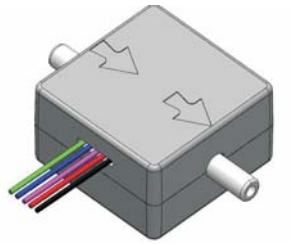
CurieJet™ Low-Power MicroPump

PS15I/GS15I

Piezoelectric Diaphragm MicroPump

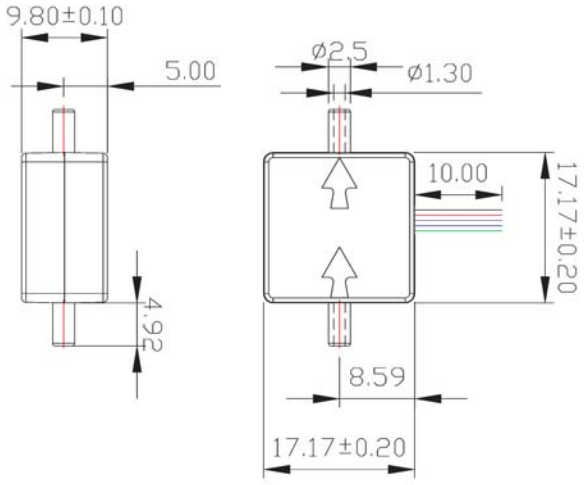


DataSheet

Specifications

Dimensions (L x W x T)	17.5 x 17.5 x 10 mm (refer to the drawing also)
Inlet/Outlet (ID / OD / H)	1.3 / 2.5 / 5 mm (refer to the drawing also)
Mass	5g
Storage Temperature	-20℃ to 70℃(refer to Figure 1 also)
Operating Temperature	-20℃ to 70℃(refer to Figure 1 also)
Wetted part material	Polyimide, POM, EPDM(or *Teflon), 304 Stainless Steel
Power Consumption	Normal version : 0.2 ~ 0.5 W (depending on FlowRate/ driving frequency)
	LessPower version: 0.05 ~ 0.25 W (depending on FlowRate/ driving frequency)
Flow rate**	0.5 ~ 7 ml/min by 25℃ water (Depending on driving frequency)
	0.5 ~ 3 ml/min by air (Depending on driving frequency)
Pumping Pressure	30 ~ 35kPa by 25℃ water (Depending on driving frequency)
	2 ~ 3.5kPa by air (Depending on driving frequency)
Suction Pressure	2 ~ 3.5kPa (Dry running)
Repeat accuracy	±15%
Life time	>5000 hours
Particle Tolerance	<100um
Liquid viscosity	<500 cP(refer to Figure 3 also)

Note:
1.* EPDM as default. Optional Teflon version is available upon request.
2.** Flow rate depends on the tube length and the data tested with 10cm length inlet/oulet tube.
3.Specifications are subject to change without notice.



Dimension in mm

Performance

The customer should realize that the flow rate is affected by the temperature and the blocking pressure, as Figure 1 shown. The maximum flow rate appears at the resonant frequency of the whole fluidic system, as referring to Figure 2.

The maximum flow rate and the corresponding resonant frequency are influenced by the tubing material and size, the fluid properties and the system volume. Besides, any un-solvable particles or fibers in the fluid may more or less influence the pumping performance. Especially, the fibers are likely to be trapped at the valve and thus the function of the valve is diminished.

According to our tests, the particles with diameter below 100μm in the fluid can be pumped smoothly. But, a large quantity of particles will decrease the pumping performance to some extent.

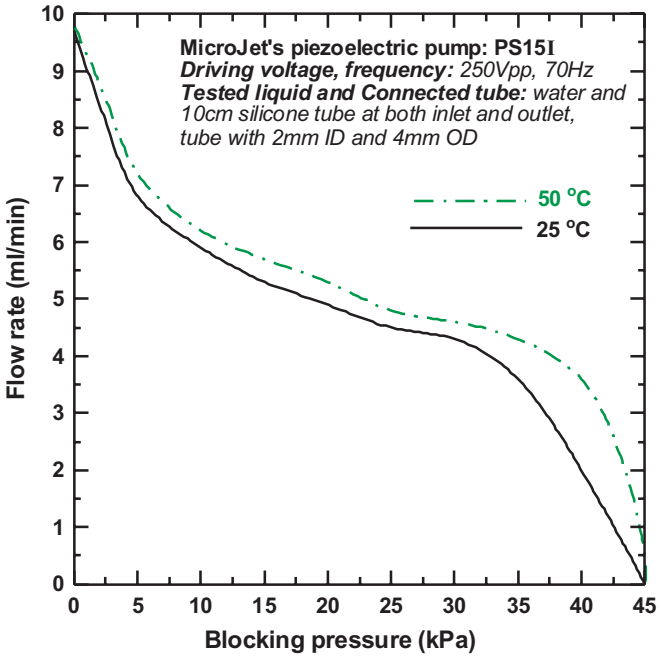


Figure 1. Relation of flow rate and outlet blocking pressure at various temperatures.

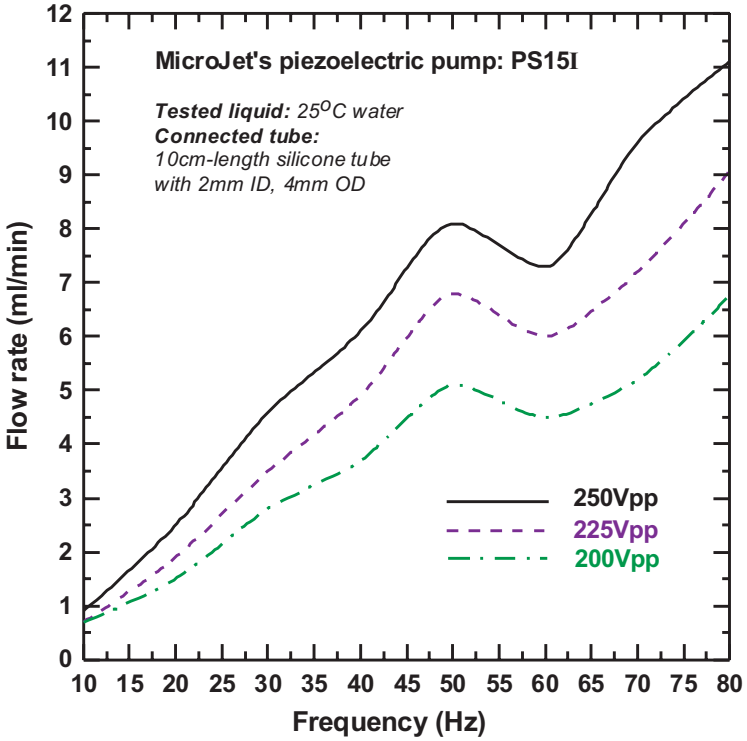
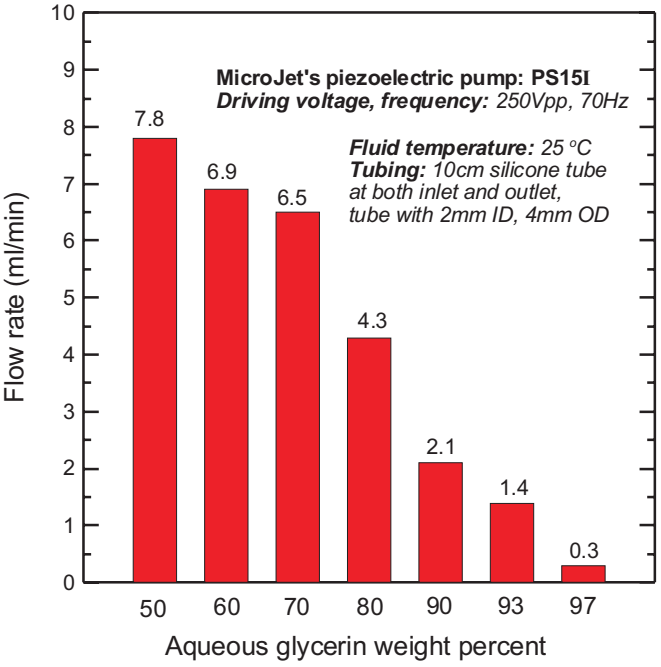


Figure 2. Frequency responses of flow rate at three driving voltages of actuator.



Weight percent	50	60	70	80	90	93	97
20 C viscosity (cP)	6.00	10.8	22.5	60.1	219	367	765
30 C viscosity (cP)	4.21	7.19	14.1	33.9	109	172	340

Figure 3. Effect of liquid viscosity on flow rate.

Ordering Information (Please refer Curiejet MicroPump Catalog for version definition)

- PS15I (5Vdc, Specified FlowRate, LessPower)
- PS15I (5Vdc, Specified FlowRate)
- PS15I (9Vdc, Specified FlowRate)
- PS15I (12Vdc, Specified FlowRate)

  /* For PS15I, Specified FlowRate can be any value between 0.5ml/min and 7 ml/min */

- PS15I (5Vdc, DualControl, LessPower)
- PS15I (5Vdc, DualControl)
- PS15I (9Vdc, DualControl)
- PS15I (12Vdc, DualControl)

- GS15I (5Vdc, Specified FlowRate, LessPower)
- GS15I (5Vdc, Specified FlowRate)
- GS15I (9Vdc, Specified FlowRate)
- GS15I (12Vdc, Specified FlowRate)

  /* For GS15I, Specified FlowRate can be any value between 0.5ml/min and 3 ml/min */

Evaluation Purpose

- DB001 (5Vdc, PS15I, LessPower) MicroPump Controller
- DB001 (5Vdc, PS15I) MicroPump Controller
- DB001 (9Vdc, PS15I) MicroPump Controller
- DB001 (12Vdc, PS15I) MicroPump Controller
- PS15I (without driver board)

Wiring Information

	Normal	LessPower
Specified FlowRate	**Black**: Gnd **Red**: Voltage(5V/ 9V /12V) input, power supply **Blue**: Disable by inputting digital "High" ("High"=2-5V), Enable by inputting digital "Low". Without any inputting, the pump runs continuously.	**Black**: Gnd **Red**: 5V input only, power supply **Purple**: On/Off control by inputting logic High/Low signal, (High: >+1.2V; Low: <0.2V)
Dual Control	**Black**: Gnd **Red**: 5V input, power supply **Blue**: Control for the AC driving voltage (DC analog 0-0.5V), driving voltage decreases with the DC analog, and thus the flowrate decreases with the DC analog. This input is not necessary in case the user doesn't want to control the driving voltage. As keeping the lead open, the pump is driven at the default driving voltage. **Green**: Control for the AC driving frequency (by 5V PWM frequency, 50% duty),input frequency will be the driving frequency. This input is always required in order to run the pump,and the frequency below 60Hz is recommended. Operations over the recommended range may induce the performance permanent decay.	**Black**: Gnd **Red**: 5V input, power supply **Purple**: On/Off control by inputting logic High/Low signal, (High: >+1.2V; Low: <0.2V) **Blue**: Control for the AC driving voltage (DC analog 0.7-1.3V). The driving voltage increases with the DC analog, and thus the flow rate increases with the DC analog.This input is not necessary in case the user doesn't want to control the driving voltage. As keeping the lead open, the pump is driven at the default maximum driving voltage. **Green**: Control for the AC driving frequency (by 5V PWM frequency, 50% duty). Without any inputting, the pump will run at the default driving frequency that almost generates maximum flow rate. The inputting frequency divided by 4 will be the driving frequency(i.e. $F_{drv}=f_{in}/4$). The inputting frequency can't be smaller than 60Hz and that ranged from 60 to 240Hz is recommended. Operations over the recommended ranges may induce permanent decay of the performance. For the requirement of the lower flow rate by driving frequency under 15Hz, the customers should choose the produce type with specified FlowRate.