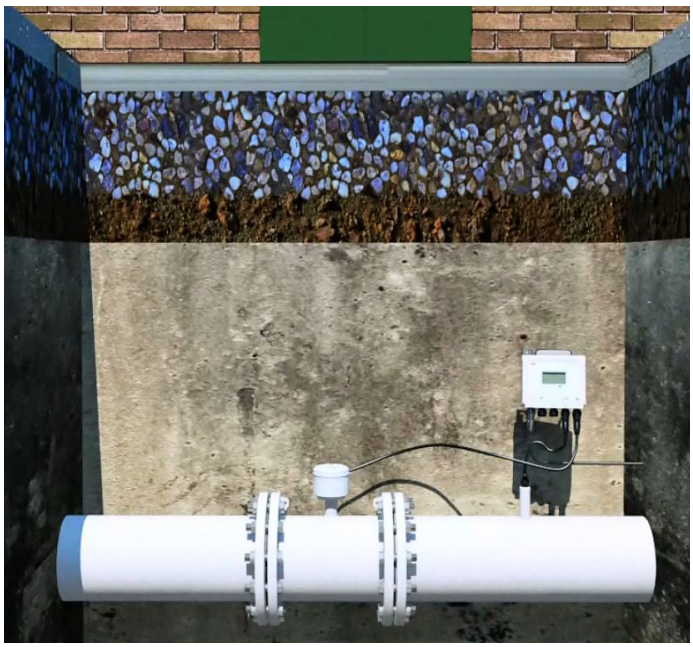
Product guide PG/FLOW/007–EN

Anytime, anywhere flow measurement
ABB's AquaMaster electromagnetic flowmeter – the most versatile flowmeter available

Maximize measurement flexibility through anytime, anywhere access to flow data

Measurement made easy



Introduction

Measuring potable water has been one of the biggest challenges for the water industry. The need to measure not only water flows but also leakage demands the highest levels of accuracy and availability. Added to this is the cost of installing the meters. Traditionally, installing more meters has meant having to build costly installation chambers, incurring costs in construction and in purchasing and maintaining additional ancillary equipment such as isolation valves and bypass lines.

With the requirement to monitor flow as widely as possible, there is also an increased need for meters to be installed in remote locations. This brings its own challenges in terms of maintenance and data collection, as well as powering the devices where electronic meters are used.

The Application

The growing realization of the need to manage and conserve potable water supplies is leading to an expanding demand for metering in a growing range of applications. These include:

- Leakage management
- District metering (DMAs)
- Clean water applications
- Abstraction
- Water distribution and network management
- Irrigation

The need to ensure that large-scale users are accurately billed for the water they use has also seen a demand for equipment capable of delivering the highest levels of accuracy for use in revenue management applications.

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The Challenge

Given the size of water distribution networks, it is inevitable that some losses will occur during transit. These have to be accurately accounted for in order to gain the best possible estimate of water flows. When it comes to the type of flowmeter used, the accuracy of the measurement can be affected by various factors, including age, overall condition and the flowmeter technology being employed. Deposits accumulating in the pipeline can also lead to reduced accuracy, as well as increasing the risk of under-reading.

Where mechanical meters are used, there is also the added likelihood of deteriorating accuracy caused by wear and tear. This will affect not only the water balance but also the estimation of leakage within the distribution system.

Whichever meter type is used, regular verification of accuracy will be needed to help minimize the impact of any errors, which can bring its own challenges. The need for mechanical meters to be periodically tested, recalibrated and repaired, for example, means that they have to be removed, requiring users either to replace the meter with a temporary device or cease measurement until the meter is refitted back into the line.

Ultrasonic flowmeters, which use ultrasonic sound waves to help ascertain the velocity and volume of water passing through the pipe, also suffer various drawbacks. Transit time meters in particular can struggle to handle flows with high levels of particulate matter, requiring a strainer to be fitted.

Both transit time and Doppler meters can also be affected by velocity profile distortions, requiring from 10 to 40 upstream diameters, depending on the severity of the disturbance.

The turndown of ultrasonic meters is also limited within an ideal range of 20:1 to 40:1. Ultrasonic meters can also be difficult to install and set up, especially where high accuracy is required.

The Solution

Modern buriable electromagnetic flowmeters are helping to transform the cost and practicality of installation. With no need for chambers or connected equipment, such flowmeters offer a simple, low cost solution that can be installed in virtually any location. The need for meters to be excavated and/or removed from the line is also being met by the arrival of in situ verification technologies.

New possibilities in communicating with an installed meter have also been opened up with developments in GSM-SMS technology. When used with a flowmeter, this technology can be used to provide operators with immediate access to a host of flow data, eliminating the time, cost and potential errors traditionally associated with the manual collection of flowmeter information.

Remote programming via SMS allows alterations to be made to the configuration of the instrument after installation, such as changing the power mode of the meter for the purposes of achieving enhanced performance. It enhances maintenance by offering performance and condition monitoring throughout the equipment's life, with options such as programming the meter to send an alarm out in case of problems.

The ability to install meters in remote areas is also being further expanded by developments in renewable power technologies. Enabling the meters to draw power from solar and/or wind, these technologies eliminate the need for either mains or battery power.

What can ABB offer

ABB's AquaMaster 3 flowmeter is ideal for water measurement applications in virtually any location. The AquaMaster 3 offers a choice of mains and battery power options, as well as a renewable power version which can draw power from either solar or wind-powered energy sources.

A simple DC (6-21V) connection can be hooked up to sources as small as a 5W solar panel or 60W equivalent wind supply.

When coupled with its use of super capacitor energy storage technology, this feature totally eliminates the need for either mains or battery power.

By using electrostatic energy storage, super capacitors offer a reliable alternative to conventional battery technology. Unlike batteries, which experience a chemical reaction whenever energy is stored or discharged, super capacitors can withstand thousands of charging cycles with no degradation.

In the mains-power mode, the SuperCap technology maintains continuous measurement and alarms reporting via SMS for up to seven days in the event of a power failure. This is expanded to up to three weeks for the renewable power mode, with the SuperCap also acting to power the meter during the night.

A new development in the battery-only version of the AquaMaster 3 is the additional option of high powered batteries, offering an extended operating life of up to 10 years in standard applications and improved performance in harsh applications above 45°C. Where the battery is utilized, the SuperCap enables the battery to be replaced without loss of logger contents.

Installing the AquaMaster 3 is made simple by its use of ABB's 'fit and flow' intelligent installation technology. With this technology, all aspects of an installation are stored within the sensor, including the site settings, calibration factors and any serial numbers usually required during installation, maintenance or replacement. When connected to a transmitter, all of this information is automatically uploaded from the sensor, greatly simplifying the installation and commissioning process.

As a further assurance of a robust metering regime and lifelong accuracy, ABB also offers users its CalMaster2 in situ verification service for the AquaMaster 3. Performed by an ABB service engineer, this service verifies a meter's current operational status and also predicts any potential future faults. Users are issued with traditional calibration verification certificate complete with an uncertainty statement.

Fig. 1: ABB's AquaMaster 3 flowmeter is ideal for water measurement application in virtually any location

ABB has extensive experience in the design, manufacture and lifelong support of electromagnetic flowmeters for water, wastewater and process applications.

For more information, visit www.abb.com/measurement or contact your nearest ABB representative.

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