SENTINEL®

GPRS SmartMeter

The combination of the Itron SENTINEL meter with the GPRS SmartMeter Module from SmartSynch® introduces a powerful communications solution for utilities.

SmartSynch's Transaction Management System (TMS™) manages all meter data in meters integrated with the SmartMeter module. With this technology, the integrated SENTINEL GPRS SmartMeter can retrieve all meter data and provide utilities with advanced capabilities for meter communications.

SENTINEL GPRS SMARTMETER ALERT CAPABILITIES

Power Outage and Power Restoration Alarms

With the onboard built-in energy storage, the SENITNEL SmartMeter module will transmit a "last gasp" notification when detecting an AC power outage at the metering point. The SENTINEL SmartMeter can also notify the TMS System when the AC power is restored. TMS enables the configuration of the SmartMeter module to transmit these alarms if the corresponding events last a specific minimum duration.

Meter Diagnostics Alerts

The SENTINEL SmartMeter module can monitor and report meter diagnostic events including but not limited: all SiteScan™ Diagnostics, demand thresholds, meter reprogramming, configuration errors, low battery condition, reverse rotation, low loss potential and demand overload alarms.

SENTINEL GPRS SMARTMETER ALERT CAPABILITIES

Meter Clock Monitoring and Correction

This feature may be enabled or disabled in the SmartMeter module via TMS. Using a reference clock from the TMS software, the module automatically adjusts the meter clock when the time deviation falls within user-defined lower and upper deviation boundaries. 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.

Service Diagnostics and Tamper Detection Alerts

The SmartMeter can report power service and wiring errors detected by the SiteScan feature of the SENTINEL meter. Monitored and reported events include:

» Reverse polarity
» Cross-phase and energy flow
» Phase voltage deviation
» Inactive phase current
» Phase angle displacemen
» Current waveform distortion

In addition, the SmartMeter can detect and report exceptions for tamper events, including:

» Number of demand resets
» Loss of AC power
» Reported power outages

TMS can configure a specific filter in the SmartMeter for each of these events enabling the transmission of a corresponding alert only after the event is

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repeated a minimum number of times within a specific duration. The TMS can also configure the SmartMeter to reset the event counter when the alert message is transmitted.

Demand Threshold Alerts

The SENTINEL meter can monitor up to four demand threshold quantities. TMS can configure the SENTINEL GPRS SmartMeter to activate alerts for these demand threshold quantities and to transmit the corresponding alert only after a specific threshold is exceeded or restored. The SENTINEL meter supports 34 demand quantities, such as max watts delivered, max watts received, max VA delivered, max VA received and max pulse inputs.

KEY TMS FEATURES

The following functions are available through TMS using system-based schedules, module-based schedules or on an on-demand basis. Both system-based and module-based schedules are set up with user-defined time intervals.

Load Profile Read/Energy Usage Retrieval

The SENTINEL SmartMeter module retrieves and transmits interval data for up to eight unique energy values. Recorded events and exceptions with each interval are also transmitted to TMS software, which interprets them and logs appropriate messages, such as time adjustments.

Register/Billing Read

The SENTINEL SmartMeter module is configured by TMS to read and transmit a subset or all enabled billing registers.

Demand Resets

The SENTINEL SmartMeter module supports extended demand reset options including:

» Module initiated schedules

» TMS initiated schedules

» TMS on-demand requests

Load Profile Near-Term Interval Read (NTIR)

The NTIR function is used when frequent interval data posting or processing is required. Typically, this is utilized to monitor usage during load curtailment or Real Time Pricing (RTP) premium period events. With NTIR, the user can configure the SmartMeter module to transmit the SENTINEL load profile data as often as every 15 minutes.

SENTINEL GPRS SMARTMETER FEATURES

Over-The-Air SmartMeter Module Firmware Upgrade

The TMS administrator can remotely upgrade the SENTINEL SmartMeter module firmware for one or multiple GPRS modules. TMS and each of the SmartMeters 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 the TMS.

SmartMeter Status Display

The SmartMeter firmware enables an optional display sequence on the SENTINEL meter to display important SmartMeter indicators. The meter displays the SmartMeter status periodically based on meter display configuration and sequence. This display identified by "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 SENTINEL GPRS SmartMeters and allows for field troubleshooting without any other tools.

Extending Meter Events and Diagnostics Reporting

TMS uses scalable templates to instruct the SmartSynch Interface to report events on any subset of meter diagnostics including ANSI Standard history and event codes, ANSI Standard status and Manufacturer Standard status. No SmartSynch module firmware upgrade is required.

On-Demand Data Reads for Virtual Disconnect

Customers have the ability to perform virtual disconnects through the TMS whereby a final read is issued for one end-user and an initial read is performed for a subsequent end-user. This function is also utilized to perform "meter replacements."

Module State Management

The SENTINEL SmartMeter module controls its internal state allowing proper operations at different stages of its integration, quality control and deployment. For example, the integrated meter can transmit data and report exceptions only after the TMS sets the module's state to "Provisioned," preventing unnecessary alarms and unauthorized access. Corresponding states are also displayed on the TMS SmartMeter Status Display providing integrity to both the quality control and deployment processes.

Automated Meter Registration

The meter is ready for deployment once it has passed necessary quality control tests. The SmartMeter module automatically transmits a registration message to the customer's TMS when the meter is installed. This message permits TMS to create or update the meter record with validated information ensuring accurate and automated record entries. TMS places the meter record in a special "Registration" group ready for full activation (provisioning) by authorized users.

Secure Remote Meter Access and Data Transmissions

128-bit encryption is applied to all messages exchanged between the TMS and the SmartMeter module utilizing a unique meter specific encryption key. The module installation utilizes the "Stamp" desktop application to securely distribute encryption information and to ensure the integrated meter ownership and service. Connecting directly through the meter's optical port, the Stamp application loads necessary keys and message destinations.

Transmission Efficiency

In addition to meter channel and diagnostics filtering capabilities (see above), the TMS and SmartMeter module compress data and commands before transmission. Compression ratio varies

depending on message contents and lengths (as high as 50 percent) to ensure the most efficient use of airtime. In addition, the SmartMeter can detect

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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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