

White Paper

Electronic Volume Correctors Enter The Wireless Century



Executive Summary

With dynamic price changes, stricter regulations and aggressive competition in the natural gas industry, efficiency is more important than ever. Small changes in pressure and temperature conditions can often lead to large changes in gas volume — impacting the operational and business performance of local gas distribution companies supplying commercial and industrial customers.

Electronic volume correctors (EVCs) are the central component of gas measurement systems worldwide. This includes advanced PTZ correctors, which convert gas volume from operating conditions to reference pressure and temperature conditions. EVCs are a crucial element in the gas value chain — from the meter to billing data — and essentially function as the “cash register” between the utility and its customer.

The latest developments in electronic volume corrector technology enable gas distribution firms to take full advantage of today’s wireless communication infrastructure. A new generation of EVC utilizes integrated cellular radio to provide greater flexibility, efficiency and ease of use, and reduce installation costs, in gas custody transfer and industrial measurement applications.

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Introduction

Local distribution companies (LDCs) and gas transmission companies are facing challenges on a number of fronts that have a major impact on their business results. These organizations require a high level of performance and control over their transmission and distribution networks. They must also drive out significant costs and increase the visibility and consistency of operations (See Fig. 1).



Figure 1. Local gas distribution companies face challenges related to their transmission and distribution networks.

For natural gas distributors, higher and more volatile gas prices affect customer satisfaction and uncollectible. Greater capital expenditures are needed to ensure system integrity and replace aging infrastructure. Plus, significant changes in gas supply dynamics are being driven by imports and new pipeline developments.

The gas industry is also under increased scrutiny from regulatory commissions, which poses the threat of fines and other penalties, as well as growing pressure from investors who demand to increase and sustain profits. Strict government and industry standards dictate accurate and trustworthy custody transfer and fiscal metering. Firms delivering gas to commercial and industrial users require measurement technologies that are precise, easy to maintain, and reliable over extended operation.

Equipment upgrades are a critical initiative for natural gas firms. The need to ensure reliable operations, and at the same time, meet industry standards and reduce field service/maintenance requirements has never been greater. Companies are striving to make the most of their capital investments while planning for the future.

Industry Developments

One of the recent trends for gas distribution companies is to increase the visibility and availability of the data in their information system. This information is not only used for billing purposes, but also to improve the availability of critical instruments through proactive and targeted maintenance, and subsequently reduce operational costs. Wireless communications is perceived as an enabling technology putting information at the fingertips of gas distributors.

Today, as we move natural gas from the wellhead to the burner tip, there are many electronic instruments used along the way for measurement and control. 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 standard cubic meters of gas that have passed through the system. However, there is a need for EVCs with greater accuracy, since this technology is relied upon in demanding residential, commercial and industrial applications around the globe.

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

One of the most advanced types of EVCs, PTZ gas volume correctors, convert gas volume from operating conditions to reference pressure and temperature conditions. These instruments are regarded as the cash register between the utility and its customer.

Latest Technology

Now, more than ever, firms involved in the energy value chain must find ways to minimize risks in their operations while improving productivity, ensuring asset safety, and reducing overall costs. The choice of an electronic volume corrector can have a significant impact on operational excellence.

Suppliers of measurement and control instrumentation are finding new ways to leverage the power of wireless communications to benefit gas industry operations. They have introduced EVCs that can be paired with an external cellular radio to help utility companies replace mechanical correctors with electronic devices, and at the same time, expand metering services. The EVCs transmit uncorrected gas volume, as well as gas volume corrected for pressure and temperature, over a wireless network.

Unfortunately, the complexity and high installation costs of these solutions have kept many gas industry users from deploying robust cellular radio capabilities.

New generation PTZ corrector

Honeywell recently introduced the EC 350 Electronic Volume Corrector, the first member of a new family of purpose-built, high-performance EVCs offered to help North American gas distributor's better account for the supply of natural gas to their customers. The EC 350 PTZ corrector is intended to simplify and optimize gas custody transfer and industrial measurement. The unit provides gas volume measurement and correction according to pressure, temperature, and compressibility factors. This UMB- and rotary-mount device is fully field-programmable and easy-to-use through a multi-line keypad interface, and offers advanced features such as improved accuracy, expanded memory and battery, and advanced diagnostics (See Fig. 2).



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

Key to the EC 350's optimized design is a highly accurate, plug-and-play digital pressure transducer and an enclosure optimized for serviceability. The unit also includes state-of-the-art features such as a reverse flow capability. With long-term stability and extended battery life, this solution minimizes the need for site visits and simplifies field repairs. It also allows for very precise measurements and long-term reliability with minimal maintenance requirements.

Advent of integrated cellular radio

In order to meet the diverse requirements for gas volume correction in the natural gas industry, EVCs must be able to operate in an efficient and flexible manner. Recognizing this fact, Honeywell developed the EC 350 platform — the first effective EVC solution to utilize integrated cellular radio technology. 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.

The EC 350 employs an internal digital cellular radio known as the CNI2e, which was developed specifically around the needs of gas applications. By optimizing low-power consumption and fast booting and connection to the network, the design of this radio greatly contributes to long battery life of the corrector (See Fig. 3).



Figure 3. The EC 350's internal digital cellular radio meets the specific needs of gas applications.

When equipped with the CNI2e radio, the EC 350 volume corrector can send audit trail and diagnostic information to a data collection system over a wireless cellular network. The unit can also be employed with Honeywell's Total Data Services PowerSpring Meter Data Management software or other data collection software to ease IT integration in advanced metering or smart metering infrastructure.

Front-to-back verification: Users can wire pulses received from the EC 350's universal mounting bracket (UMB) to the cellular radio pulse input in parallel to the corrector pulse inputs, thus ensuring a fully redundant, uncorrected pulse accumulation. Pulses accumulated by the UMB can be compared to the pulses accumulated by the corrector, and a maintenance check scheduled in case a discrepancy is detected.

Long battery life: The EC 350's internal cellular radio is supplied by a dual independent lithium battery pack providing five years of service. Under normal operating conditions, the corrector battery pack will last twice as long as the radio battery pack. If the radio battery goes dead, the corrector continues to perform normally — unaffected by the loss of power — giving the utility time to service the unit without any loss of data.

Benefits to End Users

An analysis shows that Honeywell's solution for integrated cellular radio in the EC 350 electronic volume corrector optimizes EVC installation procedures in the field and reduces associated costs.

Most gas utilities use different crews to install an EVC and a cellular radio device. An instrumentation crew will typically install the EVC, while another party will be responsible for radio equipment. As outlined below, this approach significantly increases the overall installation cost (See Fig. 4).

- Increased installation costs
 - Truck roll: \$250
 - Mounting two boxes instead of one: \$30
 - Cabling/wiring: \$20



Two-box Installation



One-box Installation

Figure 4. Comparison of EVC and cellular radio installation procedures.

Users can also minimize potential installation risks and delays with Honeywell's solution. An EC 350 equipped with an internal cellular radio can be configured and tested in the metershop to ensure 100% success in deploying the instrument. The EVC can also be shipped fully configured with the cellular radio activated by Honeywell.

Summary

With the EC 350 family of PTZ gas volume correctors, natural gas industry users are assured of robust performance in standard meter applications. These advanced EVCs employ a unique, integrated cellular radio configuration that enables local gas transmission and distribution companies to enhance operational efficiency, reduce installation time and cost, and minimize risks to project schedule.

For More Information

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

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