



kV2c® SmartMeter

SmartSynch's C&I metering solution features a communications module that is integrated into the GE kV2c electricity meter. The kV2c SmartMeter communicates with a server running SmartSynch's Transaction Management System™ (TMS) and complies with ANSI C12.19 protocols for data storage and transmission.

In addition to the meter's register and metrology components, the SmartSynch-enabled kV2c meter includes a SmartSynch GPRS module for data delivery public wireless networks (such as AT&T and Rogers Wireless).

Unlike proprietary, closed-architecture solutions, the kV2c SmartMeter is essentially a *future-proof* investment in technology. Its standards-based IP connectivity makes it adaptable and field-upgradable to support today's sensing and communications needs, as well as tomorrow's opportunities, better than any alternative.

Functions & Features

Wireless Communications

- GPRS

Key Functions and Features

- In-Premise Communications
- Wireless Submetering
- Totalization
- Tilt Detection
- Field-Upgradable External Antenna
- Flexible Two-Way Data Retrieval
- Scheduled and On-Demand Reads
- Automated Interval Read Retrieval
- Real-Time Interval Reads
- Automated Register, Self-Read and TOU Retrieval
- Current and Voltage Profiling
- Demand Resets
- Real-Time Meter Event and Alarm Retrieval
- Demand Threshold Monitoring and Alarms
- Tamper Detection
- Meter Clock Synchronization
- SmartMeter Status Display
- Automated Meter Registration
- Secure and Encrypted Data Transmissions
- Supports Reads from Itron MV-90 Software
- Over-The-Air SmartMeter Module Firmware Upgrade

Hardware Components

- Radio Control Module Board (RCM)
- Capacitor Storage Bank (CSB)
- GSM/GPRS Modem
- Interconnect Board
- Internal Antenna

External Antenna Option

- Omnidirectional Antenna Kit

Operating Ranges

Temperature

- Operating: [-40°C, +85°C]
- Transmission (wireless): [-40°C, +85°C]

Humidity

- 0% to 95% non-condensing

Accuracy

- Meets ANSI 12.20 for accuracy class 0.2%

Supported Meter Forms

- Class 20: 3S, 4S, 9S, 36S, 45S, 10A, 36A, 45A
- Class 150: 13A, 16A
- Class 200: 2S, 12S, 16S

Regulatory & Industry Specifications

- FCC Part 15 Class B; Part 22, 24
- ANSI C37.90.1 – 1989: (SWC)
- ANSI C12.20 – 1998
- PTCRB Certified
- Network Carrier Certified
- Measurement Canada Certified

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Flexible Two-Way Data Retrieval and Scheduled Data Collection

Users can execute all appropriate TMS functionality using user-configurable TMS-controlled schedules and SmartMeter-controlled schedules as well as on an on-demand basis.

Automated Interval Data/Energy Usage Retrieval

The kV2c GPRS SmartMeter module retrieves and transmits interval data for up to 8 unique energy values for intervals as small as 5 minutes. Recorded events and exceptions with each interval are also transmitted to TMS, which interprets them and logs appropriate messages (e.g. time adjustments).

Real-Time Interval Reads

Real-time interval data acquisition enables utilities to implement Load Curtailment and Real Time Pricing (RTP) programs. With this functionality, the user can configure the SmartMeter module to transmit interval data as often as every 15 minutes at interval completion.

Automated Register, Self-Read and TOU Retrieval

The kV2c GPRS SmartMeter module is configured by the TMS to read and transmit all or a subset of enabled registers, including totals, self-reads, maximum demand and time-of-use values.

Instrumentation Profiling/Current and Voltage Profiling

The kV2c SmartMeter retrieves and transmits up to 30 instrumentation sources, each with one or more additional selections, including Current and Voltage sources, for intervals as small as 5 minutes. Recorded events and exceptions with each interval are also transmitted to TMS, which interprets them and logs appropriate messages (e.g. time adjustments).

Demand Resets

The KV2c SmartMeter module executes Demand Resets using one of three methods: SmartModule-initiated schedules, TMS-initiated schedules or TMS on-demand requests.

Real-Time Meter Event and Alarm Retrieval

The kV2c SmartMeter module provides real-time monitoring and reporting of meter diagnostic events including, but not limited to, all SiteGenie Diagnostics, demand threshold, meter reprogrammed configuration error, low battery, reverse rotation, low loss potential and demand overload alarms.

Real-Time Power Outage and Restoration Alarms

With built-in ultracapacitor energy storage, the KV2c SmartMeter module will transmit a real-time "last gasp" notification when detecting an AC power outage without the use of less reliable batteries. The KV2c SmartMeter also notifies TMS when the AC power is restored and provides full configuration of these alarms based on user-defined durations.

Over-The-Air SmartMeter Module Firmware Upgrade

TMS users with administrator privileges can remotely upgrade the KV2c GPRS SmartMeter module firmware for one or multiple GPRS modules. TMS and the SmartMeter execute the download sequence after a compatibility check is performed. The TMS administrator is able to switch any of these GPRS modules to the new firmware once the SmartMeter communicates a successful download notification to TMS.

Tamper Detection

The kV2c SmartMeter can detect and report exceptions for the following tamper events: total demand resets, optical port sessions in progress, device reconfigured/reprogrammed, service error, password failure, password recovery, power outages recognized by the SmartSynch module, power outages due to loss of AC power, tilt switch set and tilt switch cleared. The TMS configures a specific filter in the SmartMeter for each of these events enabling the transmission of a corresponding alert only after the event is repeated a minimum number of times within a specific duration. TMS can also configure the SmartMeter to reset the event counter when the alert message is transmitted.

Demand Threshold Monitoring and Alarms

The kV2c can monitor a single demand threshold metric for separate threshold values across all available Rate Bins (Tiers) within the meter (i.e. different thresholds may be set up for kW for the Total, Rate A, Rate B, Rate C, etc.). These alarms may be enabled and configured through the TMS to transmit only after user-specified thresholds are exceeded or restored.

Meter Clock Synchronization

If enabled, the SmartModule automatically adjusts the meter clock when the time deviation falls within user-defined lower and upper deviation boundaries based on a reference clock provided by TMS. If the deviation exceeds the upper boundary, the module reports the deviation via an alarm but does not correct the meter clock. If the deviation is less than the lower boundary, the module ignores the deviation.

SmartMeter Status Display

The SmartMeter firmware enables an optional display sequence on the kV2c meter to display important SmartMeter indicators. The meter displays the SmartMeter Status periodically based on meter display configuration and sequence. This display identified by the "SSI" prefix, shows the coverage status at the meter site, relevant SmartMeter firmware state, firmware errors and a field to display a message from TMS. The display values are updated as frequently as twice a minute. This powerful feature enables technicians to ensure proper installation of the kV2c SmartMeters and allows for field troubleshooting without any other tools.

Automated Meter Registration

The SmartMeter module automatically transmits a registration message to TMS when the meter is installed without requiring user intervention. This message permits TMS to create or update the meter record with validated information ensuring accurate and automated record entries without user intervention.

Secure and Encrypted Data Transmissions

256-bit encryption is applied to all messages exchanged between TMS and the SmartMeter module, utilizing a unique meter specific encryption key.

Transmission Efficiency

In addition to support for allowing users to filter the number of meter channels and types of diagnostics that are returned, all wireless messages are converted to binary and optimally compressed before transmission to ensure the most economical data processing rates. The compression ratio can be as high as 50% and overall data usage can be as little as 5% of the total usage of other wireless systems.

Automated ID Tracking

Barcode labels and important identifiers (e.g. ICC-ID / MS-ISDN) are attached to the integrated SmartMeter for tracking and troubleshooting purposes. The SmartMeter module manufacturer and meter integrator scan and track all device IDs accurately.

On-Demand Data Reads For Virtual Disconnect

Customers can perform virtual disconnects through TMS by retrieving a final read for one end-user and an initial read for a subsequent end-user. This function is also utilized to perform meter "switch-outs."



Hardware Specifications



<i>Hardware Component</i>	<i>Description</i>
Radio Control Module Board (RCM)	32-bit ARM processor, 8 MB RAM, 2 MB flash
Capacitor Storage Bank (CSB)	Supplies peak power for data transmissions and all functions during power outages – no batteries required
G24 Modem	GSM modem communicates with TMS using GPRS and SMS services
Interconnect Board	Connects the SmartMeter module to the kV2c meter
Internal Antenna	Flexible dual-frequency GSM antenna for the G24 modem
External Antenna Kit (optional)	External GSM antenna & isolation circuit for the modem

Temperature Ranges

Operating: [-40°C, +85°C]

Transmission (wireless): [-40°C, +85°C]

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Input/Output Signal or Interface Definition/Values

Meter Option Interface	for MIO/SIO board (optional)*
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*The MIO/SIO kit consists of the board, which plugs into the CPU board, and the cable assembly, which connects to the board and exits from the meter base. It provides one or four MIO/SIO outputs – one low current/high current output and two pulse or state inputs. No external wetting voltage source is provided.

Integration

The SmartMeter module is a fully integrated under-the-cover option inside the kV2c meter. The kV2c SmartMeter is shipped as one complete unit, ready for field deployment.

Version and Compatibility Information

kV2c meter hardware:	Supported meter forms, classes and types
kV2c meter firmware:	Latest fully supported
SmartModule:	kV2c SmartMeter module
SmartSynch TMS:	Software version 6.0 or higher
GE MeterMate:	Version 5.40 or higher (optical programming)

About SmartSynch: Headquartered in Jackson, Miss., SmartSynch has been developing successful Smart Grid Intelligence solutions for the utility industry since 2000. The company's clean-tech innovations in the two-way delivery of real-time energy usage data over public wireless networks, in lieu of private network build-outs, have to date simplified SmartMeter deployments for 100 major North American utilities, while enabling green-energy initiatives and delivering significantly higher Returns on Resources. Unlike proprietary, closed-architecture solutions, SmartSynch's SmartMeters represent future-proof investments in technology. The standards-based IP connectivity enabled in every SmartMeter deployed makes them adaptable and remotely upgradable to support today's sensor and communications needs, as well as tomorrow's opportunities, better than any alternative.