

HSPC-2-SB

If you study mechanosensitive channels, then you need ALA's High Speed Pressure Clamp, HSPC-2-SB. The HSPC-2-SB is the only commercial instrument that can generate reproducible and rapid pressure/vacuum steps. Adding the HSPC-2-SB and the PV-Pump accessory to any patch clamp rig creates a complete system for biophysical studies in this important area.

The HSPC-2-SB is an easy-to-use device for generating arbitrary pressure waveforms for the study of mechanosensitive ion channels during patch clamp recording. It is also used to stimulate the inner hair cells in the ear canal. The device consists of a control unit and a small headstage.



Specifications for HSPC-2-SB

Max. Input Pressure/Vacuum	+/-7psi; 362mmHg
Standard Output Pressure/Vacuum Range	+/-200mmHg
Noise	+/-10mV; +/-1mmHg
Power	110/220V AC; 0.5A Slow Blow
Controller	2.9lbs/1.32kg - 8.5"/21.6cm x 7.5"/19cm x 4"/10cm
Headstage	0.5lbs/0.23kg - 3.75"/9.5cm x 1.75"/4.4cm x 1.75"/4.4cm
Typical Speed of Response	0 to 100mmHg jump in 12ms; 0 to 100% settling time
Command Input	20mV/mmHg
Monitor Output	20mV/mmHg
Set Point Control (Holding Pressure/Vacuum offset control)	+/-200mmHg
Moisture Alarm	Capacitance liquid detection sensor to protect valve

HSPC-2-SB System Highlights:

- Pressure and vacuum partitioned by small headstage that easily mounts near amplifier probe
- Simple connection to electrode holder transmits pressure/vacuum pulses
- Command input of 20mV/mmHg sets pressure
- Pressure output of 20mV/mmHg signal monitor or from LCD display
- Moisture sensor prolongs life of headstage
- Compatible with all major patch clamp hardware/software
- Improves consistency of establishing gigaseals and whole-cell configuration
- Based on design of Besch et al

References:

Besch, S.R., et al., (2002). High-speed pressure clamp. *Pflügers Arch.* 445, 161-166.
 Suchyna, T., et al., (2004). Dynamic regulation of mechanosensitive channels: capacitance used to monitor patch tension in real time. *Phys. Biol.* 1, 1-18.
 Gomis, A., et al. (2008) Hypoosmotic- and pressure-induced membrane stretch activate TRPC5 channels. *J Physiol* 586.23, 5633-5649.

Coste, B., et al., (2012) Piezo proteins are pore-forming subunits of mechanically activated channels. *Nature*, Vol 483, 176-181.
 Sukharev, S. (2010) Piezo proteins are pore-forming subunits of mechanically activated channels. *Nature*.
 Vargo, J.W., et al. (2017). Inhibition of Mitochondrial Division Attenuates Cisplatin-Induced Toxicity in the Neuromast Hair Cells. *Frontiers in Cellular Neuroscience*, Vol. 11, Article 393.

PV-Pump System



The **PV-Pump System** is the ideal pressure/vacuum source for the **HSPC-2-SB High Speed Pressure Clamp**. It provides balanced pressure and vacuum to the **HSPC** headstage. The system includes separate power switches for each pump and separate gauges for monitoring the pressure and vacuum outputs. The supporting platform under the pumps contain two internal chambers

that dampen oscillations from the pumps to the electrode holder. Emergency release valves on the side of the rail are also incorporated into the **PV-Pump** and open when the pressure or vacuum go beyond the factory set limits. The pumps are specific for 110/220 VAC operation. The outputs are set to +/- 7psi/362mmHg.

Ordering Information

HSPC-2-SB	Complete pressure clamp system includes controller, piezo valve headstage and cable, misc. tubing, and fittings
PV-Pump	Pressure / vacuum pumps with output tubing