Area-Velocity Ultrasonic Flow Meters

Features

- **Open Channel, River and Partially Filled Pipe applications**
- Excellent low flow rate measurement ability, low to 0.021 m/s
- Superior measurement accuracy
- 4-20mA, RS485(Modbus)/GPRS and SD card logger outputs
- Very suitable for sewage measurement
- User-friendly configurations
- Complete in specifications, and can provide a variety of applications

DMDF-OP-B Area-Velocity Ultrasonic Flow Meters

Principle

Velocity Measurement

When sound is reflected from a moving target, the frequency of sound is varied by the velocity of target. This variation is known as a Doppler shift.

To measure water velocity in open channels or pipes, DMDF-OP-B exploits the particles moving with the water as acoustic targets (or scatterers) from an instrument fixed to the bed, bank or bottom. Each Doppler shift is directly related to the water velocity component along the beam. This is a physical relationship and if you know the speed of sound in water you can calculate the velocity of the reflector and thereby the velocity of the surrounding water.

Level Measurement

Water level is measured using a solid state pressure sensor mounted underneath the DYNAMETERS transducer and vented to atmospheric pressure via a vent tube inside the signal cable. Water pressure is sensed via a pressure damping manifold which has been designed to sense level in front of the flow transducer.

Flow Rate Calculation

The flow formula: $Q=V \cdot A$

Where V——Fluid velocity

A——Cross-sectional area of flow

A is the function of liquid level and width of channels or inner diameter of pipes, $A=f(D \cdot h)$

Where D——Width of channels or inner diameter of pipes

h——Liquid level

DMDF-OP-B Fixed Area-Velocity Ultrasonic Flow Meters

DMDF-OP-B Flow Meter consists of flow calculator, DYNAMETERS integrated transducer to measure velocity and level at the same time.

Based on digital signal processing techniques, DMDF-OP-B is able to perform in a wide range of environments. It is used to measure flows in pipes, channels and streams and operates in a wide range of water qualities from fresh streams to primary sewage channels.

Flow Calculator

The flow calculator can display the velocity, level, flow rate and flow totalizer. It also can be available with 4-20mA, RS485(Modbus)/GPRS and SD card logger outputs.

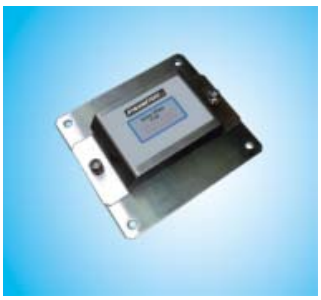
The flow calculator can calculate the cross-sectional area of partially filled pipe, open channel stream or river, for stream or river, it can input up to 20 coordinate points describing the river's shape of cross section. It is suitable for various applications.

Fixed Flow Calculator

Velocity and Level Transducer

One transducer can measure both velocity and level at the same time. This instrument is intended for economically recording flows in channels, rivers, culverts and pipes. It can also be used where existing techniques are unsuitable or too expensive. It is particularly useful at sites where no stable stage/velocity relationship exists and where flows are affected by variable tailwater conditions, culvert entry blockages, pipe surcharging, other unstable flow conditions, or even reverse flows.

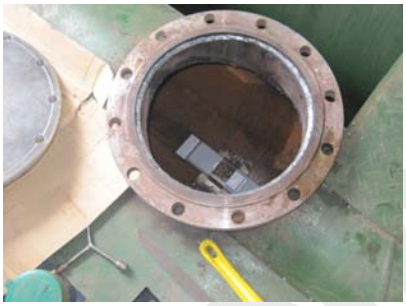
Transducer

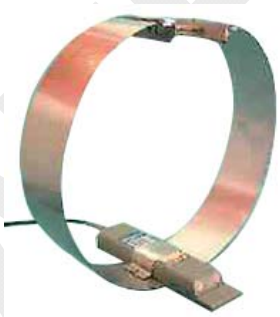


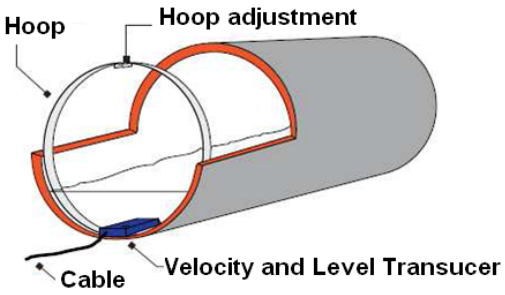
Mounting Bracket

DYNAMETERS velocity and level transducer is mounted on (or near to) the bottom of the channel/stream/pipe/culvert and measures the velocity and depth of the water flowing above it.

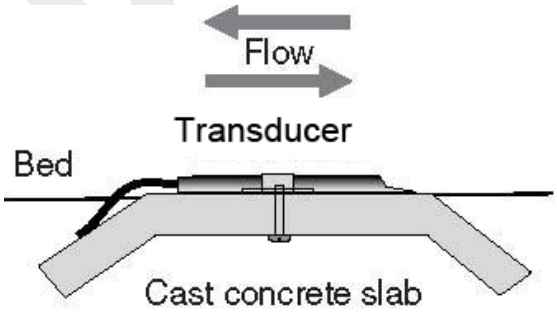
When installing transducer in pipes or culverts, users can directly weld the mounting bracket in pipe, and then put the transducer into mounting bracket. Or users can make an expanding hoop shown as below, weld the mounting bracket on it, put the transducer into the mounting bracket, and then fix the whole component into pipes.

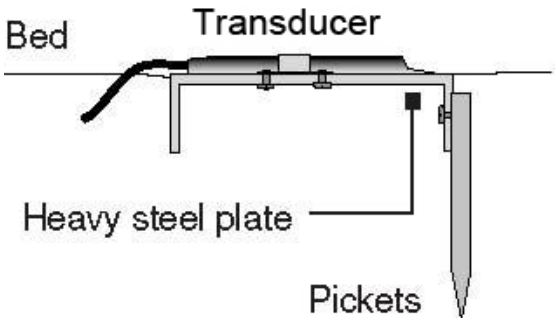




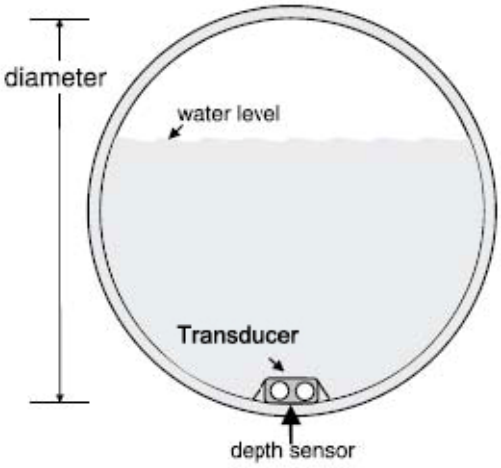


The transducer can also be located in the bed of a natural or artificial channel. Again it should be installed and located in such a way as below to avoid accumulating debris, being buried by alluvial material or getting washed away. The cable should be protected from damage.

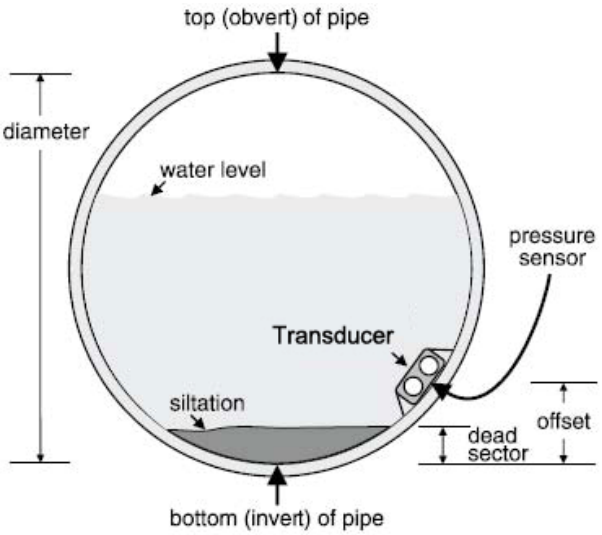




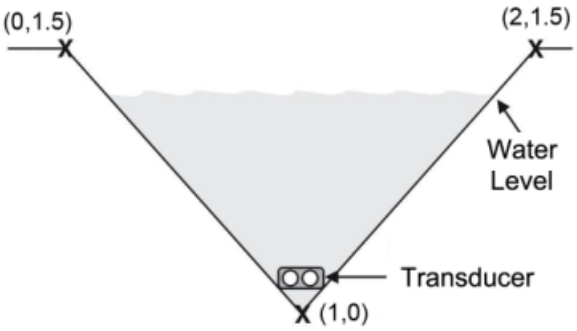
Typical Applications



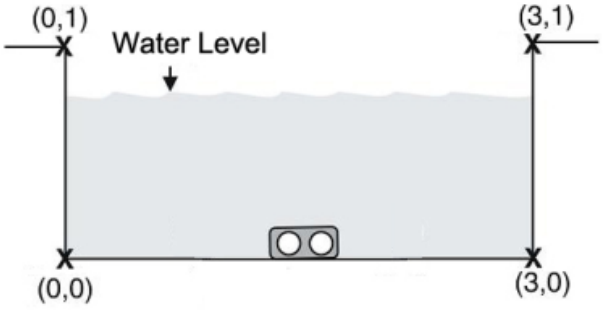
Application in pipe



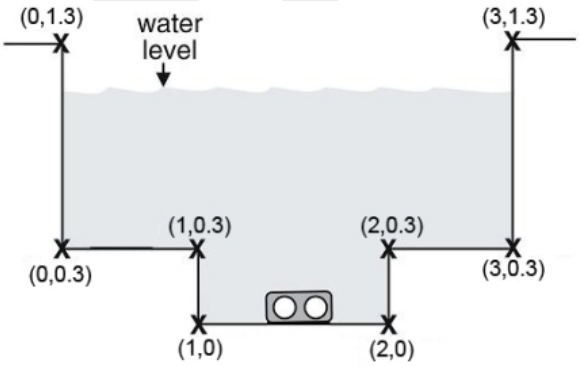
Application in pipe with siltation on bottom



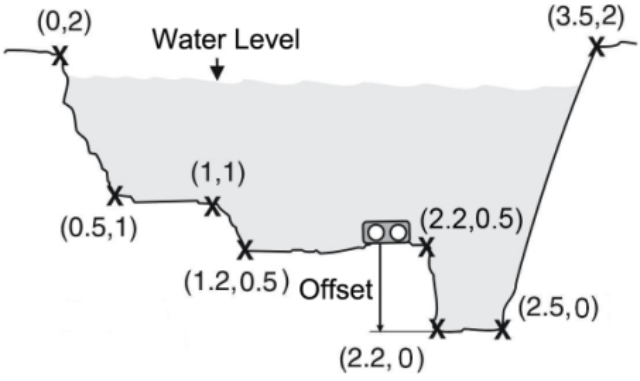
Application in Triangle channel



Application in Rectangular channel

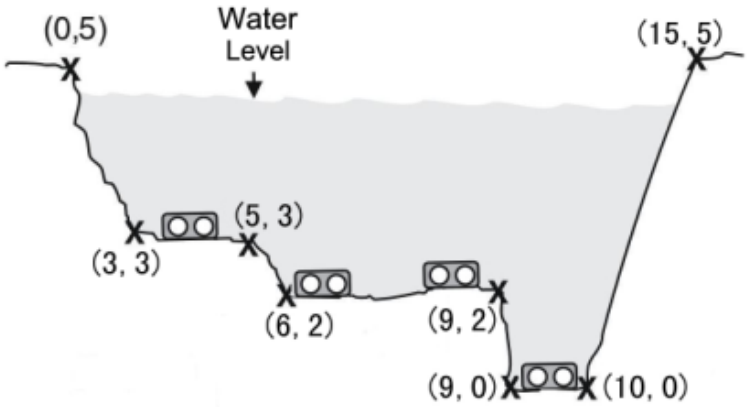


Application in Polygonal channel



Application in Irregular-shaped channel

While the width of river/channel is large, or the river's shape of cross section is rather complicated, we can provide DMDF-OP-B multi-path ultrasonic flow meter to get better accuracy. Its installation is simple, and users can change the installation point as require, high adaptability and high cost performance.



Technical Specifications

Fixed Flow Calculator

Transducer

Mounting Bracket

Measuring range	Pipe: 300-5000mm Channel: 200-5000mm	
Flow Calculator		
Enclosure	NEMA 4X [IP65], cast aluminum 260L×193W×80H (mm), 10.2L×7.6W×3.2H(inch)	
Power Supply	100~240VAC, 50/60 Hz ±5%, 5VA Max Or 12~28VDC, 2.5VA Max.	
Outputs	4-20mA, RS485(Modbus), GPRS, SD card logger	
Temperature	-40 to +70℃	
Velocity and Level Transducer		
Enclosure	290L×70W×25H(mm); 11.4L×2.8W×1H(inch)	
Material	PVC body, Stainless steel mounting bracket	
Accuracy	Velocity	2% of measured
	Level	±0.25% of calibrated lower range
Measuring Range	Velocity	21mm/s to 4500mm/s bidirectional
	Level	0 to 2m（D2） 0 to 5m（D5）
Temperature	0°C to 60°C water temperature	
Cable Length	15 meters, 9 way vented cable «SQL» Compatible	

Model Selection Table of DMDF-OP-B fixed flow Meters

MODEL DMDF-OP -B -X -X -X -X -X

Flow Calculator

F—Fixed

Power Supply

A—110VAC

B—220VAC

E—24VDC

S—Solar Supply

Output

N—None

A—4-20mA

R—RS485 (Modbus)

G—GPRS

S—SD Card

(Outputs R and G only can be selected one)

Level Range

D2—0 to 2m

D5—0 to 5m

Transducer Cable length

15m— Std. 15m, need more length, please contact us.

Example: DMDF-OP-B-F-B-AGS-D2-15m, it means DMDF-OP-B fixed flowmeters, 220VAC power supply; 4-20mA, GPRS and SD card outputs, level range is 0 to 2m, and the transducer cable length is 15m.

DMDF-OP-B Portable Area-Velocity Ultrasonic Flow Meters

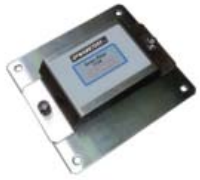
We also can provide DMDF-OP-B Portable Area-Velocity Ultrasonic Flow Meters.

A set of DMDF-OP -B Portable Flow meters

Technical Specifications

Portable Flow Calculator

Transducer



Mounting Bracket

Measuring range	Pipe: 300-5000mm Channel: 200-5000mm	
Flow Calculator		
Enclosure	NEMA 4X [IP65], ABS 358L×250W×150H (mm), 14.1L×9.8W×5.9H(inch)	
Power Supply	Rechargeable built-in lithium battery, 12VDC, 12Ah, Over 50 hours working time on a full-charge Charger: 110/220VAC, 50/60 Hz ±5%, 3A Max	
Outputs	4-20mA, RS485(Modbus), GPRS	
Temperature	-40 to +70℃	
Velocity and Level Transducer		
Enclosure	290L×70W×25H(mm); 11.4L×2.8W×1H(inch)	
Material	PVC body, Stainless steel mounting bracket	
Accuracy	Velocity	2% of measured
	Level	±0.25% of calibrated lower range
Measuring Range	Velocity	0.021m/s to 4.5m/s bidirectional
	Level	0 to 2m（D2） 0 to 5m（D5）
Temperature	0°C to 60°C water temperature	
Cable Length	15 meters, 9 way vented cable «SQL» Compatible	

Model Selection Table of DMDF-OP-B Portable Flowmeters

MODEL DMDF-OP -B -X -X -X -X -X

Flow Calculator

P-Portable

Charging

A-110VAC

B-220VAC

Output

N—None

A—4-20mA

R—RS485 (Modbus)

G—GPRS

(Outputs R and G only can be selected one)

Level Range

D2—0 to 2m

D5—0 to 5m

Transducer Cable length

15m— Std. 15m, need more length, please contact us.

Example: DMDF-OP-B-P-B-AG-D2-15m, it means DMDF-OP-B portable flowmeters, 220VAC charging power supply; 4-20mA and GPRS outputs, level range is 0 to 2m, and the transducer cable length is 15m.

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