect/re-connect, in-home Customer Display Units, EG™ tamper detection with automatic disconnect, and remote monitoring of distribution transformer performance.

Energy Guard AMI System Elements

EG

Energy Guard shown with integrated distribution transformer housing. Only customer service wires are exposed – no opportunity for Theft-of Service from utility.

SSK

Sub-Station Kit (SSK), installed at each sub-station transformer, includes the Quadlink data gateway, Transponder, and capacitive signal couplers for Power Line Communications (PLC) with Energy Guard units installed on each branch.

CDU

Customer Display Unit (CDU). Plugged-in at any outlet on the customer premises, displays accumulated kWh from the customer meter. Other alpha-numeric customer-specific information from the utility in any language may also be displayed.

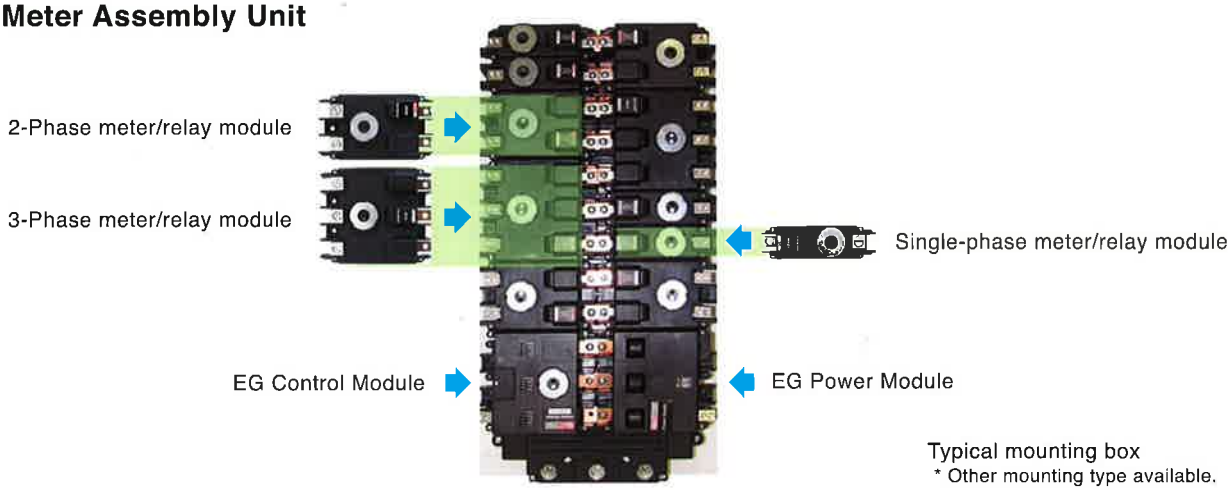
FCU

Feeder Concentrator Unit (FCU). Installed on high-density feeders, converts frequency bands for more efficient PLC data throughput.

Energy Guard Specifications

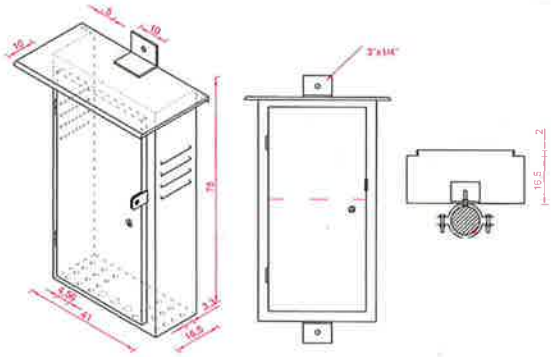
EG18 (18-phases) shown with combination of 3-phase, 2-phase, and single-phase Plug-In Meter/Control Modules. Also available in EG24, EG12, or EG6 phase units.

Meter Assembly Unit



Typical mounting box
* Other mounting type available.

EG installed at building service entrance



Meter-Relay Module Specifications

Meets or exceeds applicable requirements of ANSI C12.1, C12.16, ANSI/IEEE C37.90.1, ANSI/IEEE 37.90.2
Meter accuracy: +/- 0.5%
Four-Quadrant consumption and demand
Non-Volatile Flash Memory
Data Storage for rolling >40 days (varies with parameters logged)
Operating voltage: 95-260 VAC
Max Amp: 100 Amp (CL100)
Power Control Relay: 100A continuous duty (No power consumption in open or closed position.)
Kh constant: 500 pulses per kWh
Operating temperature range: -40C to +85C
Operating Humidity: 0-95% R.H. (non-condensing)
Single-Phase Module (1P2W 120V 50/60Hz): 100 Amp max with remote disconnect
Split-Phase Module (1P3W 120/240V 50/60Hz): 100 Amp max with remote disconnect
2-Phase Module (2P3W 120/208V 50/60Hz): 100 Amp max with remote disconnect
3-Phase Module (3P4W 120/208V 50/60Hz): 100 Amp max with remote disconnect
Bi-Directional Power Line Communication (PLC) through distribution transformers

* Specifications subject to change without notice

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