KANOMAX
The Ultimate Measurements

Void Measurement

BubbleMaster

Two-phase Flow Measurement System

This system detects individual bubble size and velocity using reflected light intensity technology that changes when a bubble penetrates through the tip of the wedge-shaped optical fiber.

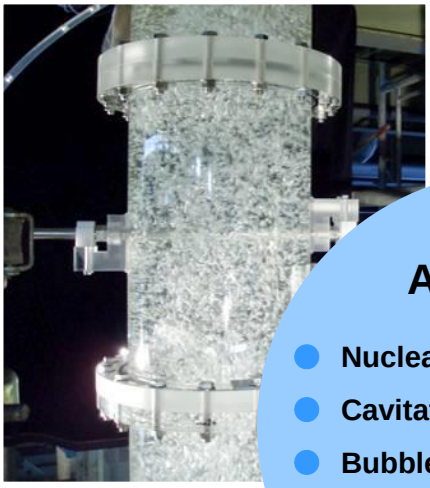
Measures bubble size and velocity simultaneously

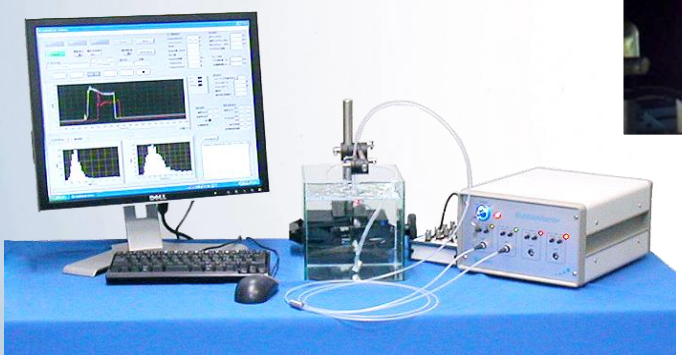
Applicable to nonconductive fluid

Highly accurate measurements derived from the correction calculation of the contact angle
(F-TOP Sensor)

System Configuration

Fiber optics unit
Highly accurate 4-tip optical fiber
A/D converter
Computer
Measurement software





Application

- Nuclear reactor coolant
- Cavitation research
- Bubble column
- Gaseous diffusion in solution

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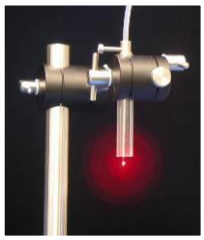
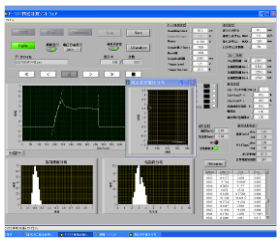
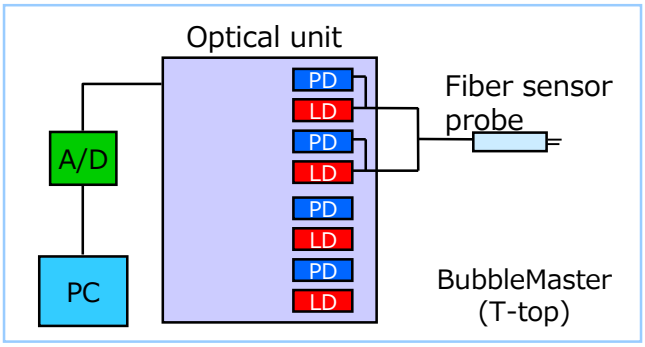
Specification

Measurement Method	Photoelectric detection
Feature	Simultaneous measurement of bubble velocity and diameter
Sensor	Wedge-shaped fiber
Measurable bubble size	1.0 mm ~
Max flow rate	10 m/s
Measurement Software	
Sampling system	Burst signal sampling
Real time monitor	Photoelectric conversion output signal
Data acquisition	Max. 100,000 (No. of bubbles)
Analysis display	Bubble velocity, bubble diameter, OK/NG
	Burst signal waveform
	Average, Standard deviation
Data table	Bubble velocity, Bubble size, OK/NG
Histogram chart	Bubble velocity, Bubble size



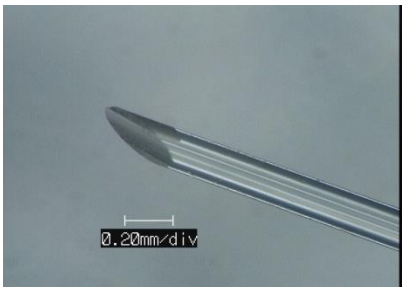


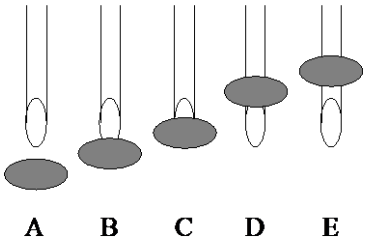
Block Diagram

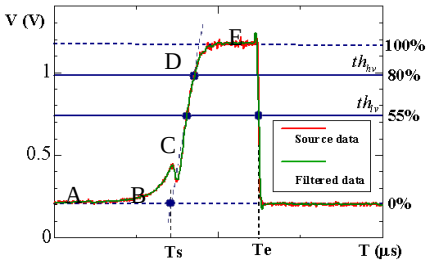


S-TOP Sensor Principle

The signal change is detected when a bubble contacts and penetrates the sensor.

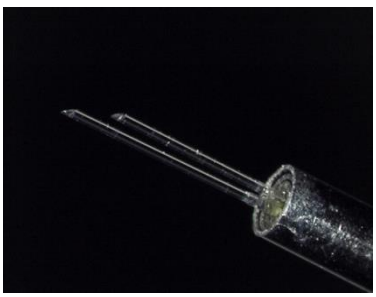


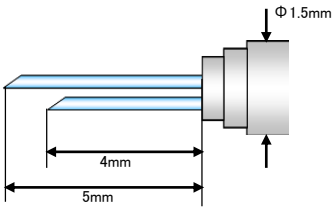


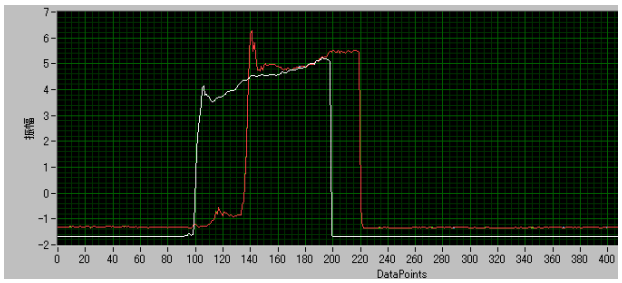


T-TOP Sensor Principle

Velocity is calculated based on the temporal differences of a bubble passing through two sensors.

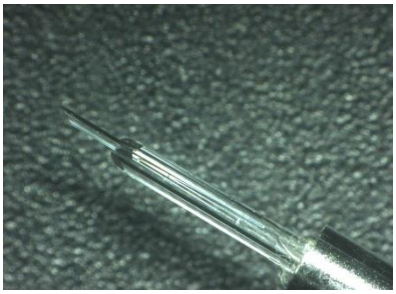


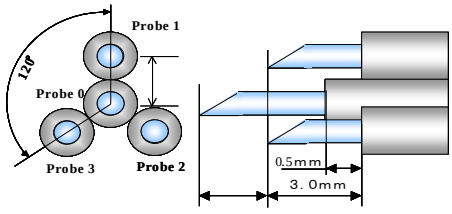


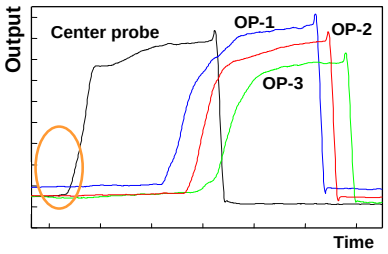


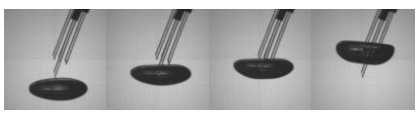
F-TOP Sensor Principle

The F-TOP Sensor delivers a highly accurate measurement by having four integrated wedge-shaped optical fibers in one. Based on the phase difference and gradient of each optical fiber sensor detection signal, the bubble entry angle is calculated and corrected.









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Project leader: Prof. Takayuki Saito, Shizuoka University