



PULL QUARTZ, BOROSILICATE AND ALUMINOSILICATE GLASS

FULLY PROGRAMMABLE INCLUDING FILAMENT SIZE

PULLS ELECTRODES WITH TIPS LESS THAN 0.03 μ m

OPTIMIZED VELOCITY SENSING CIRCUIT

LONG-LIFE CO₂ LASER

FIBER VERSION IDEAL FOR NANOSPRAY AND NSOM



P-2000 LASER-BASED MICROPIPETTE PULLER

The **P-2000** integrates a CO₂ laser-based heat source with the technology derived from our extensive experience with conventional pullers. A significant advance in the technology of fabrication of micropipettes, optical fiber probes, and nanospray tips, is offered with the **P-2000** micropipette puller. This system offers capabilities unmatched by other pullers.

The use of laser heat allows the **P-2000** to work with quartz glass (fused silica) as well as conventional glasses. Quartz offers superior material properties for a variety of research applications. Quartz is stronger than other glasses and can facilitate penetration through tough tissues which would normally break conventional pipettes. For applications requiring a low noise glass, users will find that quartz is the lowest noise glass available. Quartz contains none of the metals used in conventional glasses. Optically, quartz is virtually free from fluorescence when illuminated.

A CO₂ laser was selected as the heat source for the **P-2000** for several reasons: 1) The nominal emission wavelength of the laser approximates the resonant

frequency of the SiO₂ lattice in glass. Thus, quartz and other conventional glasses can be melted when the appropriate laser power is supplied. 2) Laser heat is clean and leaves no metal residue on the pipette as do conventional heating filaments. 3) Laser heat can be turned off instantly, leaving no residual filament heat. 4) The user can program the amount and distribution of heat supplied to the glass. 5) No filaments to age or burn out.

The **P-2000** can store up to 100 separate programs, with each program consisting of up to 8 command lines. Programmable parameters include: laser power level, scan width, trip velocity, delay/laser on time, and hard pull strength.

One important consideration for the use of the **P-2000** is the diameter of the glass used. The optical design produces even heating on glass up to 1.2 mm in outside diameter. Larger diameter glasses can be used with the **P-2000/G** (up to 1.5 mm quartz and 1.8 mm conventional glasses), but the performance is best with glass that is 1.2 mm diameter or less.

P-2000/G

Laser-based puller, outfitted for use with glass GREATER than 0.6mm outer diameter

P-2000/F

Laser-based puller, outfitted for use with glass LESS than 0.6mm outer diameter

(Pullers include a sample box of Q100-70-7.5 glass)

SUTTER INSTRUMENT

One Digital Drive • Novato • CA 94949 • Phone 415.883.0128
Fax 415.883.0572 • Web www.sutter.com • Email info@sutter.com