ScioSense

UFM-02

Ultrasonic Flow Measurement for Smart Agriculture

UFM-02 Ultrasonic Flow Measurement for Smart Agriculture Application Note

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1. Introduction

Water is one of the most valuable and limited resources in modern agriculture. Increasing water costs, sustainability targets, and the need for higher crop yields require precise and reliable irrigation control. While low-cost mechanical flow meters are still widely used, they offer limited accuracy, no digital intelligence, and a short service life due to mechanical wear.

The ScioSense UFM-02 ultrasonic flow module enables a new generation of smart irrigation systems. It transforms simple water flow measurement into a digital, maintenance-free and long-lasting sensing solution.

This application note outlines the key characteristics of the UFM-02 and explains the technical and economic advantages of using ultrasonic flow measurement in smart agriculture.

2. Application: Garden and Agricultural Irrigation

The UFM-02 ultrasonic flow sensor is designed for garden irrigation, horticulture, greenhouses, and agricultural water distribution systems. It enables real-time monitoring and precise control of irrigation volumes to ensure optimal plant growth while minimizing water waste.

3. Key Functional Benefits of UFM-02

- Ultrasonic flow measurement technology
- Precise flow measurement from 4 to 18,000 l/h
- Real-time monitoring of irrigation volume
- Prevention of over- and under-irrigation
- Automated irrigation based on sensor and system data
- Early leak detection and abnormal flow detection
- Water consumption logging for sustainability and reporting
- Extremely low power consumption (< 50 µA), ideal for battery-powered systems
- Integrated temperature measurement
- Compact and robust design for outdoor use
- Pulse and SPI interfaces, customization possible
- Excellent price-performance ratio for high-volume production

4. Why Ultrasonic Flow Measurement?

Ultrasonic flow measurement is based on a contactless principle with no moving parts inside the sensor. This technology offers decisive advantages compared to mechanical flow meters, especially in demanding outdoor and agricultural environments.

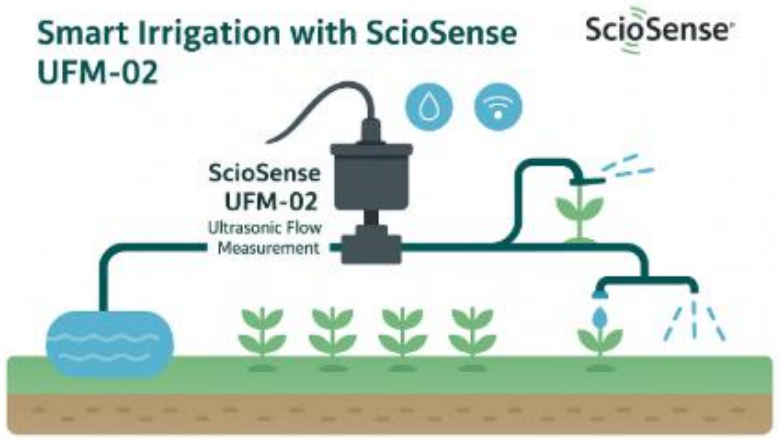
- No mechanical wear – significantly extended service life
- No clogging due to sand, particles or mineral deposits
- Stable measurement accuracy over the entire lifetime
- Suitable for different water qualities
- High robustness against temperature and pressure fluctuations

5. Mechanical vs. Ultrasonic Flow Meter

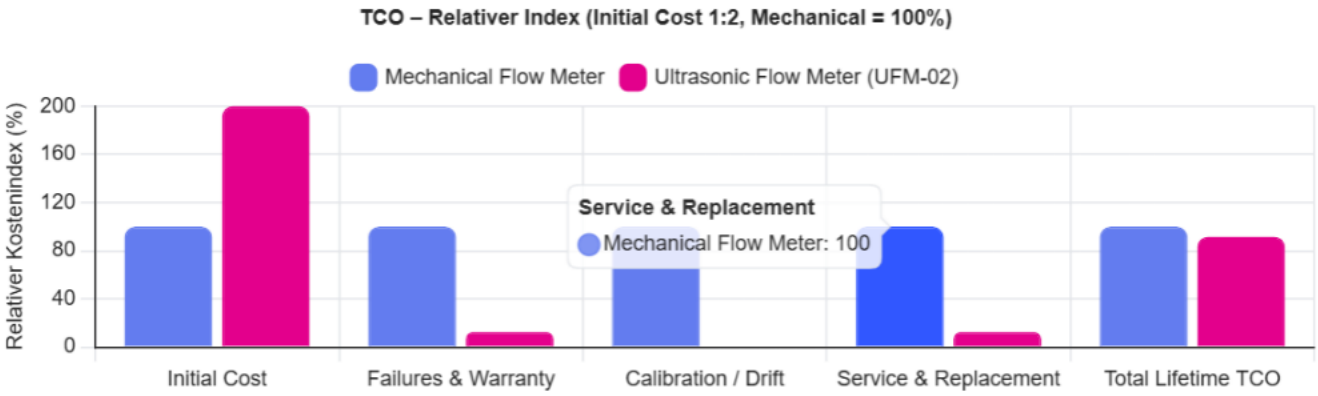
Criterion	Mechanical Flow Meter	Ultrasonic Flow Meter (UFM-02)
Measurement Principle	Moving parts	Contactless ultrasonic
Accuracy over lifetime	Decreases due to wear	Stable over lifetime
Maintenance	Regular service required	Maintenance-free
Lifetime	Limited	Very long
Digital interface	Usually not available	Pulse & SPI
Leak detection	Not possible	Integrated
Suitability for smart systems	Limited	Ideal for IoT irrigation

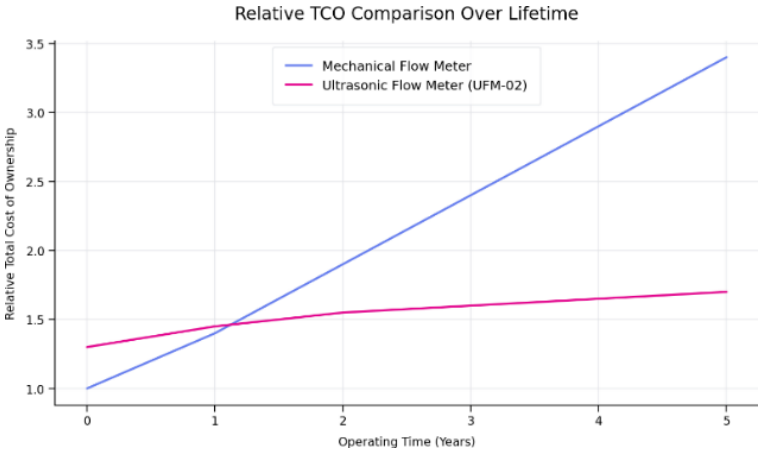
6. Typical Customer Application

The diagram below describes a typical agricultural irrigation system using the UFM-02 ultrasonic flow module:



7. Total Cost of Ownership (TCO)





8. Conclusion: A Smart Investment for Smart Irrigation

The ScioSense UFM-02 ultrasonic flow module enables OEMs and system integrators to upgrade traditional irrigation systems into intelligent, connected and sustainable solutions. By replacing mechanical meters with ultrasonic technology, customers benefit from higher efficiency, lower operating costs and long-term reliability.

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