

Partially Filled Pipe & Open Channel Flow Meter

Summary >>>

POF series flow meter is designed to measure velocity and flow for partially filled pipe and open channel stream or river. It utilizes Doppler ultrasonic theory to measure fluid velocity. According to pressure sensor, the flow depth and sectional area can be obtained, finally the flow can be calculated. POF transducer has the functions of conductivity test, temperature compensation, and coordinate correction. It is widely applied in measuring sewage, waste water, industrial effluents, stream, open channel, residential water, river etc. Also it is applied in monitoring sponge city, urban black odor water and river & tide research.



Features >>>

- The Meter Can Programme And Measure Any Shapes Of Open Channel & Partial Filled Pipe
- By 20 Coordinate Points
- Velocity Range 0.02-12m/s, Accuracy $\pm 1.0\%$
- Bi-directional Measuring Velocity, Positive Flow And Negative Flow
- Depth Measurement By Pressure Sensor And Ultrasonic Sensor, Accuracy $\pm 0.1\%$
- Built-in Coordinate Correction Function
- Standard 4-20mA, RS485/MODBUS Output, Opt.GPRS
- Available Configure Data Logger With SD Card

Panda POF Series

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Measuring following datas:

Velocity, Flow, Depth (Ultrasonic), Depth (Pressure), Temperature, Electrical Conductivity (EC)

• Sensor Specification

Velocity	Range	20mm/s-12m/s Bi-directional Measuring, t Default 20mm/s to 1.6m/s signal-directional measurement
	Accuracy	±1.0% typical
	Resolution	1mm/s
Depth(ultrasonic)	Range	20mm to 5000mm (5m)
	Accuracy	±1.0%
	Resolution	1mm
Pressure level	Range	0mm to 10000mm (10m)
	Accuracy	±1.0%
	Resolution	1mm
Temperature	Range	0 ~ 60°C
	Accuracy	±0.5°C
	Resolution	0.1°C
Conductivity	Range	0 to 200,000 us/cm
	Accuracy	± 1.0% typical
	Resolution	±1us/cm
Tilt	Range	±70° Vertical and horizontal axis
	Accuracy	±1° angles less than 45°
Communication	SDI-12	SDI-12 v1.3 Max.cable 50m
	Modbus	Modbus RTU Max.cable 500m
Display	Display	Velocity, flow, depth
	Application	Pipe, open channel, natural stream
Environment	Operation Temp	0°C ~60°C (water temperature)
	Storage Temp	-40°C ~75°C
	Protection Class	IP68
Others	Cable	Standard 15m, Max.500m
	Material	Epoxide resin sealed enclosure, stainless steel mounting fixture
	Size	135mm x 50mm x 20mm (LxWxH)
	Weight	1kg (with 15m cables)

• Calculator Specification

Installation	Wall mounted, Portable
Power Supply	AC: 85-265V DC: 12-28V
Protection Class	IP66
Operation Temp	-40°C ~75°C
Display	4.5 inch LCD
Output	Pulse, 4-20mA (flow, level) , RS485(Modbus) Opt. Data logger, GPRS
Weight	2.4kg
Data Logger	8GB
Application	Partial filled pipe: 150mm-6000mm Open channel: channel width >200mm

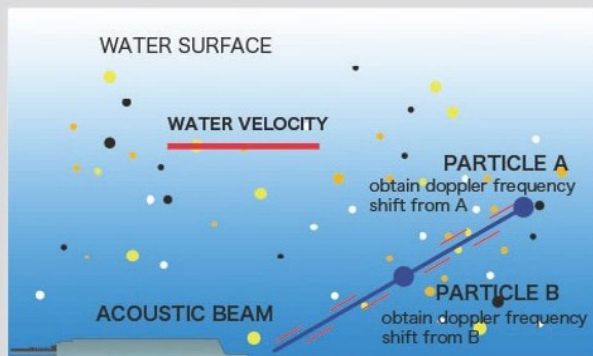
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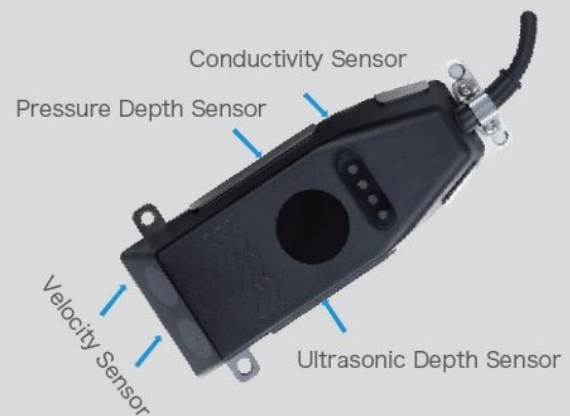
Working Principle >>>

• Velocity Measurement

Utilizes doppler ultrasonic principle: any moving liquid in pipeline has discontinuous turbulence. Turbulence may be caused by particles, air bubbles or turbulent surface. The turbulence makes the reflected acoustic wave occur doppler frequency shift Δf . The doppler frequency shift Δf is a function of velocity. So it is not suitable for pure water without any air. Also if too many particles or air bubbles, the acoustic wave and pipe sectional area will be influenced.



• velocity working principle figure



• depth working principle figure

• Depth Measurement

Pressure sensor is mounted at the bottom of or near water area to measure the fluid pressure, referring to the power signal cable hole atmosphere pressure and then liquid depth can be calculated by the pressure. At the same time pressure sensor is designed in special shapes, in order to reduce the influence of velocity. but it's worthy to pay attention when velocity $> 2\text{m/sec}$

• Flow Calculator

fluid flow formula : $Q = V \cdot S$

V—liquid velocity, S—liquid sectional area

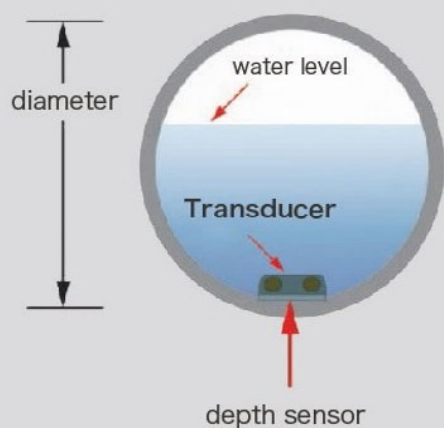
S function of liquid height and pipe inner diameter or open channel width,

$$S = f(D \cdot h)$$

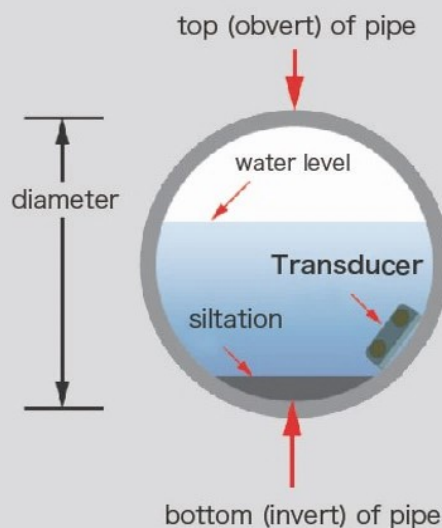
D—width(pipe inner or channel)

h—height

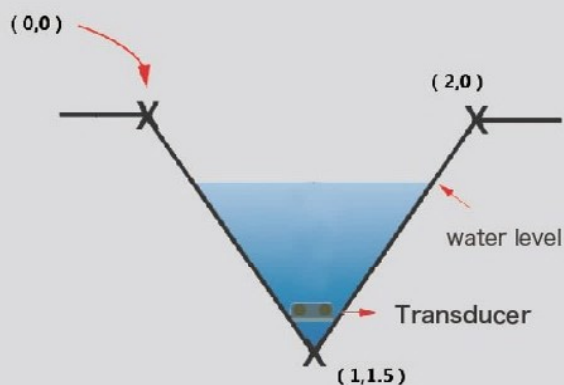
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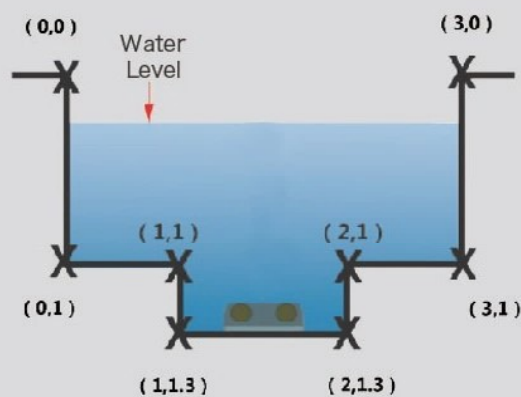
Partial Filled Pipe



Pipe with siltation on bottom



V-Notch Shape Channel



Polygonal Channel



Rectangular Channel

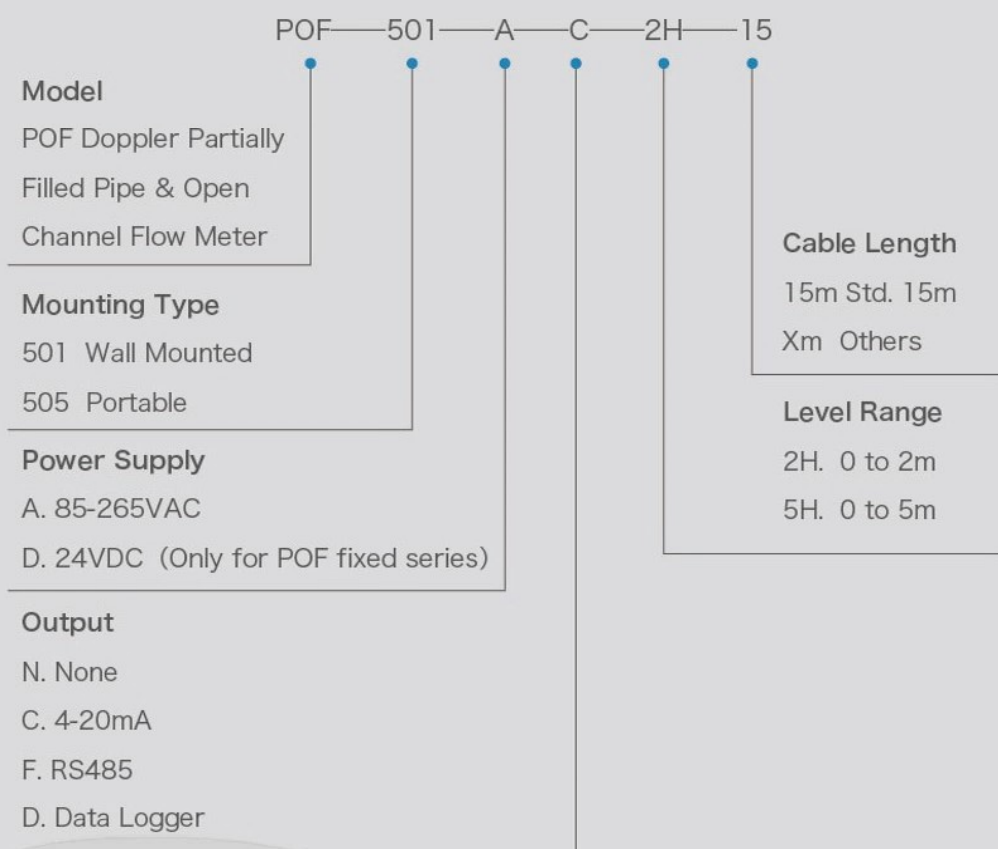


Irregular Shaped Channel

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Model Selection >>>



For Example: POF-501-A-C-2H-15

Stands for: Wall mounted doppler partially filled pipe & open channel flow meter, 85-265VAC power supply, 4-20mA, 2m level range, cable length is 15m.