KANOMAX
The Ultimate Measurements

Void Measurement

BubbleMaster

Two-phase Flow Measurement System

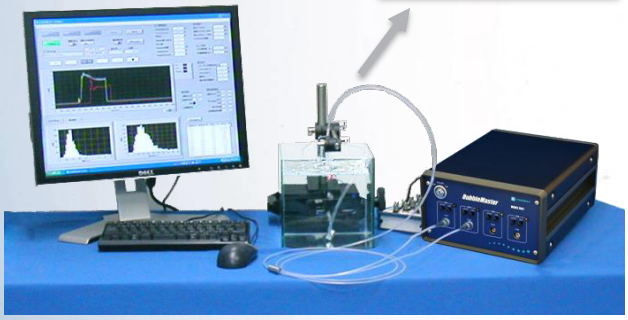
Model 7961

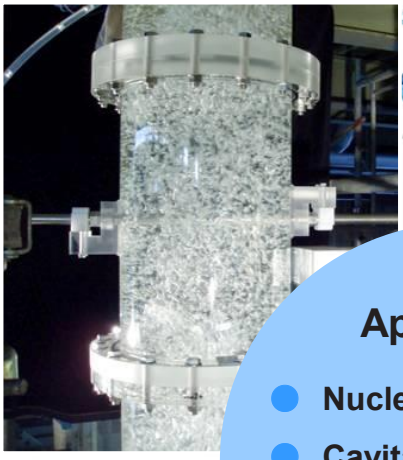
This system detects individual bubble size and velocity using reflected light intensity technology that changes when a bubble penetrates through the tip of the wedge-shaped optical fiber.

- **Measures bubble size and velocity simultaneously**
- **Applicable to nonconductive fluid**
- **Highly accurate measurements derived from the correction of the contact angle (F-TOP Sensor)**

System Configuration

Fiber optics unit
Fiber sensor probe
A/D converter
Computer
Measurement software





Application

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

KANOMAX USA, INC.
219 US HWY 206
ANDOVER, NJ 07821 USA
TEL: 973-786-6386
FAX: 973-786-7586
E-MAIL: SALES@KANOMAX-USA.COM
URL: WWW.KANOMAX-USA.COM

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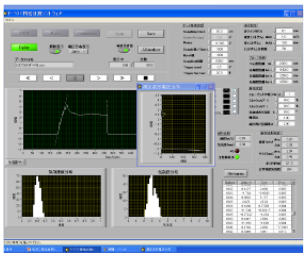
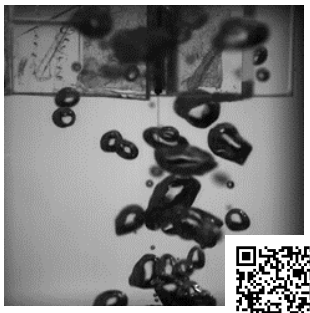
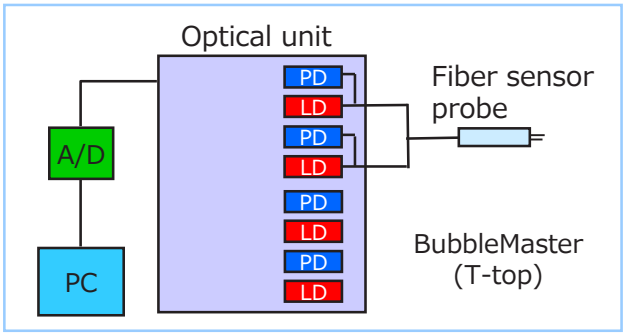
Specification

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	< 5 m/s
Measurement Software	
Sampling mode	Trigger mode Continuous sampling mode
Real time monitor	Photoelectric conversion output signal
Data acquisition	Max. 100,000 (number of bubbles)
Analysis display	S-TOP: bubble signal waveform, void fraction T-TOP/F-TOP: addition to above, bubble velocity, bubble diameter, average value, standard deviation
Data table	Bubble velocity, Bubble size
Histogram chart	Bubble velocity, Bubble size



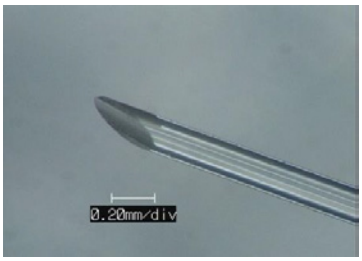


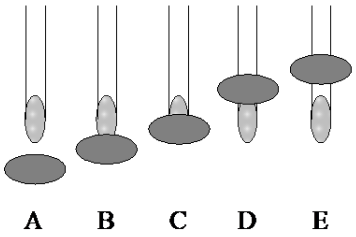
Block Diagram

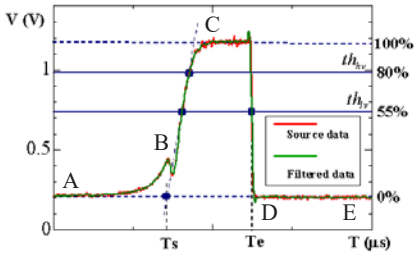


S-TOP Sensor Principle

The signal change is detected when a bubble contacts and penetrates the sensor, by which transit time of the bubble is to be obtained and time-averaged void fraction is to be calculated.

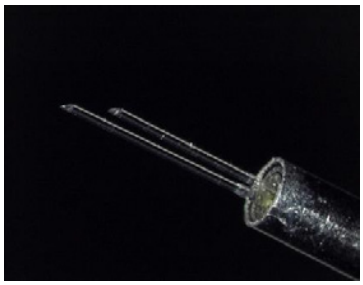


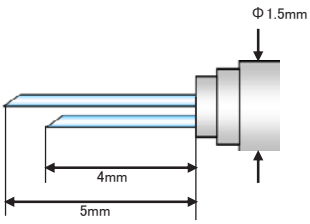


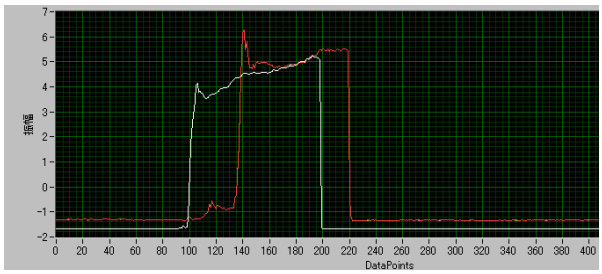


T-TOP Sensor Principle

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







※S-TOP, T-TOP sensor:
heat and pressure resistant type can be also offered upon consultation

F-TOP Sensor Principle

The F-TOP Sensor delivers a highly accurate measurement by having four integrated wedge-shaped optical fibers in one. By the phase difference and gradient of each optical fiber sensor detection signal, the bubble entry angle is calculated and an error of bubble size by the penetration angle can be reduced.