

White Paper

EC 350 Simplifies Billing Data Integration in PowerSpring Software



Executive Summary

In the current energy environment, gas-metering data must be collected more frequently and in smaller increments for commercial and industrial (C&I) customers. The trend towards smart metering has demonstrated the importance of meter data management (MDM) in realizing the full potential of advanced metering infrastructure (AMI).

As natural gas moves from the wellhead to the burner tip, there are many electronic instruments used along the way. One such device is an electronic volume corrector (EVC). Equipped with integrated cellular radios, the latest EVCs can ease IT integration in smart metering infrastructure and send audit trail and diagnostic information to data collection systems over a wireless cellular network.

By pairing Honeywell's advanced EC 350 gas volume corrector technology with powerful PowerSpring MDM software, gas industry firms can distribute meter information across the enterprise — framing the volumes of data retrieved from the field into manageable and familiar information. This solution utilizes Microsoft's[®] SQL 2008 R2 and Windows[®] Server 2008 as its database foundation to enable effective and flexible remote monitoring and data management performance.

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Introduction

Natural gas is an important part of the global energy supply. Gas distribution companies worldwide are placing increased emphasis on optimizing their operations based on the experience gained by pioneering electric utilities and their smart-grid initiatives. The main drivers pushing current technology upgrades include:

- Reduction in meter reading costs (mainly labor costs)
- More frequent and accurate meter reading, as driven by strict regulatory requirements
- Outage detection

There is growing pressure on natural gas production and distribution companies to deliver more energy, increase profitability and minimize financial losses. Greater capital expenditures are needed to ensure system integrity and replace aging infrastructure. In addition, significant changes in gas supply dynamics are being driven by imports and new pipeline developments. All of these factors are resulting in growing adoption of smart metering solutions. This approach has an essential role in the transformation of the distribution infrastructure used to deliver natural gas to households and commercial and industrial (C&I) consumers.

Current Industry Trends

In today's energy environment, data must be collected more frequently and in smaller increments for natural gas customers. The ideal solution is a central repository where consistent, secure and auditable processes are enforced, and where all users can access accurate and reliable meter data (See Fig. 1).



Figure 1. In today's energy environment, natural gas metering data must be collected more frequently and in smaller increments.

Regulators and consumers alike are pressuring gas industry companies to change the way they monitor and report gas consumption so they can better address environmental and efficiency concerns. More importantly, firms are beginning to realize the operational savings they can achieve from smart metering technologies and related processes.

To achieve maximum value, gas transmission and distribution operations are seeking new automated metering and business systems to provide enterprise-class, mission-critical data management, with the ability to collect data at least once per day and report hourly usage.

Evolution of metering technology

As natural gas moves from the wellhead to the burner tip, there are many electronic instruments used along the way. One such instrument is an electronic volume corrector (EVC). This device takes incoming pulses from a gas meter and records the pressure and

temperature to calculate the amount of gas that has passed through the system. It is regarded as the “cash register” of the gas value chain.

The current generation of EVCs is intended for use by:

- Local gas distribution organizations needing a precise gas measurement solution that meets applicable industry standards for custody transfer
- Gas transmission companies requiring a robust electronic volume corrector that is reliable over extended operation
- Gas industry firms seeking to eliminate the need for frequent site visits to perform routine maintenance and repairs of gas control, measurement and analysis equipment

Honeywell has introduced the EC 350 Electronic Volume Corrector, the first member of a new family of high-performance EVCs intended to simplify and optimize gas custody transfer and industrial measurement. The EC 350 provides gas volume measurement and correction according to pressure, temperature, and compressibility factors. This UMB- and rotary-mount device offers advanced features such as improved accuracy, expanded memory and battery, and advanced diagnostics. Most significantly, its use of integrated cellular radio technology offers key benefits for integration with meter data management solutions (See Fig. 2)..



Figure 2. Honeywell's new EC 350 PTZ Electronic Volume Corrector.

Growth of smart metering

Due to market-driven pricing throughout the world, natural gas suppliers have been looking for a means to match consumption with generation. Traditional gas meters only measure total consumption, and thus provide no indication of when the energy was consumed at each metered site. Smart metering provides a way of measuring this site-specific information, allowing for different prices for consumption based on the time of day and other specific factors.

Smart metering offers gas industry firms vast amounts of new data. With this technique, they can improve operations and implement new customer programs. Smart metering also supports the fundamental goals of improved operational efficiency, network reliability, asset optimization, lower costs, customer satisfaction, regulatory compliance, and continued business expansion opportunities.

A smart meter is an electronic device that records consumption of energy in intervals of an hour or less and communicates the information at least daily for monitoring and billing purposes. In addition to gas consumption, other useful information (for example, gas pressure) can be captured and received for analysis to monitor the status of the gas network. Smart meters are designed to enable two-

way communication between the meter and the central system. They can also gather data for remote reporting. Such an advanced metering infrastructure (AMI) differs from traditional automatic meter reading (AMR) as it enables two-way communications with the meter.

The natural gas industry's move toward smart metering has firmly established meter data management (MDM) as a critical component to realizing the full potential of AMI. Indeed, with the proper architecture in place, AMI will have an immediate impact on a company's business processes.

Value of Meter Data Management

For natural gas distribution companies, MDM solutions are vital to any successful AMI effort. They gather and process data from all types of devices, and load, validate, store, and format the information in ways that facilitate business processes across multiple internal and external systems. This includes functionality for aggregations, event subscriptions, usage subscriptions, bill determinants, and smart meter transition processes.

Gas industry organizations have found MDM applications ease IT integration of AMI and facilitate the distribution of meter data across the enterprise by framing the volumes of interval data retrieved from the field into manageable and familiar information. Furthermore, by consolidating reading data from multiple collection systems into one MDM, gas firms can set consistent validation routines to truly evaluate the performance of their AMI systems.

The MDM platform provides a central repository of all metering data in a common format. The system imports meter data from several meter data collection systems, validates the incoming data, exports billing determinants to the CIS system, and provides interfaces to other systems. Its critical role is to pre-process granular interval meter data in large volumes very quickly. In the past, only C&I meters collected interval data, while specialized systems were required to collect, store and compute bills. But with the onset of AMI, the entire meter population is now bringing back this data.

As smart meters or AMI are deployed, the MDM system must also handle the storage and distribution of non-billing data and messaging such as tamper alarms. Additionally, an MDM solution has to facilitate change within the IT department by isolating changing collection and back office solutions and practices.

Recent Technology Advancements

Investing in smart grid and AMI solutions is one thing, capitalizing on the wealth of valuable data they deliver is something else. Gas suppliers are required to swiftly and reliably interpret remote meter information and integrate it seamlessly with their business processes. This hinges on advanced meter data management technology, which can deliver meter data throughout the enterprise and turn it into valuable knowledge.

Data collection software

A key development in MDM solutions, Honeywell's PowerSpring data collection and software suite allows for easy, browser-based user interaction with remote monitoring and data management assets. The system offers the power and flexibility of the latest MDM/AMI technologies, utilizing Microsoft's Windows OS 2012 and SQL 2012/2014 platform for effective and flexible performance in demanding MDM applications. PowerSpring users can transparently integrate the software with the new EC 350 EVC to reduce the cost of deploying and maintaining an accurate meter remote monitoring capability.



Figure 3. Honeywell's PowerSpring software enables effective and flexible remote monitoring and data management.

The PowerSpring suite consists of five data collection subsystem applications that run as a service supporting headless operation and automatic recovery upon reboot. With this solution, natural gas companies can provide optimized meter data management to their largest industrial and commercial customers:

- Very large metering stations (off takes, city gates, power plants, etc.)
- Industrial customers (chemical complexes, fertilizer plants, manufacturing facilities, etc.)
- Commercial customers (large heating loads, hospitals, institutions, etc.)
- Residential customers

PowerSpring enables gas providers to simplify IT integration of AMI/smart metering and easily distribute meter data across the utility enterprise by framing the volumes of information retrieved from field meters into manageable and familiar information. The system provides a database repository and gas distribution business logic to automate the complex process of collecting meter data from multiple meter data collection technologies, as well as evaluate the quality of data and publish it in the appropriate format to utility enterprise systems for billing, metering, operations, engineering, customer service, etc. This, in turn, has an immediate, positive impact on gas distribution business processes.

PowerSpring aggregates large volumes of granular-interval meter data, and then pre-processes it efficiently before such data is commercially processed by various other enterprise utility applications. The sheer volume of meter data from gas meters requires consistent, corporate-wide "best practice" rules for managing the increased potential for data error. With the deployment of smart meters or AMIs, PowerSpring also handles the storage and distribution of non-billing data and messaging such as two-way commands, Hi/Lo pressure alarms, outage alarms, zero flow conditions, tamper alarms, etc. (See Fig. 4).

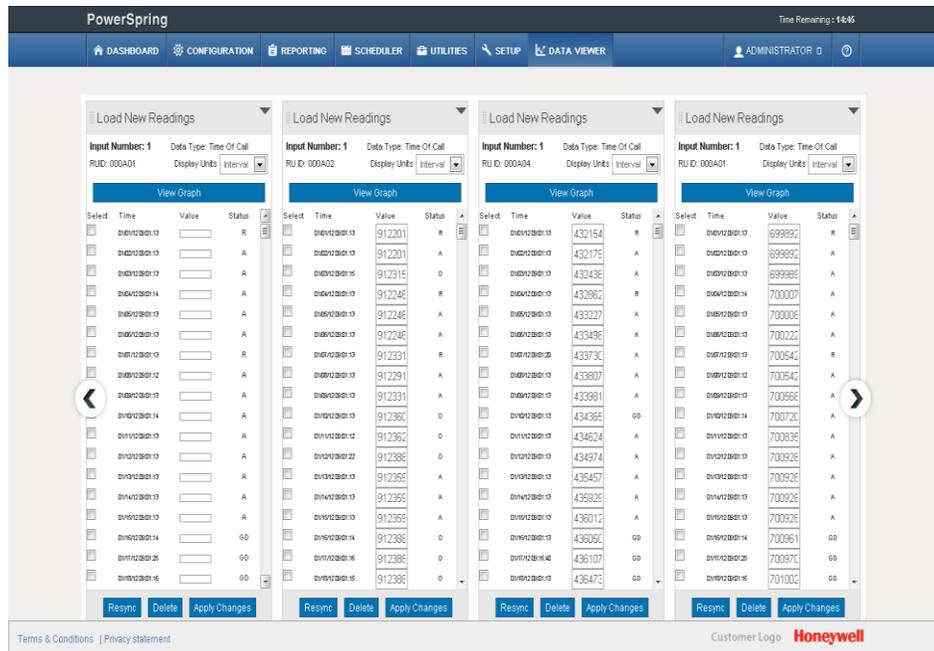


Figure 4. PowerSpring aggregates and presents large volumes of granular-interval meter data.

Based on robust data collection capabilities, users can effectively manage collection of meter readings as well as other telemetry-type data (i.e., pressures, temperatures, etc.) and facilitate two-way communication. They can also simplify integration of new meters and billing systems acquired through mergers and acquisitions, as well as future integration of new AMI technologies.

PowerSpring's data storage solution maintains data integrity and powerful audit trails on the changes performed on the base line system. Understanding what load data was the "best available" at a point in time is a critical MDM capability. In addition, the system database maintains snapshots of each meter read associated with a time reference, making it much easier to resolve billing and settlement questions and disputes.

The system's powerful Human Factors-centric user interface supports Internet access to reports, which can be customized for each user with respect to the type of the parameters to be included in each report. Two-way communications provides the ability to receive data from meters and write new configuration data during a communications session. Access to additional information about energy usage and long-term historized data helps with analyzing gas distribution consumption patterns and demand forecasts using relevant demand forecast tools. Users can also employ interfaces in the form of APIs and open database communications to employ third-party analysis tools with minimal effort.

PowerSpring's optional Alarm Forwarding application provides virtually real-time notification of events, which can occur at remote sites being monitored by devices of all types — whether they are instruments or data-loggers.

Remote data transmission

Honeywell's EC 350 is the first effective electronic volume corrector to utilize integrated cellular radio technology to support MDM/AMI systems. The EVC is compatible with a wide range of cellular devices for remote data transmission. Its use of an integrated versus external cellular radio device simplifies installation, configuration and set-up, while supporting improved operational efficiency and reliability. By optimizing low-power consumption and fast booting and connection to the network, the design of this radio contributes to long battery life of the corrector.

The EC 350 employs an internal digital cellular radio known as the CNI2e, which was developed specifically around the needs of gas applications. When equipped with this radio, the volume corrector can send audit trail and diagnostic information to the PowerSpring data collection system over a wireless cellular network. Users minimize potential installation risks and delays with this solution, since

the EVC can be configured and tested in the meter shop to ensure 100% success in deploying the instrument. The instrument can also be shipped fully configured with the cellular radio already activated (See Fig. 5).



Figure 5. The EC 350's internal digital cellular radio sends audit trail and diagnostic information to the data collection system.

The CNI2e supports both pulse counting inputs and alarm trigger inputs. Pulse signal inputs (dry contact) and alarm inputs are supplied by the EVC. The radio provides synchronized gas day meter readings and interval data to the PowerSpring software.

Benefits of an Integrated Solution

With Honeywell's approach to meter data management, which utilizes the Microsoft SQL Server 2008 R2 Enterprise as its database foundation, utilities and gas distribution companies gain an advanced metering infrastructure and management solution that supports the most intensive mission-critical needs at a low total cost of ownership (TCO). Users benefit from SQL Server 2008 R2 features such as failover clustering, table partitioning, advanced data compression, and database mirroring.

Honeywell can deliver the EC 350 electronic volume corrector pre-configured and ready to deploy with a built-in cellular radio, and then seamlessly integrate the unit with the PowerSpring data collection software to ease IT integration challenges in advanced metering or smart metering infrastructure. This facilitates the distribution of gas meter information across the enterprise by organizing and presenting large volumes of data retrieved from metering devices in a useful, clearly understandable manner.

The Honeywell solution allows for the daily retrieval of audit trail data over a fixed wireless network at a much lower cost than telephone connections. While not intended to replace SCADA systems, it enables near real-time alarming of instrument-supported parameters such as pressure, aiding in system integrity management. Not only will users know an alarm has occurred, but the cause of the alarm as well. Additionally, the system can deliver commands from the PowerSpring software to modify parameters in the EVC, eliminating the need for a costly site visit.

Summary

With the right solutions for data collection and management, and remote meter monitoring, gas industry organizations can streamline operations, provide better pricing models, and improve purchasing decisions for customers, while they make their own businesses more profitable. By pairing advanced MDM software with the latest instruments for gas volume correction, they can also enhance efficiency, reduce costs, and minimize risks to operation.

For More Information

Learn more about how Honeywell's EC 350 Electronic Volume Corrector, visit our website www.honeywellprocess.com or contact your Honeywell account manager.

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