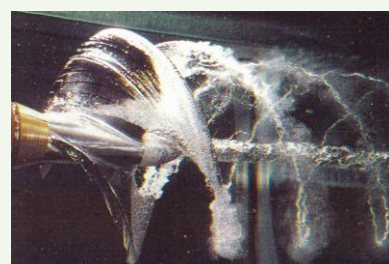


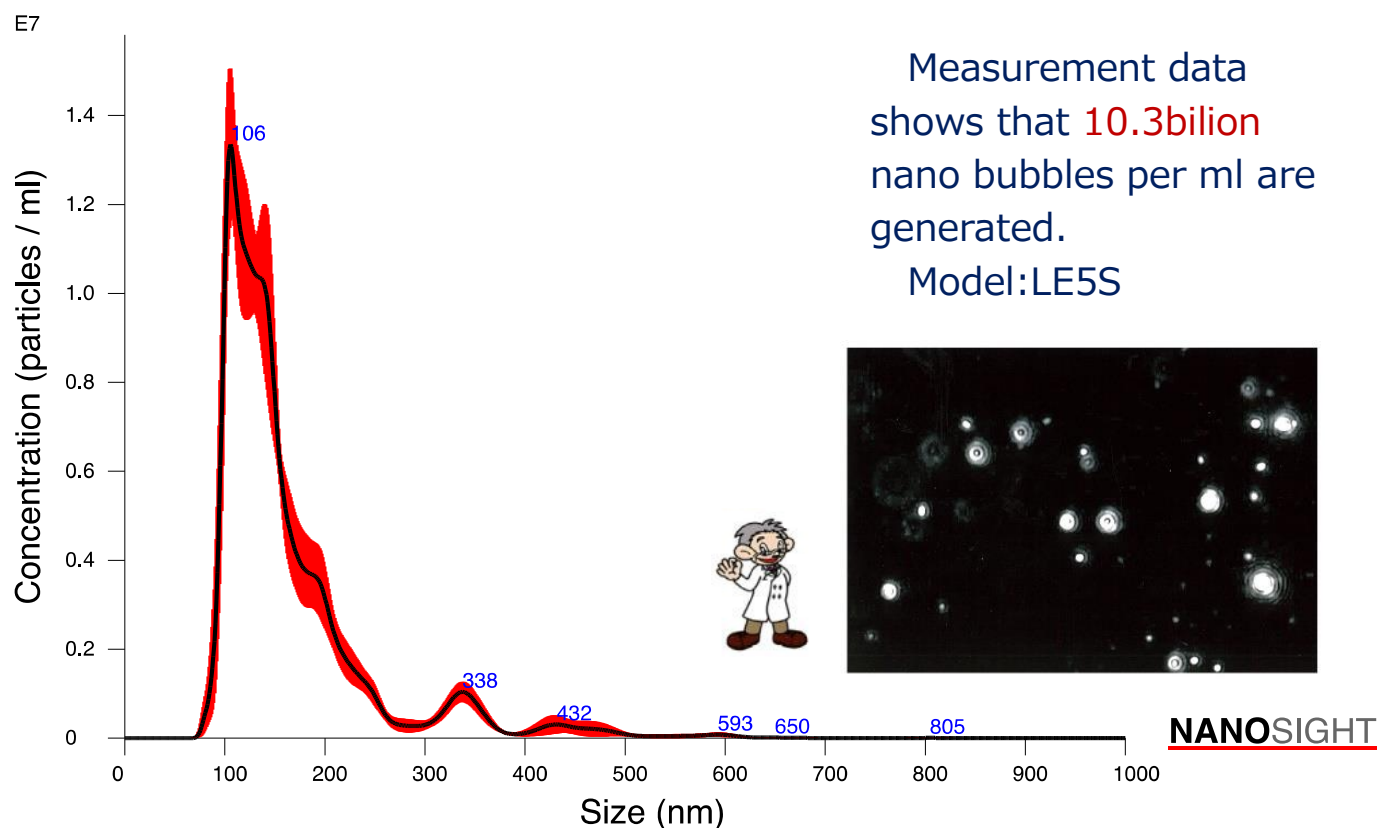
M. Takahashi have studied and engaged in R&D of 'Ultrasonic fish finder' in the ultrasound laboratory of Shibaura Institute of technology in the late 1950s. Tips is that he found the fine-bubbles generated from the fishing boat screw of old model in the process of development of fish finder. That was found because of cavitation phenomenon. It led to the development of fine-bubble generator. He decided to start development applications of fine-bubble.

We have been supported a number of the "encounters" for our history of research and development of 50 years. We have developed the "original products such as" unit filtration device", "Bubbling nozzle that can be broken down", "light catalyst filtration device" and others in addition to the "fine-bubble generation technology"



Cavitation due to the screw of fishing boat.

Ultrasound laboratory, Shibaura Institute of Technology (1964)  
M. Takahashi is sitting in the front row far left



## LIVINGENERGIES & Co.

[Manufacturer]

☎ 055-956-3384 📠 050-3852-2412

URL : <https://www.livingenergies.biz/>

E-mail : [info@livingenergies.biz](mailto:info@livingenergies.biz)

We provide a wide range of machines and we have more machines than in this catalog. We are also happy to take orders for OEM and custom-made devices.

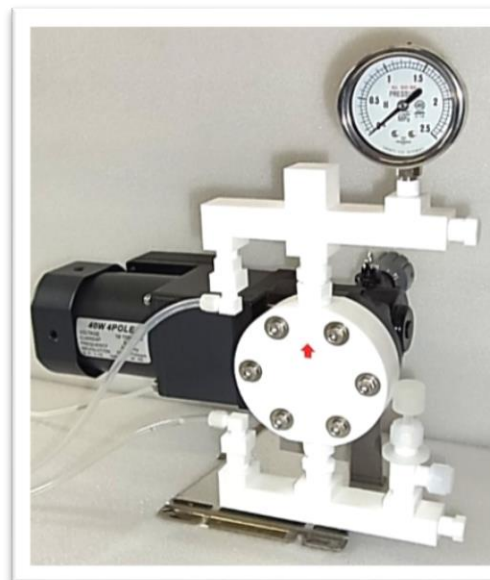
# Micro/Nano-bubble generator

● Micro/Nano-bubbling for organic solvent, acidic/alkali solution and oils.

LAB Model / High density and low flow rate.

● Oxygen, Hydrogen, Nitrogen, Ozone, CO<sub>2</sub> can be bubbled.

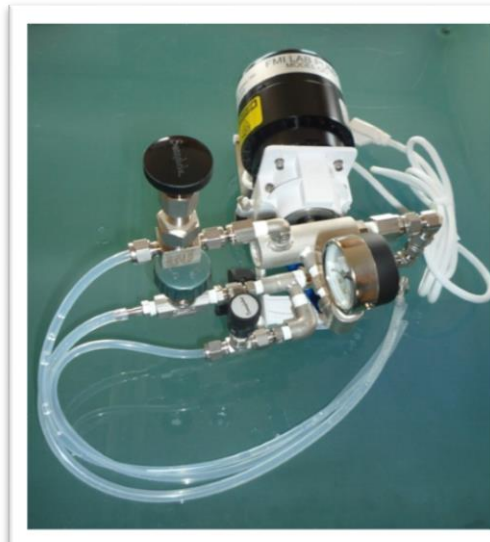
**Model LE3FS** Main wetted parts are made of PTFE. Chemical resist model.



Dimension mm	H380× W360× D210
Weight Kg	7.45
Voltage V	AC100-110
Power W	40
Frequency Hz	50/60
Flow Scope ml.	120-150
Fluid Temperature °C	≤70
Wetted Materials	PTFE·Ceramic·Silicon
Fluid Viscosity mPa·s	≤50

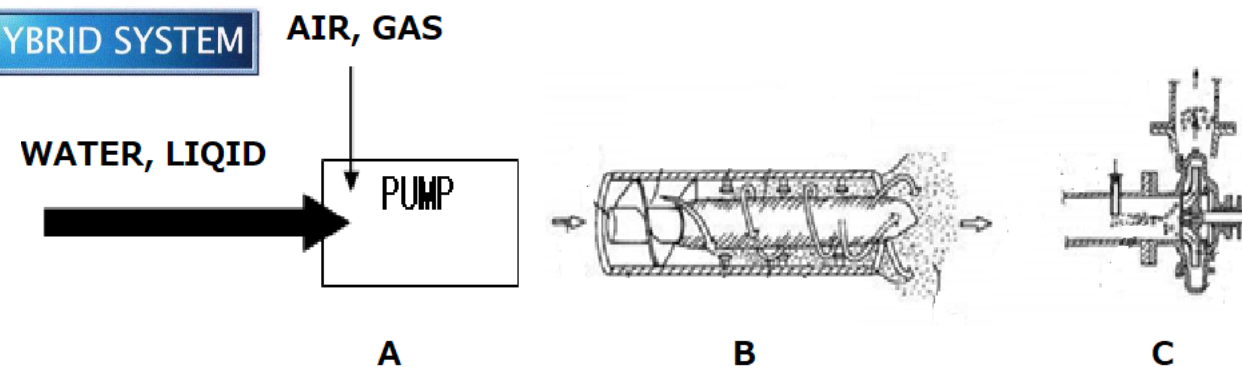
※Pressure gage of SUS can be replace to PTFE plug.

**Model LE5S** Stainless steel model. Widely used in bubbling organic solvent.



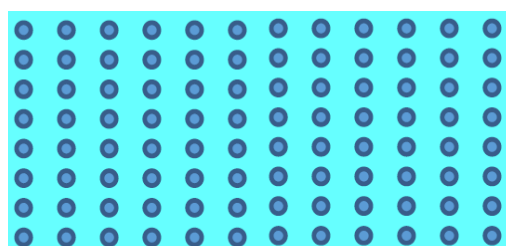
Dimension mm	H190× W300× D220
Weight Kg	4.75
Voltage V	AC100-110
Power A	1.3
Frequency Hz	50/60
Flow Scope ℓ /ml.	200-300
Fluid Temperature °C	120
Wetted Materials	SUS·Ceramic·Silicon

## HYBRID SYSTEM



◆ Gas/Air is fed in (A) and put a pressure and mix in (B), and release pressure to make bubbles in (C).

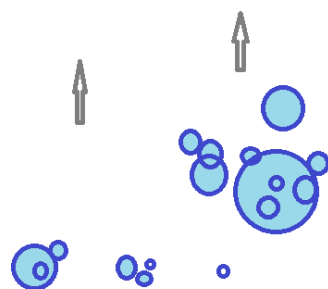
## Hybrid method



© Same size of nanobubbles have same zeta potentials, so they disperse and never stick each other.

That means that they hold themselves stably and exist in water such a long time in high density.

## × Other methods



× Low density × ununiformity

× Ununiformed bubbles stick together because of different zeta potentials. It tends to be low concentration.



## ● APPLICATIONS

Water purification, cleaning, nursing, fermentation, sterilization, deodorant, aeration, degassing, chemical reaction synthesis, emulsion, liquid-

liquid mixing, dispersion, dental mouthwash, atopic medical treatment and nursing care bathing, agricultural water, high concentration hydrogen water other

● Gas ... Ozone, oxygen, hydrogen, argon, nitrogen, carbon dioxide and other

● Liquid ... Water, an organic solvent, oil, even highly viscous liquid.

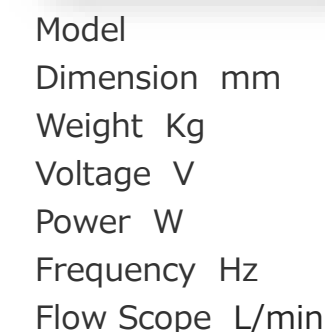
Please ask details.

## Handy model - Large scale model Widely used in variety fields .

Model	: FU11
Dimension mm	: H500×D260×W550
Weight Kg	: 14
Voltage V	: AC100V/AC220
Power W	: 750W
Frequency Hz	: 50/60Hz
Flow Scope ml.	: 11 – 20L/min.
Fluid Temperature °C	: 40°C
Attachments	: Horses, Strainer, Switch



Model	: LEA15S
Dimension mm	: H710×D490×W500
Weight Kg	: 36
Voltage V	: AC100V.
Power W	: 650W
Frequency Hz	: 50/60 Hz
Flow Scope ml.	: 15L/min.
Fluid Temperature °C	: 40°C
Attachments	: Horses, Strainer, Switch



Model	: LEX50
Dimension mm	: H800×D786×W440
Weight Kg	: 65
Voltage V	: 3相200
Power W	: 1.1
Frequency Hz	: 50/60
Flow Scope L/min.	: 40-60



Model	: LEX200
Dimension mm	: H1336×D1000×W365
Weight Kg	: 220
Voltage V	: 3相200
Power W	: 5.5
Frequency Hz	: 50/60
Flow Scope L/min.	: 80-12

● Flow rates could be changed depends on various factors.