



**WORLD
PRECISION
INSTRUMENTS**
Instrumenting scientific ideas

Pneumatic PicoPumps

Repeatable microinjection in volumes ranging from picoliters to nanoliters



Each PicoPump is supplied with a 5430-ALL kit that includes two PicoNozzles and tubing to connect the holders to the pressure and vacuum ports.



New PicoNozzle Kit 5430-ALL (included) allows micropipettes to be securely mounted in micropositioners for stable axial air delivery. Because air enters the pipette axially, lateral whipping during injection is eliminated.

Designed to simplify intracellular injection and a variety of other microinjection tasks, WPI's PicoPumps use carefully regulated air pressures for securing cells and injecting them with fluid. Injected volumes range from picoliters to nanoliters. Separate ports supply positive and negative pressure—positive pressure for high-pressure ejection, and suction for supporting the cell or for filling the pipette from the tip. A second pressure port maintains a low positive “holding” pressure to the injecting pipette between injection pulses, to prevent fluid uptake through capillary action or diffusion. Timing, ejection pressure, holding pressure, and suction are adjusted independently by control knobs and indicator gauges on the front panel. Injection pressure is controlled by a 20-turn regulator on the front panel. A built-in timing circuit allows precise control of the amount of time that the injection pressure is applied to the output port. Time intervals can range from 10 seconds down to 10 ms or less, depending

on the eject pressure setting. The injection pressure interval can be triggered manually on the front panel, by footswitch, or by computer controlled TTL pulse. A 5-volt monitor output provides a logic-level pulse for your computer or other monitoring device.

PV830 — Eject pressure, Hold pressure, and Vacuum are all available, controlled by separate regulators on the front panel. Eject pressure supplies a high-pressure pulse for injecting fluid. Hold pressure, which is not sufficient to cause fluid ejection, is used to prevent back filling of the pipette by capillary action or diffusion when the solenoid is inactive. Pressure in the injection pipette is automatically switched between Eject and Hold pressure by a precision timing circuit that controls a solenoid valve. Vacuum is used to fill pipettes from the tip or to secure a floating cell during microinjection. Vacuum is regulated the same way, by a 20-turn knob on the front panel. Vacuum may be switched from regulated vacuum to atmosphere by using the pneumatic toggle on the front panel. Vacuum can also be routed to the eject port.

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PV820 offers separate regulated Hold and Ejection pressure, used to maintain a low pressure in the pipette between injections to prevent unwanted fluid uptake by capillary action or diffusion. A precision timing circuit switches from Eject pressure to Hold pres-

sure automatically, once timing has been set. Although regulated vacuum is not provided in this model, suction can be provided by connecting a vacuum source to the vacuum port on the rear panel. Suction is then available through the pressure ports.

PICOPUMP SPECIFICATIONS

	PV820	PV830
PRESSURE		
PRESSURE INPUT	0 to 150 psi	0 to 150 psi
PRESSURE OUTPUT	0.3 to 90 psi *	0.3 to 90 psi
PULSE WIDTH (10-turn dial)	10 ms to 10 s in Timed Mode	10 ms to 10 s in Timed Mode
REGULATOR ACCURACY	0.1% (20-turn dial) *	0.1% (20-turn dial) *
REGULATOR REPEATABILITY	0.05 psi *	0.05 psi *
GAUGE ACCURACY	3% at full scale *	3% at full scale *
INPUT CONNECTOR	Quick Connect (1/4 in. OD Tubing)	Quick Connect (1/4 in. OD Tubing)
OUTPUT CONNECTOR	Barbed (1/16-in. ID Tubing)	Barbed (1/16-in. ID Tubing)
CONTROL	Solenoid	Solenoid
	* Both Hold and Eject Pressures	* Both Hold and Eject Pressures
VACUUM		
VACUUM INPUT	0 to 30.0 in. Hg	0 to 30.0 in. Hg
VACUUM OUTPUT	Unregulated	0.2 to 29.9 in. Hg
LOWEST REGULATED VACUUM	Unregulated	3 in. water
REGULATOR ACCURACY	Unregulated	0.1% (20-turn dial)
REGULATOR REPEATABILITY	Unregulated	0.03 in. Hg
GAUGE ACCURACY	None	3% at full scale
INPUT CONNECTOR	Quick Connect (1/4 in. OD Tubing)	Quick Connect (1/4 in. OD Tubing)
OUTPUT CONNECTOR	Barbed (1/16 in. ID Tubing)	Barbed (1/16 in. ID Tubing)
CONTROL	Manual	Manual
VENT	Atmosphere	Atmosphere
CONNECTIONS INCLUDED		
INPUT KIT	10-ft nylon tubing (0.25-in. OD, 1000 psi), one 1/2-inch female NPT adapter	
OUTPUT KIT	Two PicoNozzle assemblies, each consisting of one MPH6S pipette holder, 60-in. of PVC tubing (200 psi), and a luer-fitted aluminum handle.	
PHYSICAL SPECIFICATIONS		
POWER	95-135 V or 220-240 V, 50/60 Hz	95-135 V or 220-240 V, 50/60 Hz
DIMENSIONS	17 x 3.5 x 9.5 in. (43 x 9 x 24 cm)	17 x 5.25 x 9.5 in. (43 x 13 x 24 cm)
SHIPPING WEIGHT	11 lb (5 kg)	14 lb (6.3 kg)



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