Gentos Measurement & Control Co., Ltd.

pFlow

Pure Water Ultrasonic Micro Flowmeter Applications

MFR Micro Flowmeter



Product Introduction



*The product shown above is a smart aquaculture device

The MFR uses LoRa communication, the LoRaWAN communication protocol is available. The advantage of the communication protocol is that it can transmit information at very low frequencies at low complexity and cost. It is an ultra-remote, low-power, high-availability, and low-cost communication technology that can be used in different regions.

MFR adopts the ultrasonic transit time measurement principle, combined with the patented flow algorithm technology, it realizes accurate measurement of the fluid flow in the pipe.The product is all-in one and clip-on structure design, which is simple and convenient to install. Only four steps are needed all along. The installation process requires no contact with fluid media and no need to shut down the flow.

Product Features

Compact size

LCD color display



No need to break the pipe, simply clip on and measure

Screen display can be rotated in four directions

*The product shown above is a smart agricultural device.

Application Industries



Pharmaceutical Equipment

Improve the quality, efficiency and reliability of pharmaceutical production.



Smart Farming Equipment

Improve farming efficiency, reduce costs, safeguard the farming environment and promote farming intelligent development.



New Energy Equipment Supporting

Improve the operation efficiency of new energy equipment, energy saving and emission reduction, ensure the safety of equipment operation, and promote the development and intelligentization upgrade of new energy industry.



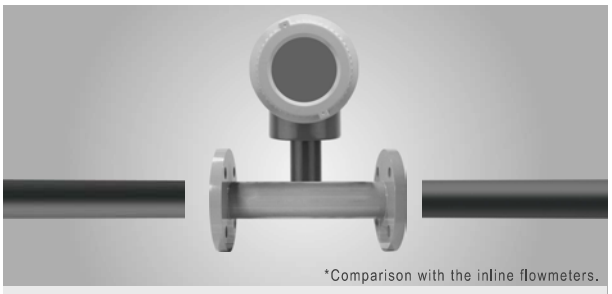
Intelligent Agricultural Equipment

Helps to improve agricultural production efficiency, reduce costs, protect crop growth demand, and promote the intelligent development of agricultural production.

Technical Parameters

- Flow velocity: 0.03m/s ~5.0m/s
- Accuracy: ±2.0% (0.3m/s~5m/s standard)
- Repeatability: 0.4%
- Communication: LoRa (wireless communication)
- IP Rating: IP54

Easy Installation



Professional, downtime pipe cutting installation

- Equipment stoppage
- Pipeline modification
- Installation time
- Extra parts costs
- Flowmeter costs

Conventional Installation

1、Shut down the machine and remove the liquid in the pipeline.

2、Cut the pipeline

3、Through each line

4、Mount the sensor to the pipe sleeve fitting.

5、Install the sensor and sleeve connector to the pipeline.

6、Power on the machine so that the liquid is injected into the pipeline

7、Adjust the flow rate to the default value

8、Check for fluid leakage



Installs with just a screwdriver

30-second rapid installation

- √ No need for professionals
- √ No need to stop work or production

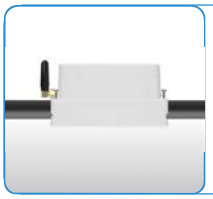
Four steps to complete the installation



Step 1
Cleanning pipes



Step 2
Installation of pipe clamp



Step 3
Tighten the screws



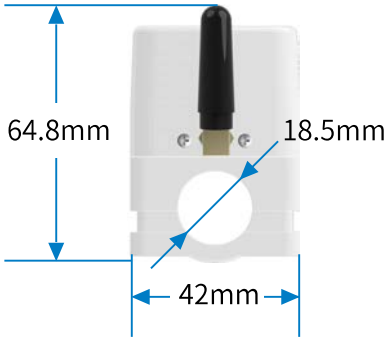
Step 4
Set parameters after powering on to start measuring

Range of Application/Size

Pipe material	Copper、Stainless steels		PVC、PPR	
				

Model	Pipe Material	Pipe Nominal Inner Diameter	Pipe Clamps for Pipe O.D. Range	Measurable range of flow rate (0.03~5.0)m/s
MFR	Copper Stainless steel PVC PPR	DN10	(13.5~18.5)mm	(0.01~1.5)m3/h



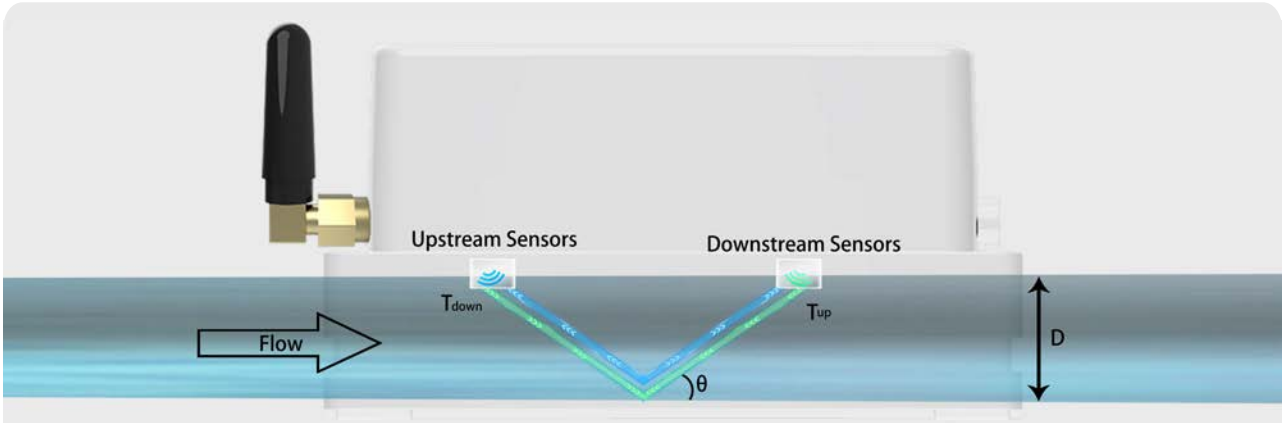




Working Principle

The MFR micro flowmeter uses ultrasonic transit time measurement. An ultrasonic signal propagates through the fluid, with the speed increasing downstream and decreasing upstream. By measuring the difference in transmission times in both directions, the flow rate of the fluid is determined.

The flow rate of a fluid varies across different locations in a pipe, with the center having a faster flow than near the pipe wall. This flow velocity distribution can be represented by the cross-sectional distribution. By setting up the flow meter and accounting for this distribution, the average flow rate can be calculated. From the average flow rate and the pipe's cross-sectional area, the volume flow rate of the fluid can be derived.

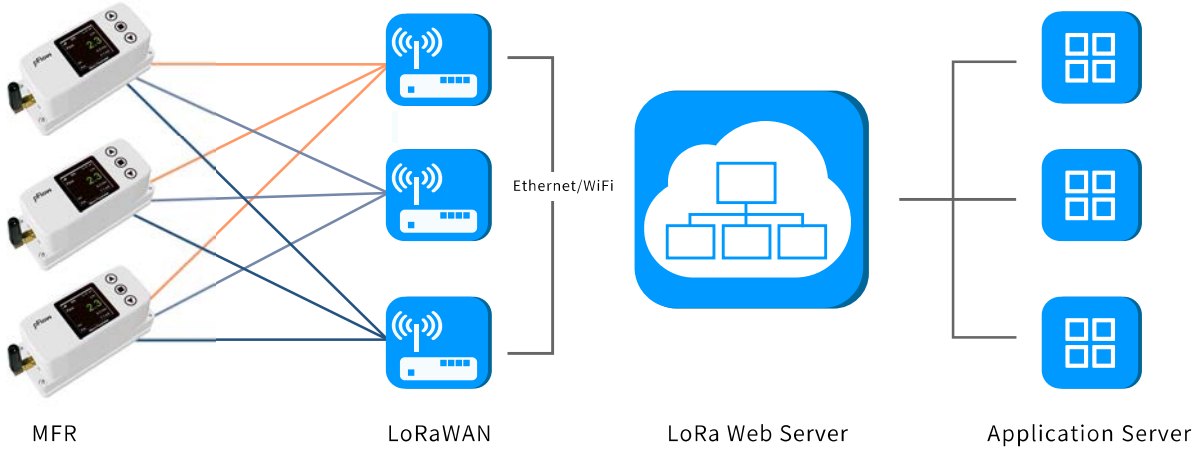


$$V = \frac{MD}{\sin 2\theta} \times \frac{\Delta T}{T_{up} \cdot T_{down}}$$

Remark

V: Fluid velocity M: Number of ultrasonic reflections D: Pipe diameter
θ: The angle between the ultrasonic signal and the fluid
T_{up}: Time for the downstream transducer to transmit a signal to upstream
T_{down}: The time when the upstream transducer transmits a signal downstream
$\Delta T = T_{down} - T_{up}$

LoRa communication, using the LoRaWAN gateway to access the network server, enables long-distance data management and monitoring. It eliminates cumbersome wiring and efficiently handles dispersed instruments with low power consumption. LoRa offers superior simplicity, cost-effectiveness, and efficiency compared to other methods, making it user-friendly across various areas.



Product Model

Format of Selection Model: MFR Format: MFR - A - B

Model	Description of Transmitter
MFR	Model Name: MFR Micro Flowmeter
	Velocity Range: 0.03~5.0m/s
	Accuracy: 2.0% (0.3m/s~5m/s Standard)*
	Pipe Material: DN10
	Repeatability: 0.4%
	LoRa Communication: Maximum Transmit Power: 22dBm
	Temperature: -40℃~85℃
	LoRaWAN communication protocol is available
	Medium: Water
	IP Rating: IP54
	Power Supply: 10～36VDC/500mA
	Keyboard: 3 touch keys
	Communication Interface: RS485, Support FUJI Protocol and MODBUS Protocol
	Enclosure Material: PC(Polycarbonate)
	Display: 1.54"LCD Colorful Screen，Resolution 240*240
	Temp: Ambient Temperature: -10℃~50℃
	Fluid Temperature: 0℃~60℃
	Transmitter: All-in-one
	Transducer: Clamp On Type
	Cable: φ5 six-core cable
	Standard Leng: 2m

Specifications

A	Application Industry (Select the appropriate instrument for your industry.)
EM	Equipment Matching
HC	Healthcare
AQC	Aquaculture
AGC	Agriculture

B	LoRa Frequency Selection
1	EU868 Frequency: 863000000~865400000, unit Hz
2	US915 Frequency: 902300000~914900000, unit Hz
3	CN779 Frequency: 780100000~786500000, unit Hz
4	EU433 Frequency: 433775000~434665000, unit Hz
5	AU915 Frequency: 915200000~927800000, unit Hz
6	CN470 Frequency: 470300000~489300000, unit Hz
7	AS923(HK)Frequency: 920000000~925000000, unit Hz

Selection Example: MFR; Specification: MFR-EM-1
For example:[Model: MFR;Specification: MFR,Equipment Matching,EU868 Frequency]

*The accuracy obtained through Gentos flow standard device may vary due to factors such as the type of pipeline used, the type of fluid being measured, temperature variations, etc.

Hint: The product provides options for selecting the application industry at the factory. Please refer to Selection A.

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The information provided is for reference only. Specific parameters are subject to the instruction manual.
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