ScioSense

UFM-02

Ultrasonic Flow Measurement for Tankless Heaters

UFM-02 Ultrasonic Flow Measurement for Tankless Heaters Application Note

PMT PRECISION MEASUREMENT TECHNOLOGIES

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1. Introduction

Tankless water heaters demand precise, fast and reliable flow measurement to ensure user comfort, safety and energy efficiency. Many designs still use low-cost mechanical meters, which wear over time and gradually lose accuracy. Ultrasonic sensing has no moving parts, so it keeps its accuracy across the life of the appliance.

The Sciosense UFM-02 ultrasonic water flow module is built for high-volume OEM designs. It measures flow from 4 to 18,000 l/h while drawing under 50 µA and provides a digital interface with stable accuracy that does not drift as the product ages.

In these appliances the flow sensor determines when the heater starts and stops and how steadily it holds the outlet temperature. The UFM-02 provides:

- Real-time monitoring of water flow
- Reliable heater start and stop
- Stable outlet temperature control
- Detection of abnormal flow or leakage
- High overall energy efficiency and user safety

2. Why Ultrasonic Flow Measurement?

Ultrasonic flow meters operate using a transit-time measurement principle without any moving parts. This contactless technology eliminates wear and clogging, ensuring long-term accuracy and maintenance-free operation, key requirements for modern, high-reliability appliances.

3. UFM-02 Highlights

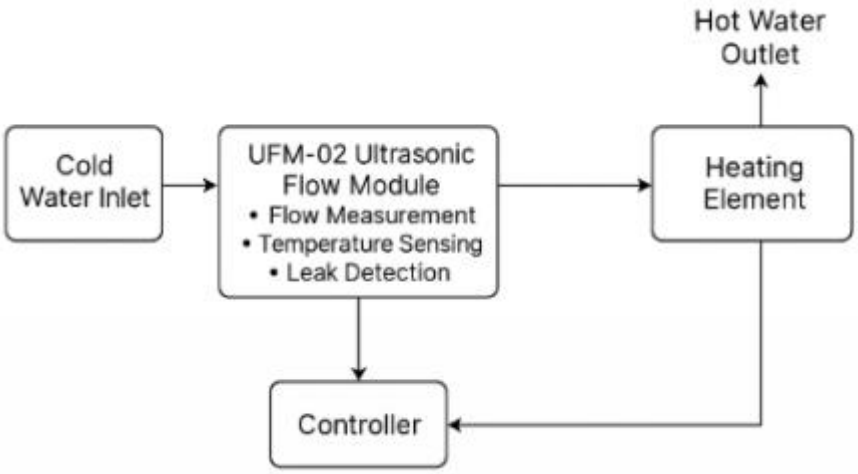
- Ultrasonic flow measurement technology
- Flow range from 4 to 18,000 l/h
- Extremely low power consumption (< 50 µA), suitable for battery-powered designs
- Excellent price-performance ratio for series production
- Integrated temperature measurement
- Available in multiple sizes and thread options
- Leakage detection and abnormal flow recognition
- NSF61 certified for drinking water applications
- Long lifetime due to wear-free operation
- Pulse and SPI interfaces, customer-specific adaptations possible
- Compact design optimized for heater integration

4. Mechanical vs. Ultrasonic Flow Meter

Feature	Mechanical Flow Meter	Ultrasonic Flow Meter (UFM-02)
Moving parts	Yes	No
Wear & aging	High	None
Accuracy over lifetime	Decreasing	Stable
Low-flow detection	Limited	Excellent
Digital interface	No	Pulse / SPI
Leak detection	No	Yes
Maintenance	Required	Maintenance free
Total Cost of Ownership	Low initial, high lifetime	Optimized over lifetime

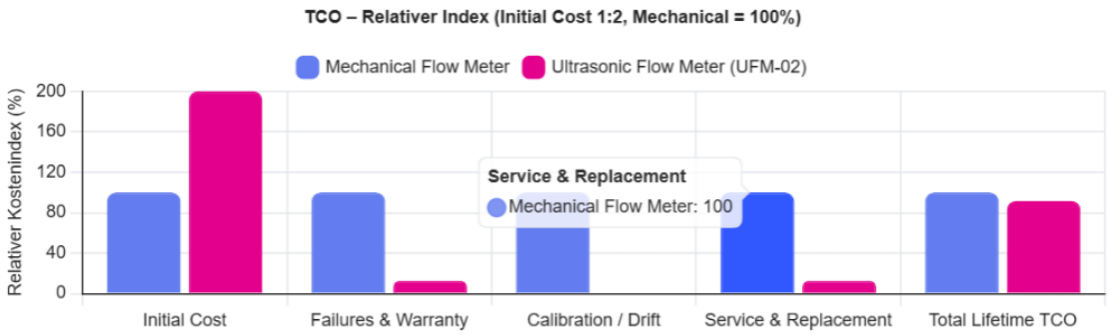
5. System Integration

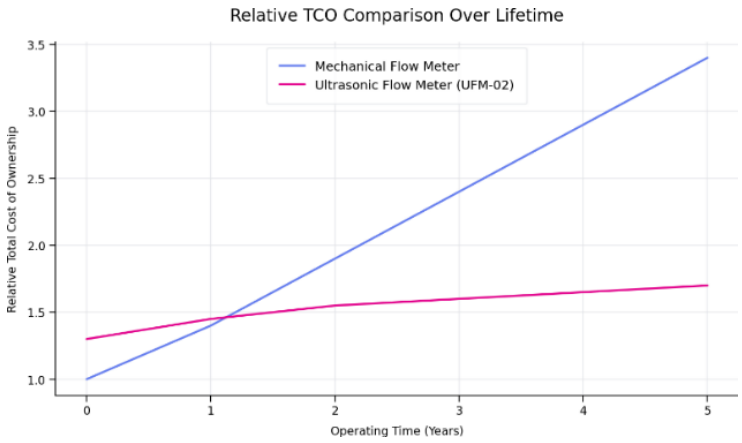
Typical integration of the UFM-02 in a tankless water heater:



6. Total Cost of Ownership (TCO)

Although ultrasonic flow meters have a slightly higher initial cost compared to basic mechanical meters, their total cost of ownership is significantly lower. The UFM-02 eliminates maintenance, calibration drift and replacement costs while improving system efficiency and reliability.





7. Conclusion

The ScioSense UFM-02 transforms flow measurement from a simple mechanical part into an intelligent sensing subsystem. For manufacturers of tankless water heaters, this enables higher product quality, enhanced safety, digital readiness and lower lifetime cost making the ultrasonic upgrade a smart long-term investment.

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