

Reduced Bore Electromagnetic flowmeter

The world's first electromagnetic flowmeter that delivers on measurement performance regardless of any flow disturbance



Superior and accurate measurement with **zero** upstream and downstream pipe conditions, allowing total flexibility in installation for demanding applications

Measurement made easy

Introduction

Being able to accurately measure both the quantity and rate of water passing through a water distribution system is crucial to gain an informed understanding of overall efficiency. As such, achieving a measurement that is exact as possible can have a significant impact on key areas. This includes supply planning, maintenance, resource deployment, leakage detection and the overall environment.

Similarly, measurement of wastewater flows is needed to help maintain compliance with increasingly stringent legislation aimed at minimizing the impact of human activities on the environment and can play a vital role in helping to keep wastewater emissions within the prescribed limits.

In cases where an industrial site, business, or other large water user discharges large quantities of wastewater to a public water treatment works, accurate flow metering is especially desirable to ensure that the customer is correctly billed for water discharged.

The application

The need to achieve a complete overview of water supply and demand to wastewater discharge means that water meters should be deployed as widely as possible throughout the system. In the distribution side, key areas where measurements can be made include:

- Between the abstraction point and the potable water treatment works
- Within the water treatment plant
- Throughout the transmission, pumping and distribution piping network system including to and from storage and reservoir facilities
- The local distribution supply mains

On the discharge side, the point at which wastewater flows are measured is the pumping station, which relays wastewater from industrial sites and/or domestic sewer networks from treatment at one or more wastewater treatment plants.

The need to use data for the purposes outlined above means that any flow meters used should be capable of providing accurate, reliable measurement under the widest range of operating conditions with total flexibility in installation.

The challenge

One of the key challenges water utilities face today is where to install electromagnetic flow meters when there is inadequate upstream and downstream piping available. Frequently it becomes a tradeoff of lower accuracy versus a manufacturer's recommend upstream and downstream piping requirements. Customers cannot afford to lose meter accuracy due to a poor installation condition. Another challenge is the potential for coating or deposits accumulating in the pipeline and inside the meters. This can lead to reduced accuracy, increased risk of under-reading or worst-case loss of measurement.

Piping networks in such demanding applications are complex and pose challenges to engineers with limited flexibility for choice of measurement points in the network. In the case of a retrofit installation the challenges are more than a new distribution or industrial network.

Electromagnetic flowmeters are the choice of users for these requirements but inherently demand an upstream and downstream straight lay length to achieve accurate flow measurement as they require fully developed axis symmetric flow profile.

Another customer challenge is measurement of low flows. Often customers cannot measure low "nighttime" flows as their meter is not capable of measuring the minute flows that occur during the night. Additionally, the customers cannot determine if they are experiencing leakage in their pipeline system.

The solution

Reduced bore Electromagnetic flowmeters are ideal for these applications with zero upstream or downstream piping as they better handle distorted velocity flow profiles arising from the pipe networks. They offer higher turn down ratios compared to a full-bore electromagnetic flow meter with same measuring accuracies and repeatability.



Reduced bore meter can be installed after an elbow, bend or pipe tee and can be also installed with other flow elements such as ball, gate, or globe valves. In the case of a butterfly valve, it is recommended to have 1 X DN to not damage the liner during the valve operation.

Reduced bore meters are also capable of measuring lower flow rates for a given size meter due to the reduced bore section increasing the fluid velocity and making the lower flow measurement. This is invaluable to customers who question or must estimate their "nighttime" flows because their flow meter cannot make the measurement.

Accuracy of a low flow measurement is also a key element in determining pipeline and system leakage.

What ABB can offer?

ABB's WaterMaster and AquaMaster electromagnetic flowmeter

Reduced bore electromagnetic flowmeters are offered as WaterMaster and AquaMaster. Both the ranges bring a host of advanced features and functionality for measurement.

Available in sizes from 40 to 600 mm (1 ½ in. to 24 in.), all sensors have a rugged, robust construction to ensure a long, maintenance-free life even under the most difficult conditions experienced in water and wastewater applications.

The sensors are inherently submersible (IP68, NEMA 6P) as standard, ensuring suitability for installation in chambers and metering pits which are liable to flooding. All sizes are buriable and are straightforward to install.

The reduced bore meters face to face dimensions follow the ISO 20456 guidelines for meters sizes to DN 400 (16"). The transmitter can be supplied as an integral mount or remotely up to 200 meters away, ideal when the sensor is required to be buried under a road, highway or in a chamber.

ABB released the world's first 0 X diameter upstream and 0 X diameter downstream sensor technology in 2000 and we have thousands of proven installations worldwide. These sensors offer superior accuracy up to ±0.2%, same as that of full-bore sensor without any limitations on installations and flow distortion elements.



ABB's Reduced bore Electromagnetic Flow sensor

They also come with the highest turn down ratios in the industry to the tune of 1000:1 which is challenging with full bore sensor for these applications. The reduced bore sensor conditions the flow profile in the measuring section, flattening any flow profile distortions that could affect either upstream or downstream measurement, as proven through OIML R49 and MID testing.

ABB's reduced bore flowmeter are designed with hydrodynamic considerations, mitigates the impact of flow distortion by reformation of flow profile. Involving no technological complicity, additional hardware components, reduced geometry of the bore combines simplicity with effectiveness with negligible pressure drop on the flow process.

These sensors have more to offer than mitigation of flow distortion effects. The geometry accelerates flow, enhancing the sensor's ability to overcome noise infiltration. Furthermore, the high-speed fluid flushes the electrode zone, preventing coating and deposits formation, a problem plaguing sensor performance.

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ABB's AquaMaster electromagnetic flowmeter

The WaterMaster and AquaMaster are proven to be robust and reliable, with unmatched diagnostic capabilities providing the right information to keep the process up and running. Alarms and warnings are classified in accordance with NAMUR NE107. The meter is also verified to OIML R49 type 'P' requirements to ensure the highest accuracy and long-term performance of the system by continuously self-checking the sensor and transmitter in the field.

All ABB flow meters are designed and manufactured in accordance with international quality procedures (ISO 9001) and are calibrated on nationally traceable calibration rigs to provide the end-user with complete assurance of both quality and performance.

For more information, visit: www.abb.com/measurement

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