EPU Clamp-On Ultrasonic Flowmeter

FineTek

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Fluid Control Specialists

WORKING PRINCIPLE

EPU Clamp-on ultrasonic flowmeters measure by using ultrasonic pulse waves to pass through the probe and strike the liquid material. While the pulse waves rapidly disperse through the liquid, the liquid flow will cause a small change in the rate at which the pulse waves are spread. This change in time at which the pulse waves are dispersed is proportional to the flow rate of the liquid. Hence, the flow rate of the liquid is derived.

As show in the figure below: A pair of ultrasonic sensors are installed opposite each other on the flow pipe in specific positions using the "Z" method and "V" method. One of the sensors is electrically charged and emits ultrasonic pulse waves, which passes through the tube wall > liquid > tube wall and is received by the other sensor. According to the upstream and reverse flow direction, the ultrasonic pulse wave dispersion time from start to end is:
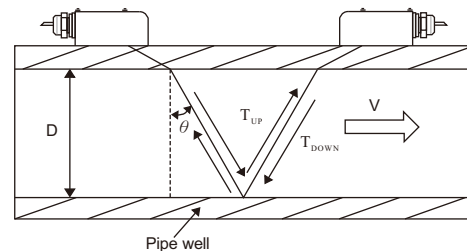
$$T_{UP} = \frac{M \times D / \cos\theta}{C_0 + V\sin\theta}$$

$$T_{DOWN} = \frac{M \times D / \cos\theta}{C_0 + V\sin\theta}$$

$$DT = T_{DOWN} - T_{UP}$$

According to the formula, the liquid's average flow rate in a straight line is calculated as:

$$V = \frac{M \times D}{\sin 2\theta} \cdot \frac{DT}{T_{UP} \cdot T_{DOWN}}$$

SPECIFICATIONS

Display size	LCM 128*64 pixels with backlight
Buttons	3 control buttons
Communication Interface	RS-485(Modbus)
Measurement system	Measurement using time difference
Pipe diameter size	DN40 – DN200 / DN200 – DN800
Measurement range	Flow rate 0~15m/s
Accuracy	2.5% O.R. The flow velocity is greater than 0.3m/s, and the flow velocity deviation range ± 0.02m/s ; Reynolds number>10000(Note1)
Repetition rate	0.5%
Ambient temperature	-20~60°C
Power Supply	DC 18 ~ 32 VDC
Input port specification	10 VA
Power consumption	M20 x 1.5
Protection level	IP67
EMC	IEC 61326

Note 1:
Combined with FineTek sensor calibration conditions: FineTek liquid flow test equipment
Liquid temperature: 20±10°C / Ambient temperature: 20±5°C
Length of straight pipe section: front 15 D and above / back 5 D and above


Pipe well

FEATURES

- No intrusion in the pipeline during measurement of flow rate, hence no adverse effects will be caused on the pipeline or process liquid.
- LCM display of instantaneous flow rate and cumulative amount.
- Standard 4-20mA, pulse wave output, RS485 Modbus communication.
- High-quality, durable, and reliable.
- Applicable to all types of liquids that without air, sediment or sludge.
- Able to measure both volume and flow rate of liquid.
- Languages on operation interface: traditional Chinese, simplified Chinese, and English.
- IP67 protection level, with waterproof transducer.
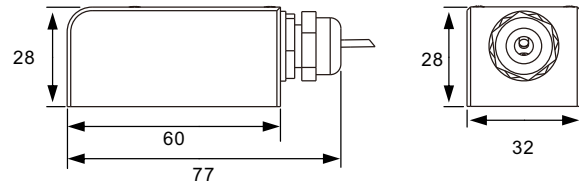
APPLICATION IN ENVIRONMENT

- Food manufacturing industry
- Beverage manufacturing industry
- Water treatment industry
- Pharmaceutical industry
- Chemical industry
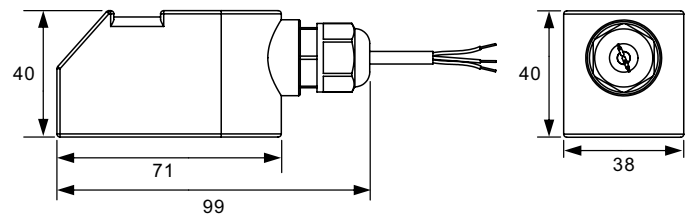- Semiconductor industry
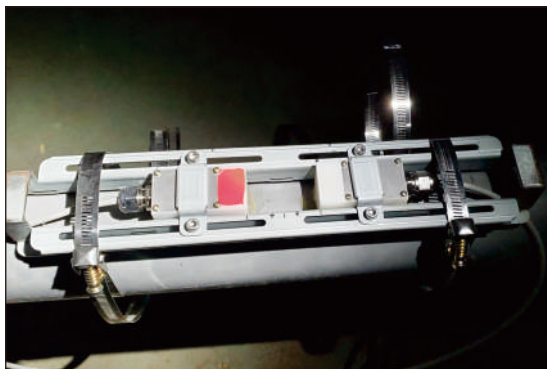
DIMENSIONS DRAWING

(Unit:mm)

EPU Meter

267
164
69.2

Bracket

71.1
354
35
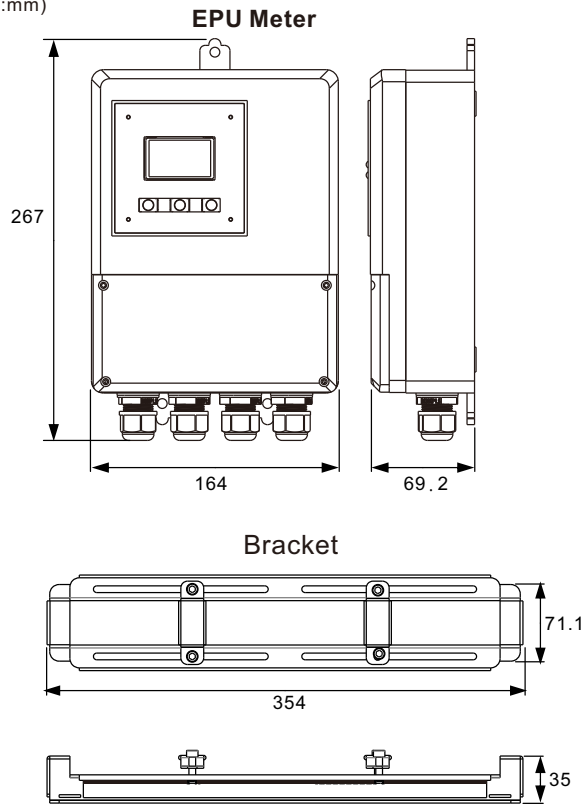
S200 EPU Transducer (DN40~DN200)

28
60
77
28
32

S800 EPU Transducer (DN200~DN800)

40
71
99
40
38

APPLICATION EXAMPLES

Food industry – pure water boiler pipe

Copper industry – tap water pipe

ORDER INSTRUCTIONS

EPU 1 ⑤⑥□□ 0 0 - ⑨⑩⑪⑫⑬⑭□□□□□ 1 ⑯⑰⑱□□ 0 0

⑤⑥ **Display code**

04：Separate type

⑨ **Operating principle**

0：Time difference type

⑩ **Power supply**

D：24Vdc

⑪⑫⑬⑭ **Transducer**

S200: Separate type DN40~DN200
S800: Separate type DN200~DN800

⑯⑰ **Cable length**

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

*DN40~DN200 is suitable with 3M、5M、10M Cable length
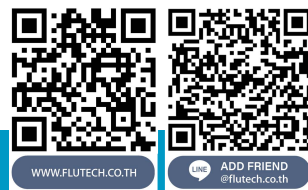*DN200~DN800 is suitable with 5M、10M、20M Cable length

⑱ **Output method**

0: Standard

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