

AP7SVI/AP7SVC

Piezoelectric Micro Air Pump

DataSheet

The AP7SVI and AP7SVC are the pumps featured with inlet and outlet ports at different orientations for the positive and negative pressure application. The shape and size make it highly suitable for portable and wearable application, especially for the wearable breast pump and gas sensor.

Specifications

Dimensions LxWxT (mm) (refer to the drawing also)	18.5 × 18.5 × 3.9 Max. (port excluded) Ports length: 3.7~3.9 Ports diameter: 2.2~2.5 Taper.
Maximum Mass	3g Max.
OQC Criteria (Outgoing Quality Control) (see Test Method) ±15V (30Vpp)* at 15-40 °C ±16V (32Vpp)* at 0-15 °C	1. Inflation pressure, $P_{max} \geq +200$ mmHg 2. Suction pressure, $P_{min} \leq -200$ mmHg 3. Maximum Flow rate, $Q_{max} \geq 110$ ml/min 4. Maximum Noise, $N_{max} \leq 40$ dBA

* Lower temperature needs a higher voltage or power to achieve the demand requirement

* 600mW power input limit at 15-40 °C, 750mW power input limit at 0-15 °C

Maximum Ratings

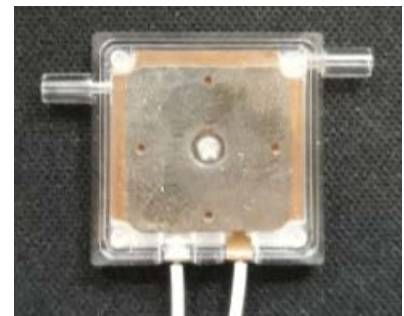
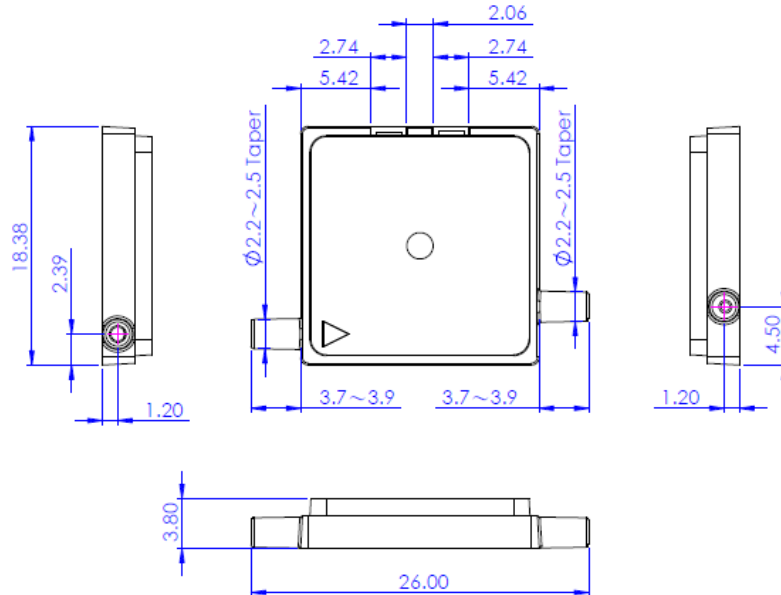
Storage Temperature/ Humidity	- 20°C to 70 °C / No liquid condensation
Operating Temperature/ Humidity	0 °C to 40 °C / No liquid condensation
Operating Frequency	24.0 to 34.0 kHz *
Maximum Driving Voltage	±15V (30Vpp)** at 15-40 °C, (0.5s ON/ 0.5s OFF) ±16V (32Vpp)** at 0-15 °C, (0.5s ON/ 0.5s OFF)
Maximum Power Input	600mW** at 15-40 °C, (0.5s ON/ 0.5s OFF) 750mW** at 0-15 °C, (0.5s ON/ 0.5s OFF)

** Lower temperature needs a higher voltage or power to achieve the demand requirement.

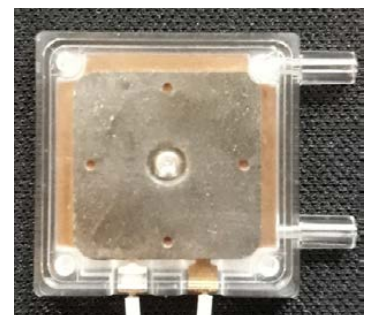
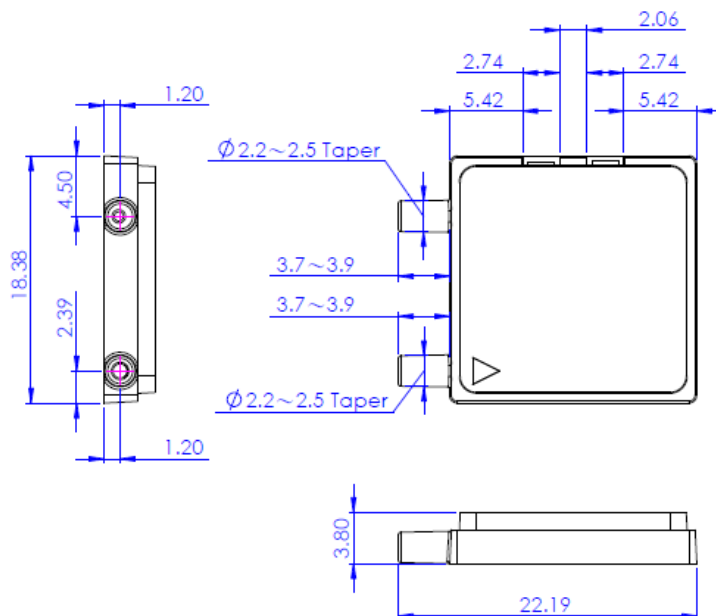
Drawing and Photo

Dimension in mm

(I) AP7SVI

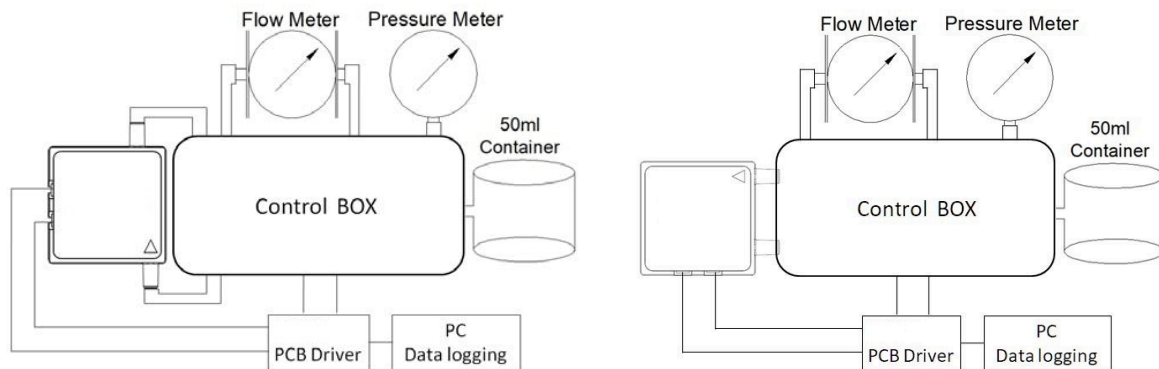


(II) AP7SVC

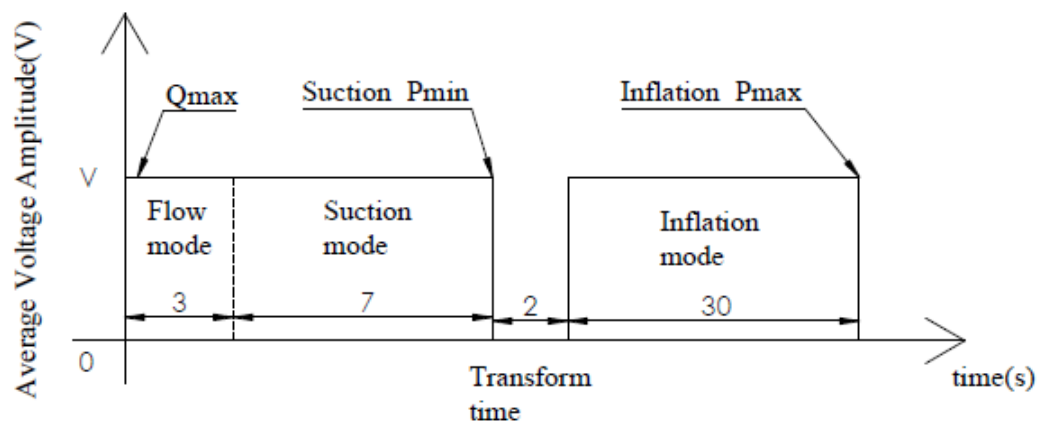


Test Method

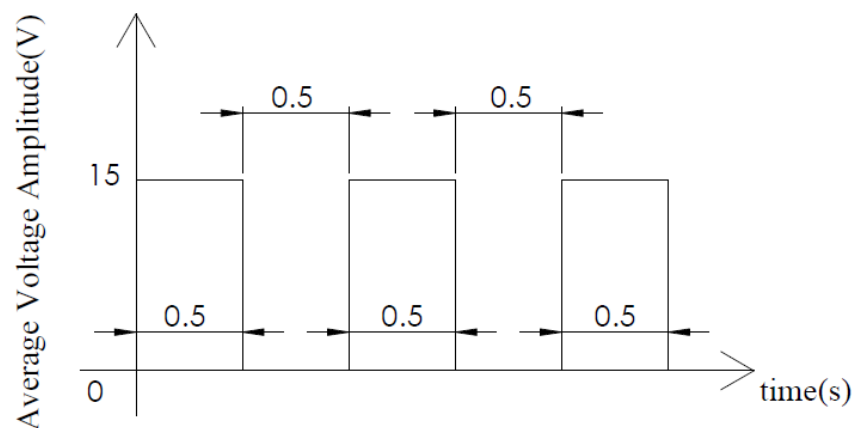
(I) OQC Setup



(II) OQC Data Collection



(III) Life Test (over 500 hours under power input below 600mW)



AP7SVIB/AP7SVCB

Piezoelectric Micro Air Pump

The AP7SVIB/AP7SVCB have locking capability for both positive and negative pressure at power off. The leaking rate is pretty low. Their small size makes them highly suitable for portable and wearable application, especially in medical field like NPWT (Negative Pressure Wound Therapy) and OSA (Obstructive Sleep Apnea).

Specifications

Dimensions LxWxT (mm) (refer to the drawing also)	18.5 × 18.5 × 3.9 Max. (port excluded) Ports length: 3.7~3.9 Ports diameter: 2.2~2.5 Taper.
Maximum Mass	3g Max.
OQC Criteria (Outgoing Quality Control) (see Test Method) ±15V (30Vpp)* at 15-40 °C ±16V (32Vpp)* at 0-15 °C	1. Inflation pressure, $P_{max} \geq +200$ mmHg 2. Suction pressure, $P_{min} \leq -200$ mmHg 3. Maximum Flow rate, $Q_{max} \geq 110$ ml/min 4. Maximum Noise, $N_{max} \leq 40$ dBA 5. LeakdP ≤ 10 mmHg/min, Pressure locking capability after power off. LeakdP is defined as the absolute value of the pressure decreases per min.

* Lower temperature needs a higher voltage or power to achieve the demand requirement

* 600mW power input limit at 15-40 °C, 750mW power input limit at 0-15 °C

Maximum Ratings

Storage Temperature/ Humidity	- 20°C to 70 °C / No liquid condensation
Operating Temperature/ Humidity	0 °C to 40 °C / No liquid condensation
Operating Frequency	24.0 to 34.0 kHz *
Maximum Driving Voltage	±15V (30Vpp)** at 15-40 °C, (0.5s ON/ 0.5s OFF) ±16V (32Vpp)** at 0-15 °C, (0.5s ON/ 0.5s OFF)
Maximum Power Input	600mW** at 15-40 °C, (0.5s ON/ 0.5s OFF) 750mW** at 0-15 °C, (0.5s ON/ 0.5s OFF)

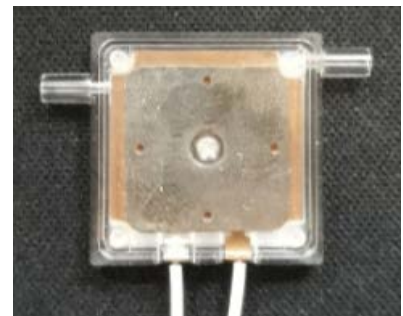
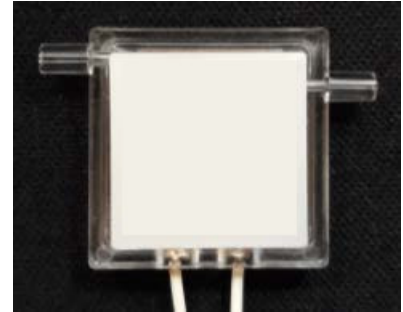
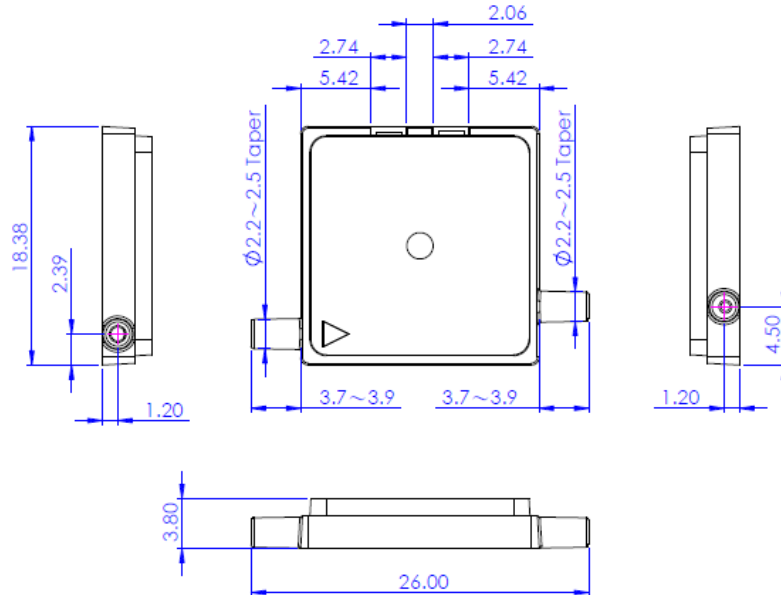
* Must drive at the actuator's resonant frequency of the pump, which differs from each other. A frequency searching circuitry is needed. Do not need to track the resonant frequency. The driving frequency must be fixed after being caught by sweeping at each startup.

** Lower temperature needs a higher voltage or power to achieve the demand requirement.

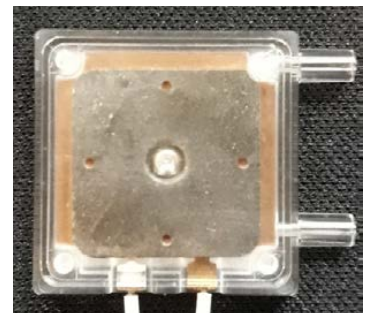
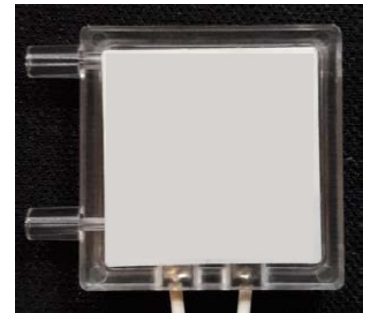
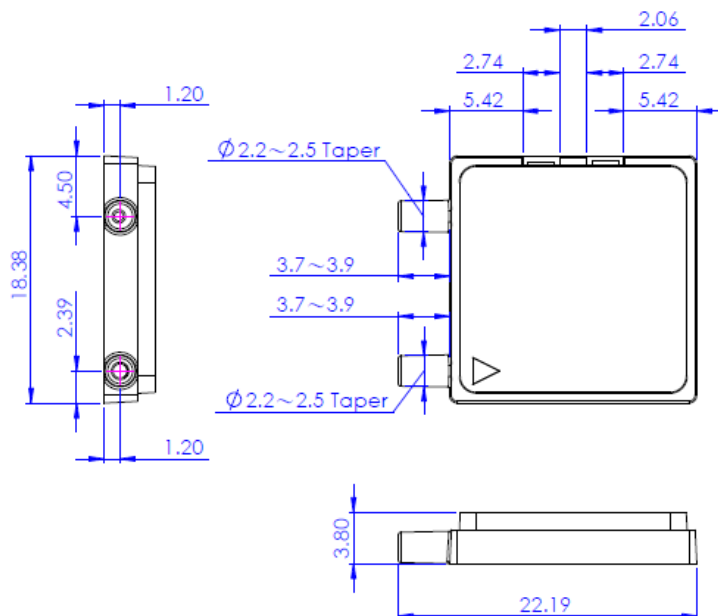
Drawing and Photo

Dimension in mm

(I) AP7SVIB



(II) AP7SVCB



Lock Capability

(I) AP7SVIB

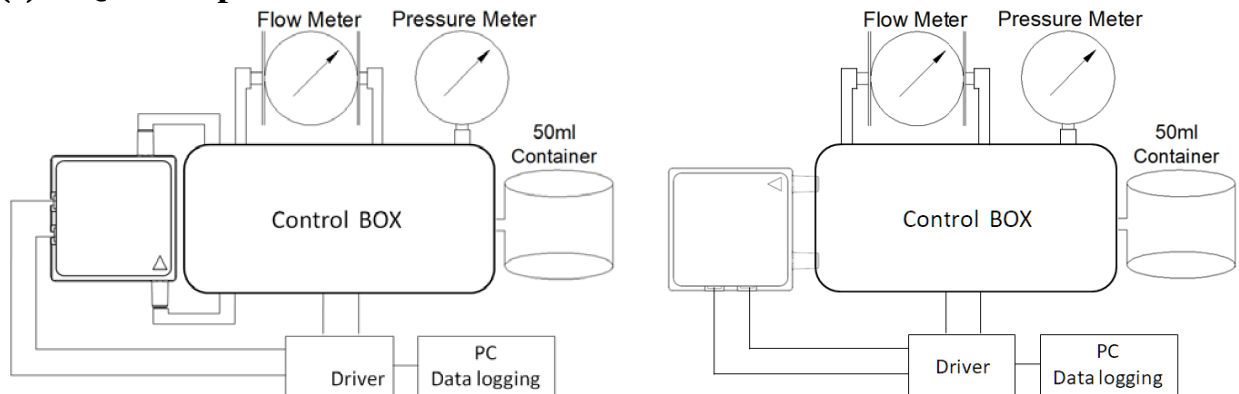
Application	Power ON	Power Off
Pumping		
Suction		

(II) AP7SVCB

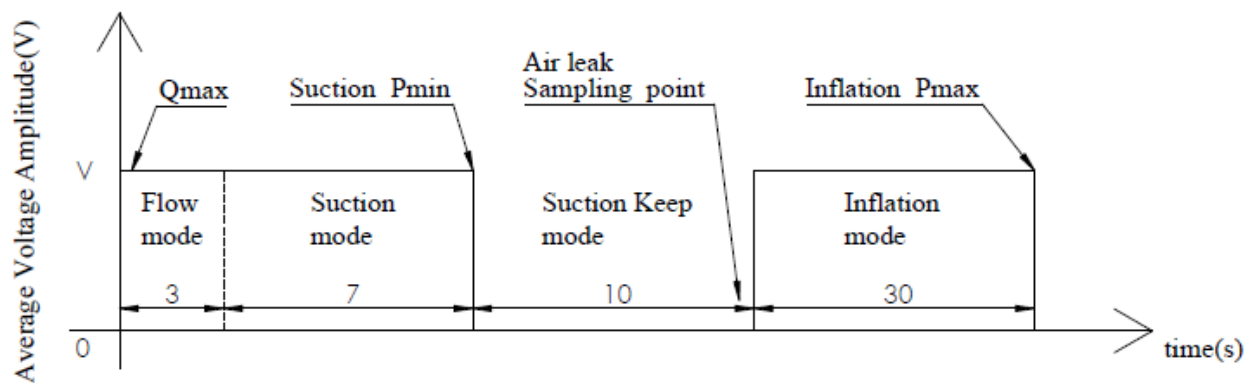
Application	Power ON	Power Off
Pumping		Non-reverse Check valve
Suction		Non-reverse Check valve

Test Method

(I) OQC Setup



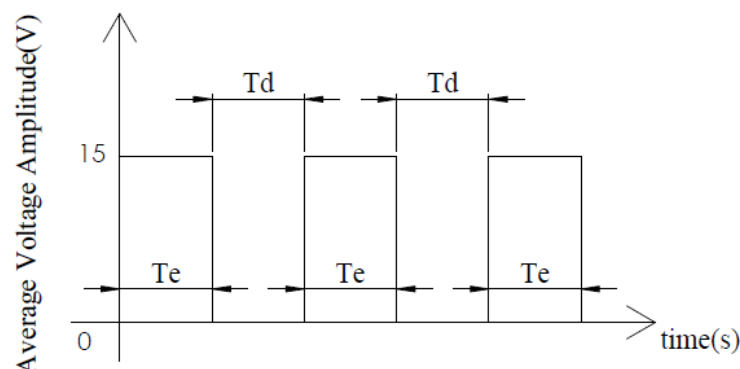
(II) OQC Data Collection



(III) Life Test (over 10,000 cycles under power input below 600mW)

Disable condition: the absolute value of the negative pressure is above 200 mmHg, i.e. $200 \leq |p|$. Experimental data shows the disable time (T_d) is typically larger than 15 mins.

Enable condition: the absolute value of the negative pressure below 150 mmHg, i.e. $|p| \leq 150$. The enable time (T_e) depends on the air volume to be sucked out and is usually smaller than 5 sec for 10 ml volume.



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