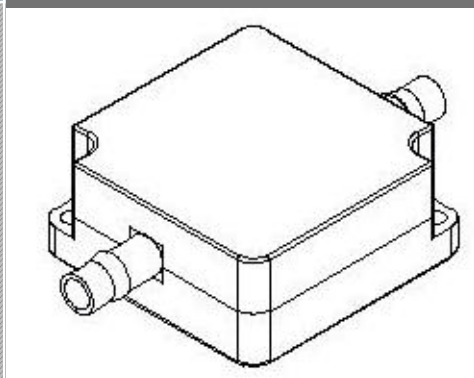




Piezoelctric Pump Manual

Specification

This specification includes the main parameter, application and advantages of Piezoelectric Pump product, aiming to provide perfect solutions for fluid transmission.



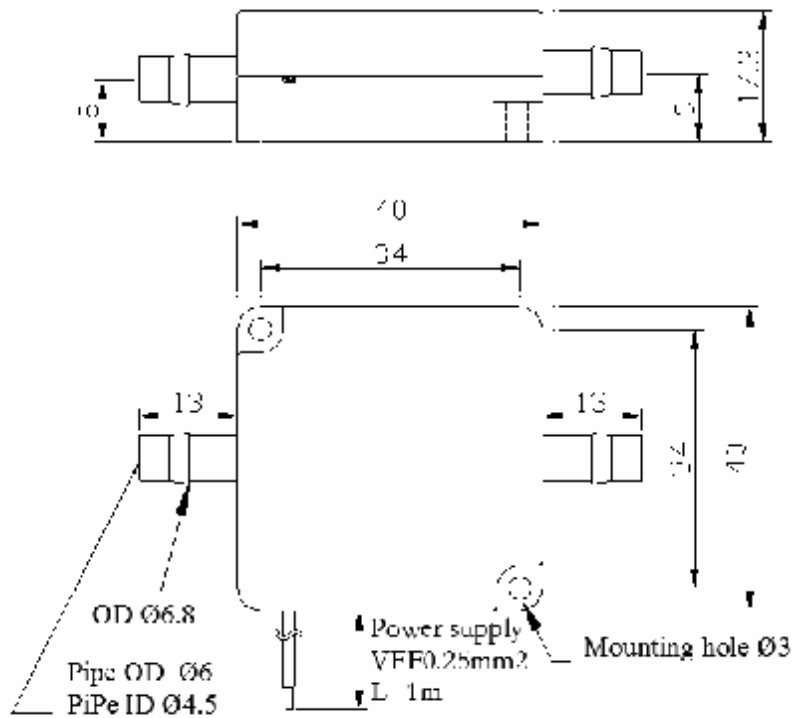
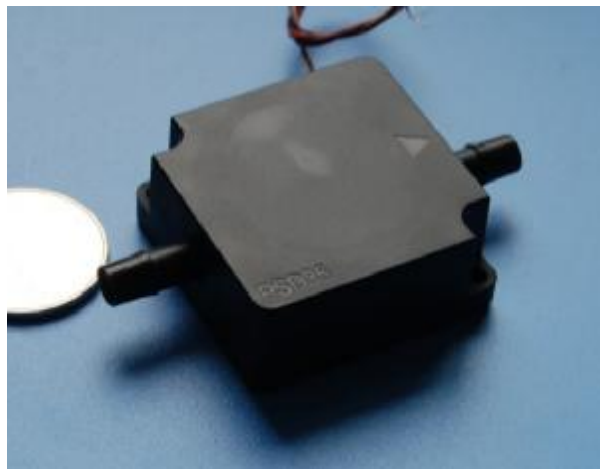
Piezoelctric Pump R&D Center
Changzhou Zhi Bang Electronics Technology Co. Ltd

04/06/2011





Types	Drive voltage	consumption	Suction pressure(kPa)	Flowrate (ml/min)	Output pressure(kPa)	materials			Weight (g)
						Housing body	Wetting material	"O" sealer	
PSD35	AC130V 200HZ	1.7W	2	400	20	ABS	PET	Butyl Rubber	45





1. Working Principle

piezoelectric pump produced in Zhibang TEC. includes piezoelectric membrane and single passive check-valve, see Fig.1, and the working principle is shown below:

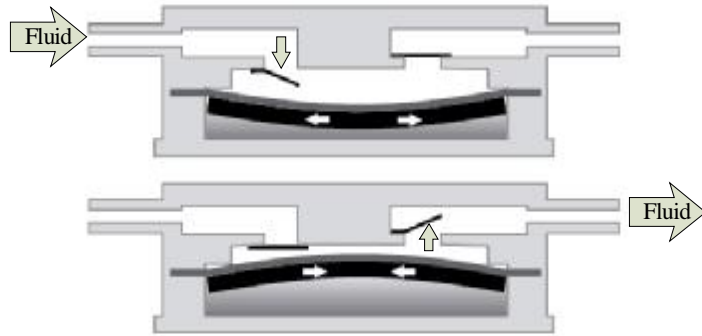


Fig.1 the working principle of piezoelectric pump

There is one or several cavities formed between the membrane and single passive check-valve. When there is alternating signal, membrane has a to-and fro vibration, which induces the cubage change. The cubage changing times is identical with the frequency of alternating signal. Supported by the single check-valve, the fluid single direction transmission can be realized. When there are several piezoelectric membranes formed this kind of vacuum cavities, it's called multi-cavity pump. There are two kinds of basic connections among vacuum cavity, series connection and parallel connection.

2. Typical Working characteristic

It's easy to be realized for all the requirement when the flow rate is 0~5L/min, outlet blocking is 0~80kPa. Meanwhile, there is also customer-oriented products, micro-pump and electric driving controller, and which can be integrated into complicated systems.

The output performance changes in piezoelectric pump when there are changes in voltage, frequency, outlet blocking and viscosity, take PSD35 for example, there are working performance pictures following.

There is good linear relationship between output flow rate and working frequency in piezoelectric pump, see Fig.2. This linear relationship is local, which needs to be specialized, that means when the frequency exceeds the linear area, there will be non-linear relationship happens.

In Fig.3, there is the relationship between flow rate and outlet blocking (load), as the outlet blocking increases, there will be a reduction in the flow rate, which is absolutely linear.



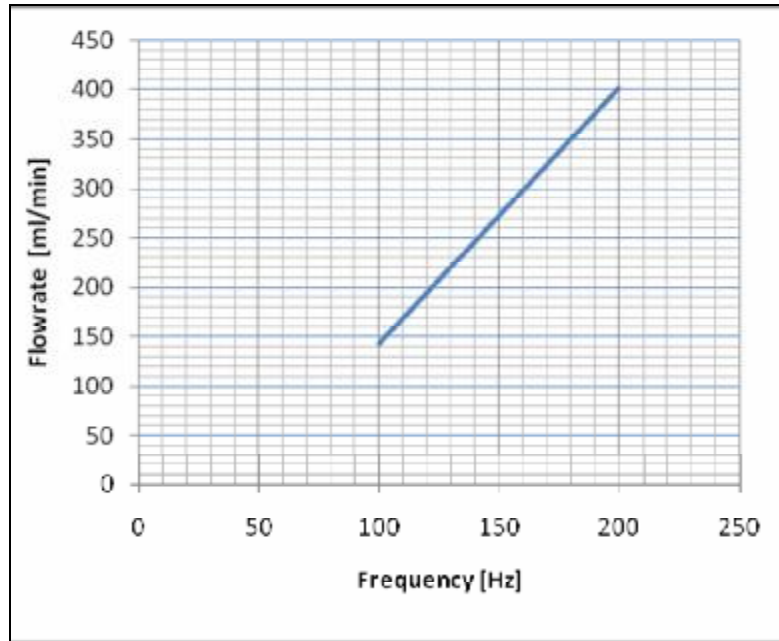


Fig.2 Relationship between frequency and flowrate

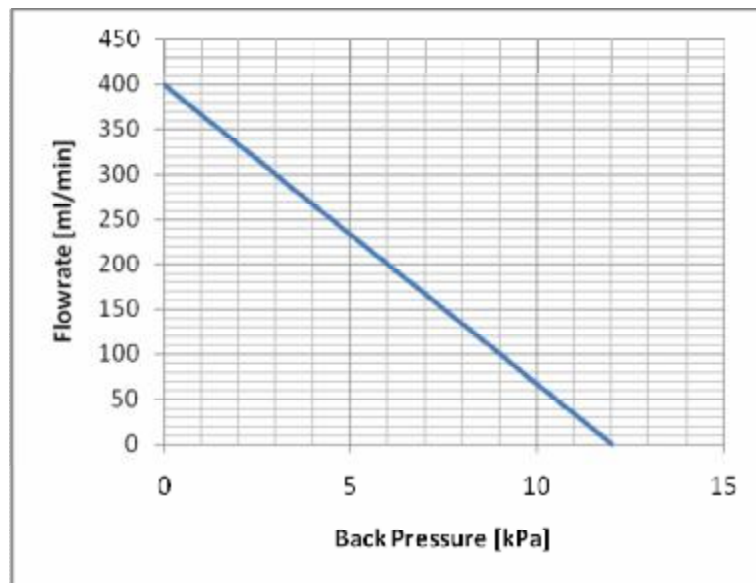


Fig.3 Relationship between flow rate and outlet blocking pressure

There is linear relationship between driving voltage and output flow rate shown in Fig.4, within the voltage allowance of piezoelectric membrane, the amplitude of membrane increases with the driving voltage increases, and the corresponding output flow rate increase, too.



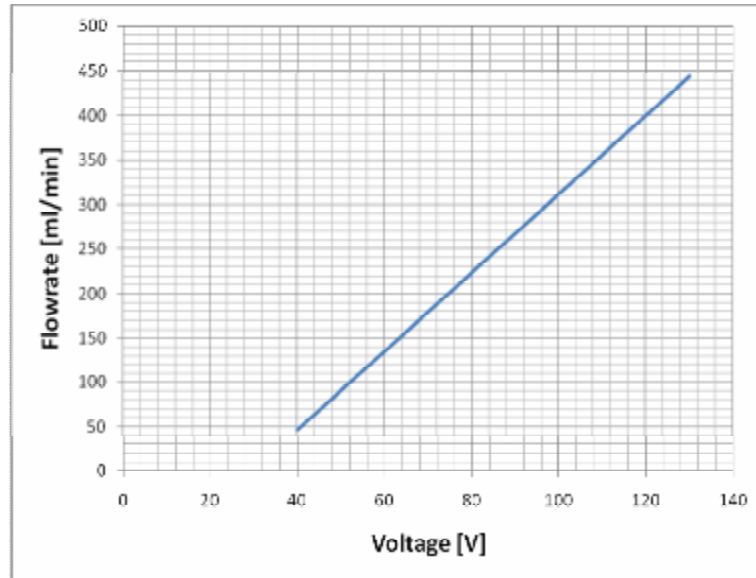


Fig.4 Relationship between flow rate and driving voltage

Optimized working frequency, when has the maximum output flow rate, has big business to do with the viscosity of delivered liquid. The smaller the viscosity is, the higher the optimized working frequency is. See Fig.5.

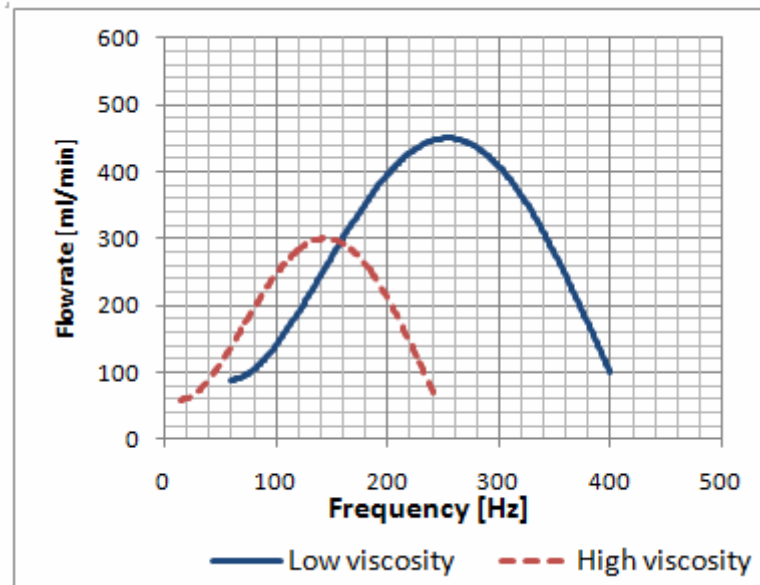


Fig.5 Relationship between flow rate and frequency at various liquid viscosities

The medium in the piezoelectric pump can be liquid or air, the grain in the liquid should be between 50 μ m, and not easy to gather together. The air in liquid may influence the flowrate

3. Characteristic





Compared with traditional solenoid pump, piezoelectric pump has some notable characteristic:

Small size, low weight, see Section5;

Low power: the power of two present products is 0.05W and 1.8W respectively.

No solenoid interferer: driven by piezoelectric membrane directly, no solenoid coil;

Long lifetime: no motor, shaft and other running components like traditional pump;

Self cooling: the heat caused by the membrane vibration is small, which can be transmitted by the flowing medium, therefore, the pump can be used in long and continuous working surrounding;

Adapt to different liquid: water, alcohol, hydrochloric acid, and so on;

Easy to control the flowrate: see Fig.4, there is linear relationship between output performance and the voltage; just change the voltage, the outflow rate can be controlled precisely. Meanwhile, the flow rate can be controlled by frequency.

4. Application

Piezoelectric pump can transmit small quantity of air or liquid, or the mixture of air and liquid, which is the critical part of the micro-fluidic system, and in numbers of fields, it's indispensable, for example, the guide micro system for lubricating supply system, cooling system for liquid, scope moist system and perfume supply, and the steam iron device, amylum plasm delivery device, and so on. More profound, higher range application like high end medical treatment device and biologic chemical analysis equipment and so on. The application is shown in Fig.6.



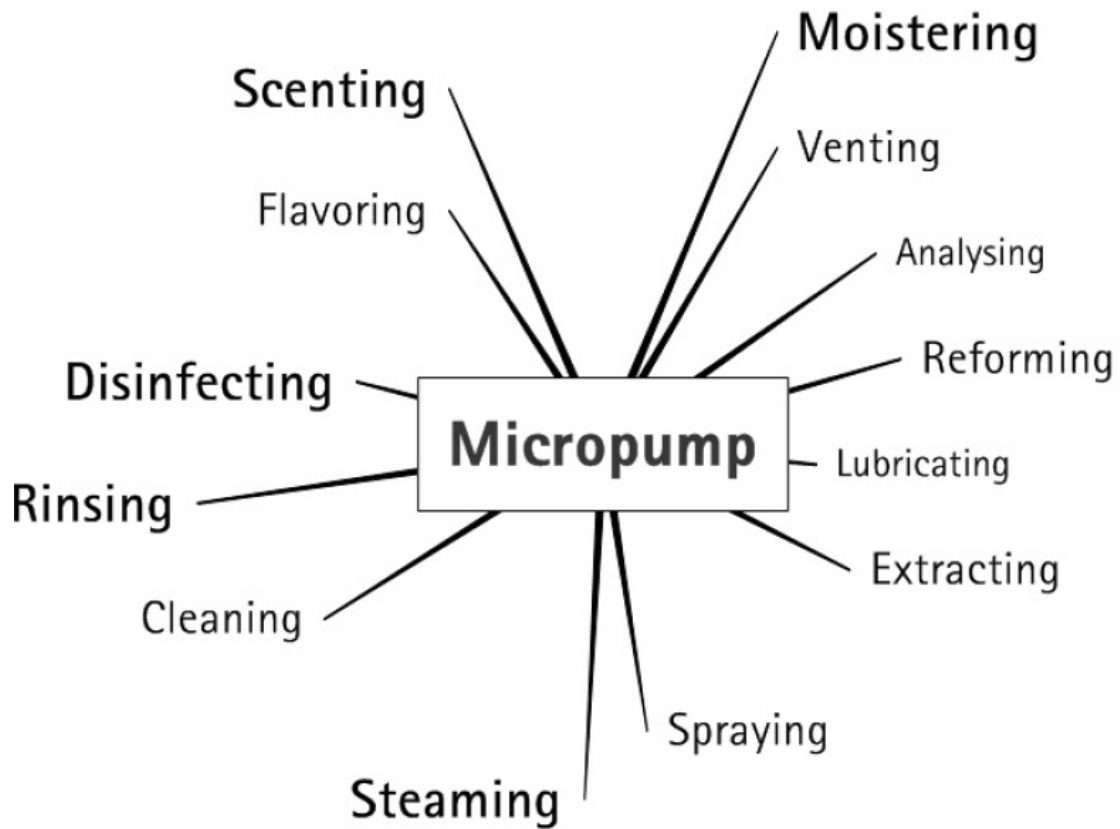


Fig.6 The application of piezoelectric pump

5 Present products

