CAPABLE OF PULLING QUARTZ, BOROSILICATE AND ALUMINOSILICATE GLASS

FULLY PROGRAMMABLE – INCLUDING HEATING FILAMENT SIZE CHARACTERISTICS

THE LASER HAS NO MELTING POINT LIMIT AS WITH CONVENTIONAL METAL FILAMENTS, AND THEREFORE, CANNOT BE BURNED OUT

PULLS ELECTRODES WITH TIP DIAMETERS THAT ARE LESS THAN 0.03µm

OPTIMIZED VELOCITY SENSING CIRCUIT FOR MAXIMIZED SENSITIVITY AND REPRODUCIBILITY*

THE P-2000/F IS IDEAL FOR APPLICATIONS SUCH AS NANOSPRAY AND NSOM

P-2000 LASER-BASED MICROPIPETTE PULLER

The **P-2000** integrates a CO_2 laser-based heat source with the technology derived from our extensive experience with conventional pullers. This system offers capabilities unmatched by other pullers. A significant advance in the technoloy of fabrication of micropipettes, optical fiber probes, and nanospray tips, is offered with the **P-2000** Micropipette Puller.

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 CO_2 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 SiO_2 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.

The **P-2000/F** works well with small diameter glass such as optical fibers, and with small diameter fused silica capillary commonly used for the manufacture of nanospray tips. Smaller diameter glass with an outer diameter in the range of 0.125mm to 0.6mm, require special puller bars as well as an optical alignment optimized for the smaller diameter material. These modified components will be installed at the time of purchase.

As with larger diameter glass, a wide range of tip sizes and taper geometries can be produced with this modified **P-2000/F** and small diameter glass. We have drawn optical fiber tips ranging from less than 10nm to more than 5µm. Please consult our technical staff for further information.

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 glass stop, sample box of Q100-70-7.5 glass, mirrored tile and manual)

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

MADE IN USA

SDR SCIENTIFIC
Phone 02 9882 2882
Fax 02 9882 6468
Email info@sdr.com.au
WWW.SDR.COM.AU