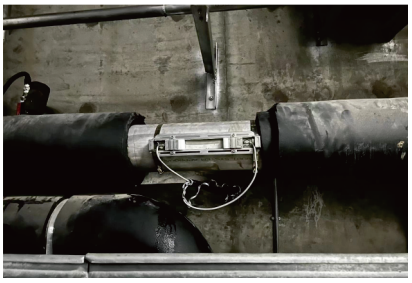
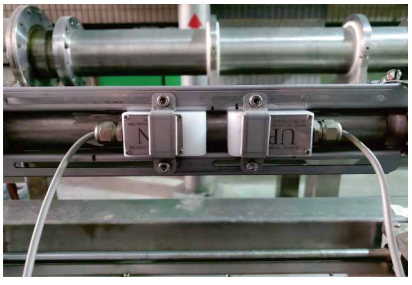
Clamp-On Ultrasonic Flow Meter
Transit-Time vs Doppler Type

FineTek Ultrasonic Flow Meter Overview

Flow is one of the important physical quantities in industrial measurement. Flow detection in industrial production processes is also becoming increasingly important, resulting in higher requirements for measurement accuracy. Flow meters are widely used in various fields with high-tech processes, for example, the manufacturing process of coating, etching, washing, and drying of equipment. With an excellent R&D team, FineTek is committed to the development of flow meters. We understand that many problems occur during the use of flow meters - an unstable flow rate, low accuracy, time consuming installation and cutting of pipes, or the volume is too large. FineTek is dedicated to resolving these problems and improving the product.

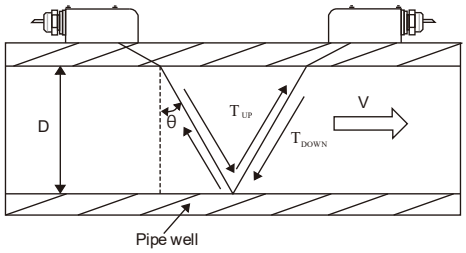
The ultrasonic flow meter is a non-contact instrument that can measure the flow of materials in large pipes, and of media that are not easy to touch and observe. It has high measurement accuracy, and is unaffected by other aspects of the medium under test. It can solve the flow measurement problems of corrosive, non-conductive, radioactive, flammable or explosive medium that other measuring instruments cannot handle.Therefore, the flow meter has been very popular in recent years.



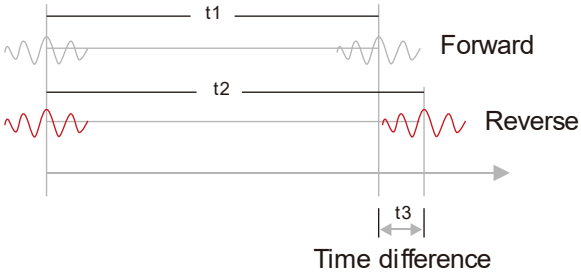


MEASUREMENT PRINCIPLE

1. Transit Time Ultrasonic Flow meter

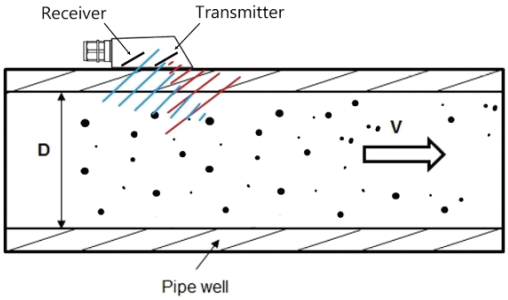


On the outer surface of the flow pipeline, install a pair of ultrasonic flow meters. The are two installation methods: the "Z" method and the "V" method. One sensor is stimulated by the electrical pulse force to produce a supersonic wave pulse, which is received by the second sensor through the pipe wall->FLUID->PIPE wall, according to its "FORWARD and reverse flow direction, there is A TIME difference DT=T (DOWN)-T (UP)

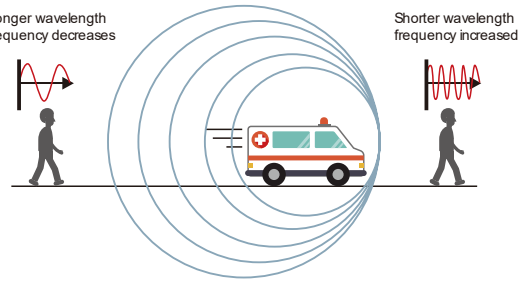


The upstream probe transmitted to the downstream probe takes t1 time, and the downstream probe transmitted to the upstream probe takse t2 time. The conversion relationship between the flow rate V and the time difference Δt is obtained, and the flow rate value Q can be obtained with further analysis.

2. Doppler Ultrasonic Flow meter



The transmitting device is a fixed sound source, and the suspended particles that move with the liquid reflect and recover the ultrasonic waves irradiated on the solid particles. The frequency difference between the emitted sound waves and the received sound waves is proportional to the flow rate of the fluid. The flow speed can be obtained based on the precise measurement of the frequency difference.



The ambulance's siren becomes sharper as the vehicle approaches (i.e. the frequency becomes higher and the wave length becomes shorter). The siren becomes lower as it leaves us (i.e. the frequency becomes lower and the wave length becomes shorter). The pulse wave signal encounters the micro-particles in the liquid or the reflected wave signal after the air. The frequency of the reflected wave is received through the sensor, and the speed of movement of the particles can be calculated based on the change in frequency.The average flow rate of the entire section is calculated through the set flow field data.

ULTRASONIC MEASUREMENT

EPU transit-time can detect and process various fluids, piping materials and piping sizes.

Measureable fluid	Pipe material	Pipe size
● Water ● Oil ● Solvent	● Iron ● Stainless steel ● Steel ● Plastic PVC pipe	● DN32~150 ● DN150~800

EPF Ductile detectable fluid, piping material and piping size

Measureable fluid	Pipe material	Pipe size
● Wastewater ● Bubbling fluid ● Suspended fluid	● Iron ● Stainless steel ● Steel ● Plastic PVC pipe	● DN15~500

BENEFITS OF ULTRASONIC FLOW METER

Clamping outside the tube

No pressure loss, no need to stop

Will not leak, will not pollute

Ultrasonic flow meter have high measurement accuracy and high resolution. The sensor emits ultra-acoustic wave signals from outside the pipe wall to inside the pipe. There is no need to come into contact with the fluid, let alone pressure loss, and because of the "non-contact" measurement method, there is no "shutdown", "pressure loss", "water leakage", "withstand pressure" problems.

Ultrasonic flow meter contact point

- The probe clamp is outside the pipe and does not touch the fluid, so there is no disturbance to the flow field and no pressure loss. When the flow is measured, the energy-saving benefits are more significant.
- It is suitable for large-caliber flow detection. Other types of flow meters have larger structures and higher costs. Ultrasonic flow meter is unaffected by the diameter of the pipe, so the price is more advantageous.
- The measurement is non-contact and is not affected by the pressure, temperature, viscosity and density of the fluid.There is no need to cut the pipe for installation, so regardless of installation or maintenance, it can be fast, time-saving and money-saving.
- It has good universality. If other contact flow meters change the diameter of the pipe, they must be replaced with instruments of different sizes. However, ultrasonic flow meter have a larger tolerance range and are usable even when the pipe size changes.

Customer benefits

- Maintenance-free flow sensor saves maintenance costs, the measurement range can be adjusted, and the product range can be reduced.
- Can be used for conductive and non-conductive liquids, saving product series and storage costs.
- Linear measuring tube reduces pressure loss, thereby saving energy costs.
- The unsealed sensor improves process safety and availability.
- Flexible measuring device, can be used in all industries.

Scope of use

- Flow measurement of cooling circulation system
- Flow detection of flushing circulation system using soft water
- Flow monitoring of flush-related equipment
- Used in CIP equipment

EPU TRANSIT-TIME ULTRASONIC FLOW METER

If the measured object is a clean and bubble-free fluid, it is recommended to use time difference type ultrasonic waves.

Working principle

The main measurement principle of the transit-time clamp-type ultrasonic flow meter is to use the ultrasonic wave pulse to strike the fluid through the probe. When the beam propagates in the liquid, the flow of the fluid will cause a slight change in the propagation time, and the change in the propagation time is proportional to the flow rate of the liquid, from which the flow rate of the liquid can be obtained.

Screen size	LCM 128*64 pixel backlight type
Button	3-button operation
Communication interface	RS-485(Modbus)
Measurement technology	transit-time measurement method
Analog output	4~20mA
Pulse width	Automatic (pulse width 50%)
Pulse mode	NPN output 32VDC/200mA
Pipe diameter size	DN32 ~ DN150 / DN150 ~ DN800
Measurement range	Flow rate 0~15m/s
Accuracy	At 0.6~3m/s, ±0.2% F.S.(Note 1) At 3~15m/s, ±1% O.R.(Note 1)
Repeatability	0.5%
Ambient temperature	20~60℃
Power supply	18 ~ 32 VDC/100~240VAC
Power consumption	10 VA
Inlet specifications	M20 x 1.5
Protection level	IP67
EMC	IEC 61326

Note 1 :
FineTek uses flow test equipment, fluid temperature: 20±10°C, ambient temperature: 20±5°C; straight pipe section temperature: 15D or more on the upstream side, 5D or more on the downstream side.
Consider the value of linearity + range error + repeatability in a fixed environment.The measured value may produce additional errors due to the type and state of the on-site pipeline, fluid type, fluid temperature, etc.

Features

- When measuring the flow rate of the pipeline, there is no need to penetrate the pipe, therefore no adverse impact on the pipe and process fluid.
- LCM displays the instantaneous flow rate and the cumulative total amount.
- Standard 4-20mA, pulse wave output, RS485Modbus communication.
- Suitable for all kinds of liquids without air and without impurities.
- Two-way liquid volume flow measurement.
- Operating language: Traditional Chinese, simplified Chinese, English.
- Sensor and transmitter protection level: IP67.

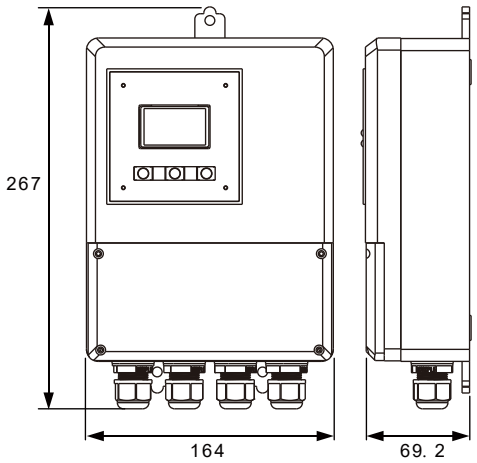
Industrial application

- Food manufacturing industry
- Beverage manufacturing industry
- Post-processing
- Pharmaceutical industry
- Chemical industry
- Semiconductor industry

EPU PRODUCT SIZE

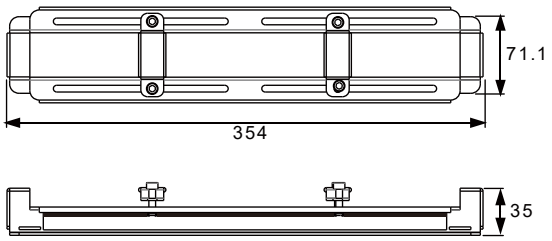
Transmitter

(Unit:mm)



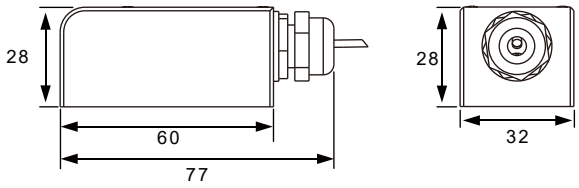
Stand

(Unit:mm)



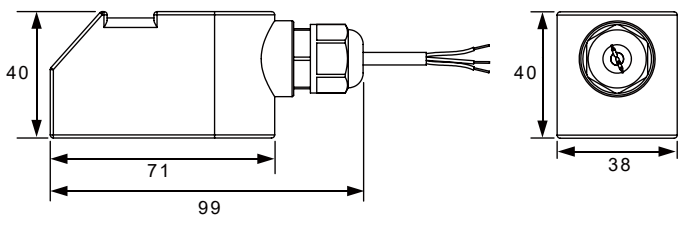
S200 sensor(DN32~DN150)

(Unit:mm)

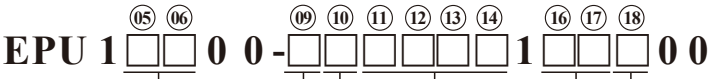


S800 sensor(DN150~DN800)

(Unit:mm)



EPU ORDERING INSTRUCTIONS



⑤⑥ Model

04: Separate type

⑨ Detection method

0: Transit-time

⑩ Power supply

D: 24Vdc
A: 100~240Vac

⑪⑫⑬⑭ Sensor

S200: Separate type DN32~DN150
S800: Separate type DN150~DN800 (Without sensor metal bracket)

⑯⑰ Cable length

03: 3M
05: 5M
10: 10M
20: 20M

*Cable length 3M, 5M, 10M, suitable for DN32~DN150
*Cable length 5M, 10M, 20M, suitable for DN150~DN800

⑱ Output mode

0: Standard

EPF DOPPLER ULTRASONIC FLOW METER

Doppler ultrasonic flow meter is suitable for all kinds of polluted water and liquids containing granular impurities with high bubble content.

Working principle

The Doppler ultrasonic flow meter uses non-contact measurement. It is simple to install, convenient, and easy to maintain. The flow meter (EPF) reflects the pulse wave signal to the air through the sensor, receives the reflected wave frequency through the sensor, and calculates the average flow rate of the entire cross-section based on the flow field data. The pulse wave signal is emitted in the pipeline, and the pulse wave signal encounters the change value of the micro-particles or frequency in the liquid, and the speed of movement of the particles can be calculated.

Screen size	LCM 128*64 pixel backlight type
Communication interface	RS-485(Modbus)
Analog output	4~20mA
Pulse width	Automatic (pulse width 50%)
Pulse mode	NPN crystal output 32vdc/200mA
Pipe diameter	DN15~DN500
Measurement range	Flow rate 0.03~12m/s
Accuracy	At 0.12~1.5m/s, ±0.25%F.S.(Note 1) At 1.5~12m/s, ±2% O.R.(Note 1)
Pipe material	PVC, carbon steel, stainless steel, cast iron, ductile iron and other materials that can propagate ultrafine waves
Power input	18~32 VDC/100~240VAC
Transmitter operating temp .	-20° ~ 70°C
Transmitter protection level	Dustproof and dustproof Ip67
Sensor operating temp	-25° ~ 55°C
Sensor cable fineness	6.8m cable length
Sensor protection level	Dustproof and dustproof Ip66

Note 1 :
FineTek uses flow test equipment, fluid temperature: 20±10°C, ambient temperature: 20±5°C; straight pipe section temperature: 15D or more on the upstream side, 5D or more on the downstream side.
Consider the value of linearity + range error + repeatability in a fixed environment.The measured value may produce additional errors due to the type and state of the on-site pipeline, fluid type, fluid temperature, etc.

Features

- When measuring the flow rate, there is no need to penetrate the pipe, therefore, no adverse impact on the pipe and process fluid.
- LCM displays the instantaneous flow rate and the cumulative total amount.Standard 4-20mA, pulse wave output, RS485 Modbus communication.
- It is suitable for all kinds of polluted water with high bubble content and liquids containing granular impurities.
- Operating languages: traditional Chinese, simplified Chinese, and English.

Industrial application

Sewage, waste water, mud, abrasives, viscous liquids, used in full tubes and fluids containing solids or air bubbles
* The minimum size of solids or air bubbles is 100 microns and the minimum concentration is 75 ppm.

Sewage treatment

Paper industry

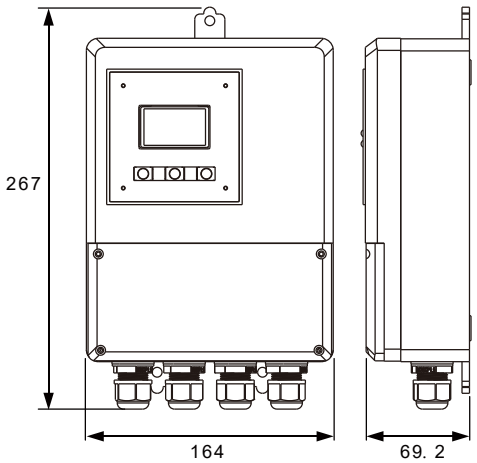
Chemical industry

Food industry

EPF PRODUCT SIZE

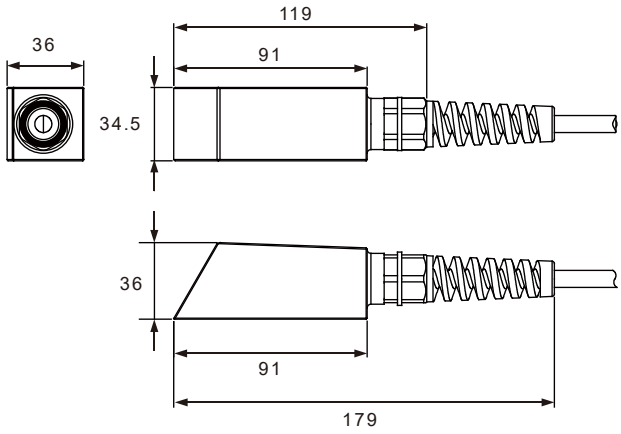
Transmitter

(Unit:mm)



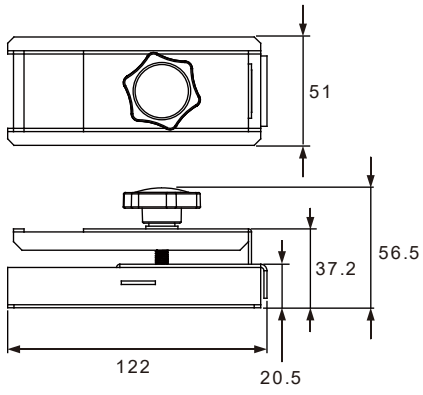
Sensor (DN15~DN500)

(Unit:mm)

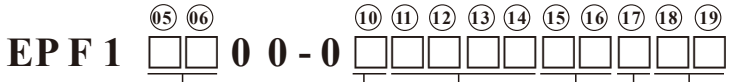


Sensor holder

(Unit:mm)



EPF ORDERING INSTRUCTIONS



⑤⑥ Model

04: Separate type

⑩ Power supply

D: 24Vdc
A: 100~240Vac

⑪⑫⑬⑭ Maximum diameter range

D500: DN15~DN500

⑮⑯ Cable length

06: 6.8M

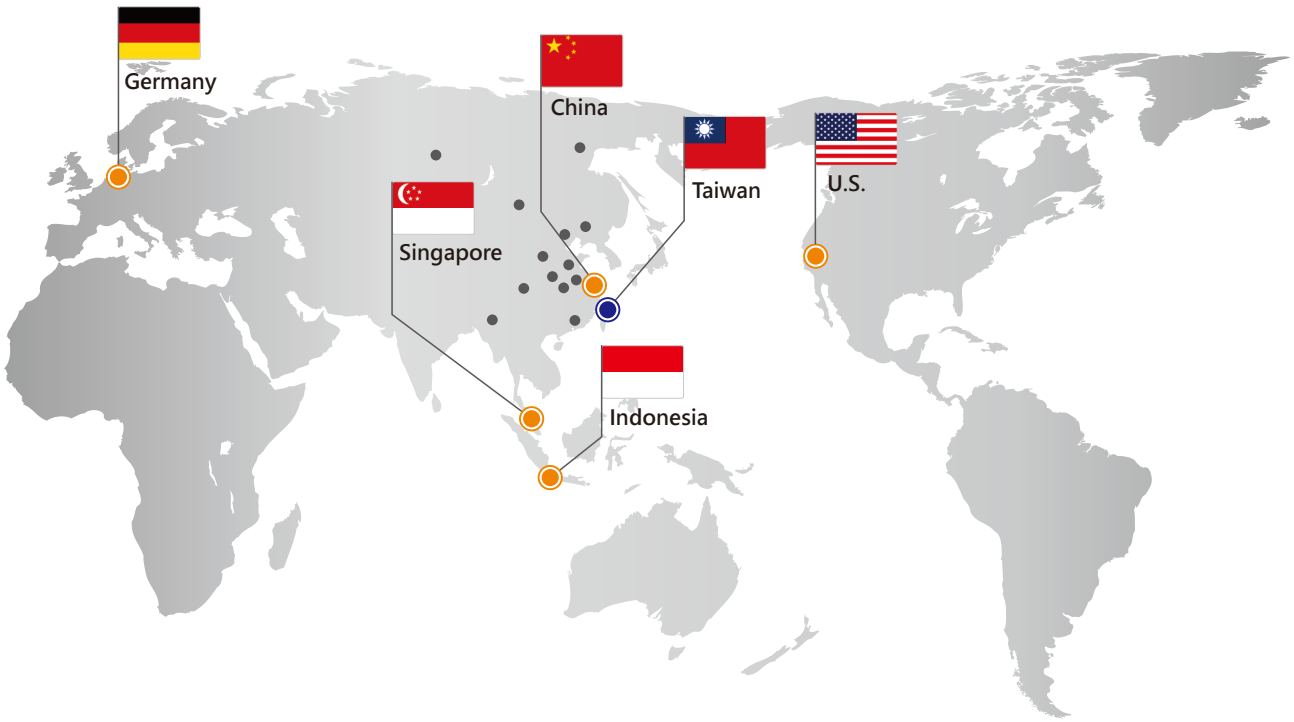
⑰ Output mode

0: Standard

⑱⑲ Optional functions

00: None

Global Network



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