kV2c® Generation II SmartMeter

Itron's C&I metering solution features a communications ICM that is integrated into the GE kV2c electricity meter. The kV2c SmartMeter communicates with a server running Itron'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 Itron-enabled kV2c meter includes an EVDO Itron Cellular Module (ICM) for data delivery over cellular networks. 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 sensoring and communications needs, as well as tomorrow's opportunities, better than any alternative.

FUNCTIONS AND FEATURES

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 EVDO SmartMeter ICM 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 ICM to transmit interval data as often as every 15 minutes at interval completion.

Automated Register, Self-Read and TOU Retrieval

The kV2c EVDO SmartMeter ICM 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 ICM 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 ICM provides real-time monitoring and reporting of all 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. In addition, the smartmeter provides a rolling ICM event log as well as a real-time reporting of these events including ICM status changes, auto-registration events and other communications diagnostic events. Alarms received by TMS can be automatically routed via e-mail to a specific user or group of users using the TMS Message Routing Interface. The entire meter or ICM event log can be retrieved on an on-demand basis by TMS.

Real-Time Power Outage and Restoration Alarms

With built-in ultracapacitor energy storage, the KV2c SmartMeter ICM 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 Firmware Upgrade

TMS users with administrator privileges can remotely upgrade the KV2c EVDO SmartMeter ICM firmware for one or multiple EVDO 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 EVDO modules to the new firmware once the SmartMeter communicates a successful download notification to TMS. Additionally, users can now upgrade the kV2c meter register firmware patches and perform a full reconfiguration of the meter program from 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 Itron ICM, 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 ICM reports the deviation via an alarm but does not correct the meter clock. If the deviation is less than the lower boundary, the ICM 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 ICM 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

Cryptographic digital signature is applied for all firmware along with the capability to validate digital signature prior to uploading and applying any new firmware. 256-bit encryption is applied to all messages exchanged between TMS and the SmartMeter ICM, 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 ICM 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."

WIRELESS COMMUNICATIONS

» EVDO

EXTERNAL ANTENNA OPTION

» Omnidirectional Antenna Kit

OPERATING RANGES

Temperature

» Operating: [-40°C, +85°C]

» Transmission (wireless): [-40°C, +70°C]

Humidity

» 0% to 95% non-condensing

Accuracy

» Meets ANSI 12.20 for accuracy class 0.2%

SUPPORTED METER FORMS

» Class: 9S, 12S, 16S, 45S

REGULATORY & INDUSTRY SPECIFICATIONS

» FCC Part 15 Class B; Part 22, 24

» ANSI C37.90.1 – 1989: (SWC)

» ANSI C12.20 – 2010

» PTCRB Certified

» Network Carrier Certified

HARDWARE

Radio Control Module Board (RCM)	32-bit ARM processor, 64 MB RAM, 128 MB flash
Capacitor Storage Bank (CSB)	Supplies power for all functions during power outages – no batteries required
Modem	CDMA modem communicates with TMS using EVDO and SMS services
Interconnect Board	Connects the SmartMeter ICM to the kV2c meter
Internal Antenna	Flexible dual-frequency antenna for the modem
External Antenna Kit (optional)	External antenna & isolation circuit for the modem
2.4 GHz Transceiver	Wireless component configurable for two-way communications/WPAN 802.15.4

VERSION AND COMPATIBILITY

kV2c meter hardware	Supported meter forms, classes and types with enhanced power supply
kV2c meter firmware	Latest fully supported
SmartModule	kV2c SmartMeter ICM
Itron TMS	Software version 8.1 or higher
GE MeterMate	Version 5.52 or higher (optical programming)

METER OPTION INTERFACE

The MIO or 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 outputs – one low current/high current output and two pulse or state inputs. No external wetting voltage source is provided.

INTEGRATION

The SmartMeter ICM 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.

At Itron, we're dedicated to delivering end-to-end smart grid and smart distribution solutions to electric, gas and water utilities around the globe. Our company is the world's leading provider of smart metering, data collection and utility software systems, with over 8,000 utilities worldwide relying on our technology to optimize the delivery and use of energy and water.

To realize your smarter energy and water future, start here: **www.itron.com**

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