P-2000/F
LASER-BASED MICROPIPETTE PULLER

Dear Researcher:

Thank you for choosing Sutter Instrument products. To guarantee the highest standards of quality and performance, every instrument is fabricated on site by highly skilled technicians. The instrument contained herein has been assembled with care and tested to assure it meets rigid quality control standards.

For your convenience, we have included a list of components contained in your shipment. Please be certain to contact us promptly if there are any discrepancies or anything was damaged during shipping.

Thank you,

Alexandra Cooper
Director, Sales & Marketing

Components of the P-2000/F

Carefully remove all components from the shipping container. For your order, these should include:

1	P-2000 Micropipette Puller
1	Sample Glass (Q100-70-7.5)
1	Power Cord
1	Manual

SUTTER INSTRUMENT

phone	fax	address	email	web
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March 13, 2009

SUBJECT: U.S. REGULATIONS REGARDING THE MODEL P-2000 LASER SYSTEM

- **To all Purchasers and Distributors**:

The Sutter Instrument Co. Model P-2000 quartz micropipette puller contains a carbon dioxide laser, the sale or operation of which is regulated by the Center for Devices and Radiological Health (CDRH). The product you have received complies with CDRH regulations for certification but there are additional record keeping responsibilities we are required to inform you of concerning this device.

The CDRH regulations require that the manufacturer, and in turn the CDRH, be informed in the event of an accidental exposure to radiation from any regulated product. If the CDRH deems additional product features or testing are necessary to ensure the current units in the field are safe, they may demand the manufacturer recall all units affected.

To ensure all units can be recalled, the CDRH requires that records of the current location of each approved product be kept by the manufacturer or an approved distributor. It is the responsibility of any person who has transferred ownership of a regulated laser product to notify the manufacturer, or distributor from whom it was purchased, of the product's current whereabouts for 5 years from the date of manufacture. A certification label stating the date of manufacture is located on the back panel of each unit.

Note: The CDRH accession file number for this product is 9211190.

- **Additional Information for Distributors**:

Generally, records of the product's present location are kept at the manufacturing site to permit the CDRH ease of access, but an approved distributor may elect to maintain their own records if they:

1. Notify the manufacturer, in writing, of their intention to maintain the records;

2. Maintain the records for a period of 5 years or, if they cease distribution, furnish the required information to the manufacturer: and

3. Provide the information to the manufacturer when advised by the manufacturer or by CDRH that the information is required for a product recall.

If a distributor elects to maintain product records at their facility they become responsible to the CDRH for the accountability of each unit and the accuracy of the distribution information in the event of a recall.

If more detail or clarify of any of the issues touched upon here is required, please feel free to contact your distributor or Sutter directly.

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January 12, 2009

To all Distributors:

Subject: Model P-2000 Laser Safety

The P-2000 is a CO_2 laser based micropipette puller and as such its construction and use are regulated in the US by the FDA's Bureau of Radiological Health (CDRH) and in the European Community by harmonized standard EN60825-1.

The P-2000 as manufactured is classified as a "Class I Laser Product". This means it can be operated safely as shipped without the need for additional safety measures.

However, it contains a 10 W (nominal) CO_2 laser which may output up to 20 W of radiant power (Class IV). This laser emits invisible radiation that can inflict severe burns to those exposed to the beam, even momentarily. A number of safety shields, enclosures and interlocks have been built into the instrument to protect the user from any radiation exposure. Under no circumstances should the safety enclosures be removed or the interlocks defeated. Doing so could injure the operator or passers by in a serious manner.

This also means any servicing of the Model P-2000 which requires entrance into the laser housing or the defeating of the safety interlocks must be carried out by specifically trained personnel in a manner prescribed in the above mentioned regulations. Because of this, Sutter Instrument Company must require that any such servicing be performed at our Novato, California facilities unless your service technicians have been given specific training by us in the prescribed methods of laser safety.

Please attend to all warning labels and do not attempt to service the laser outside of our facilities. If you wish to discuss how your service personnel can become trained to service these units please contact Jack Belgum here at Sutter.

As a reminder, we have enclosed herein a copy of the CDRH record keeping regulations. Thank you for your continuing support of Sutter Instrument Company products.

Best regards,

Alexandra Cooper
Sutter Instrument Company

SUTTER INSTRUMENT

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P-2000/G: Supplement To The P-2000 Manual For First Time Use

Experience has shown that the alignment of the P-2000 optical system may shift as a result of vibration in shipping. In order to get the best performance, we recommend that you check the alignment and, if required, adjust the unit before you place it in service. Follow the procedure here, which has been adapted from the manual, as well as the instructions in the manual for first time use. **Note that the adjustment required is usually slight and never as large as a complete turn.**

Scanning Mirror Tilt Adjustment

The scanning mirror is mounted on a tilting table (Figure 1). The tilt controls the elevation of the laser beam relative to the glass. The degree of tilt is controlled by a micrometer on the back of the puller. This micrometer pushes against an arm attached to the tilt table, which is spring-loaded against the micrometer. Turning the micrometer clockwise elevates the laser beam relative to the glass.

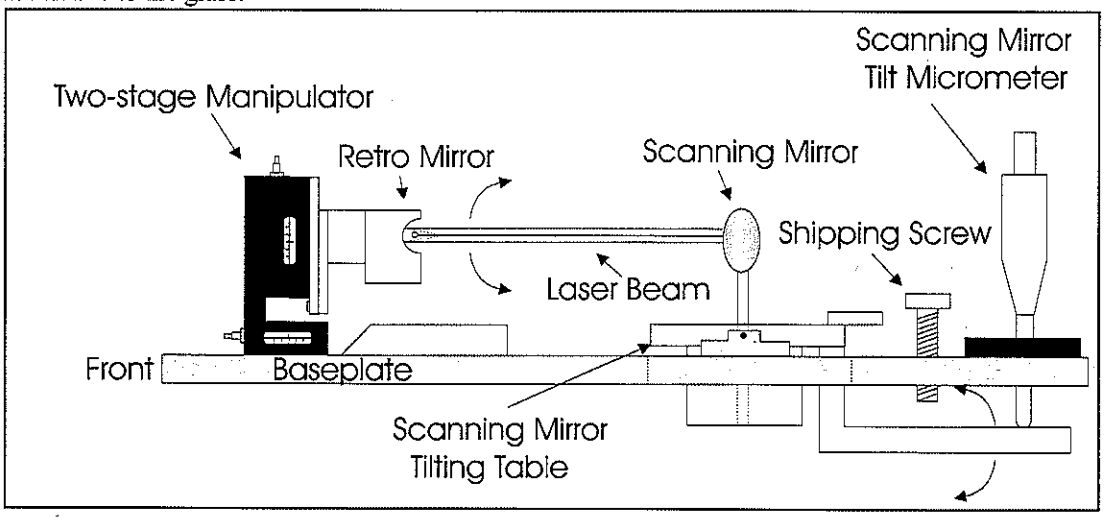


Figure 1. Scanning Mirror Tilt Adjustment
(From right end of cabinet; shroud, laser and laser housing not shown)

In order to protect the tilting mechanism a shipping screw has been installed next to the micrometer. This screw is turned down prior to shipping to unload the micrometer and lock the table in place. **Before using the puller for the first time this screw should be unloaded (turned counter-clockwise until the screw is almost out of the base plate). The micrometer should also be set to the factory default setting.** This value is indicated on a label near the micrometer. Make sure that the micrometer is set as indicated. If you are not sure how to read a micrometer, consult the text below.

Reading The Micrometer

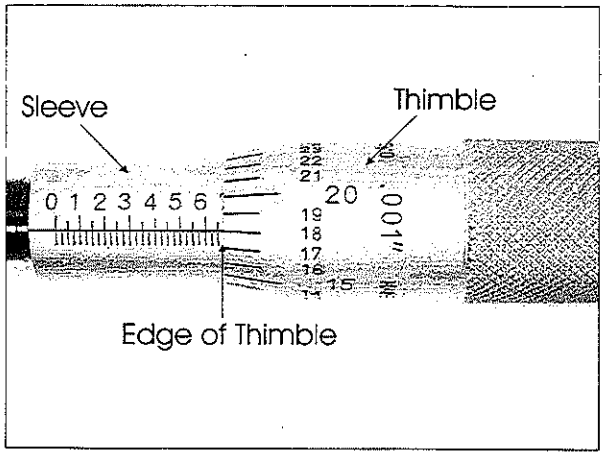


Figure 2. Micrometer Scale

The micrometer is marked in 25 increments of 0.001" around its thimble. One rotation of the thimble will advance it along the length of the sleeve by 0.025". The long markings on the sleeve represent increments of 0.1" and are numbered. There

are also intermediate marks dividing each numbered increment into 0.05" increments. The closest marks along the sleeve represent 0.025" increments. When the thimble is turned so that its zero mark is in line with the vertical line on the sleeve, the reading is an even increment of 0.025". Locate the highest 0.1" number visible and then add 0, 0.025, 0.05, or 0.075 to that number depending on the number of 0.025 increments visible between the 0.1" line and the edge of the thimble. In this case the micrometer sleeve reveals 2 marks beyond 6 tenths of an inch, or .65" total.

If the thimble is rotated counter-clockwise from the 0 position, the number on the thimble next to the vertical line will increase but no more 0.025" marks on the sleeve will appear until a full turn back to 0 has been made. The value from the thimble is added to the value on the sleeve to obtain the reading in .001". In this case the value is .018", which when added to .65" gives the final reading of .668".

The default micrometer setting supplied by Sutter Instrument Company should be adequate for most users. **Mistakes in reading the value on the sleeve are common, and they result in a large error in positioning the laser. If you find that the micrometer appears to be off the factory setting by more than a few divisions, assume that you have not got the right reading from the sleeve.**

Since the micrometer is located about the same distance from the mirror as the target glass, a change in micrometer setting will produce about the same change in the elevation of the laser beam at the glass.

As there is no sensor-based beam positioning system built into the P-2000. You will need to make beam position adjustments utilizing qualitative information obtained with thermally sensitive paper. Scanning mirror adjustments are made as follows:

1. Remove the shroud which encloses the retro mirror. There are two screws holding the shroud to the cover plate (see the instructions for cleaning the retro mirror).

2. Load a piece of 1.0mm OD tubing into the puller.

3. Enter the following values into a program (set by factory as program 51):

HEAT	FILAMENT	VELOCITY	DELAY	PULL
200	5	0	40	0

4. Cut a 1.5cm x 3cm rectangle from a piece of thermal fax paper and slip it between the tubing and the retro mirror with the shiny side of the paper facing the tubing.

5. Lower the plastic top and press <PULL>. The laser will burn the fax paper in the region just above and below the glass. Note the symmetry, or lack of symmetry, of the burn pattern. Ideally, you want the burn pattern above and below the glass to be perfectly symmetric.

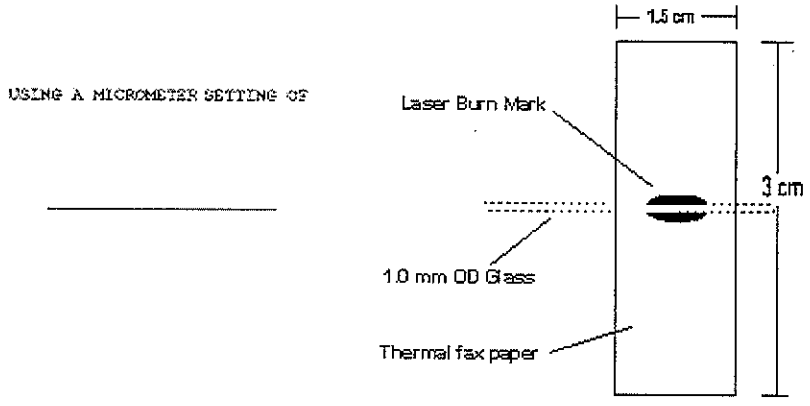
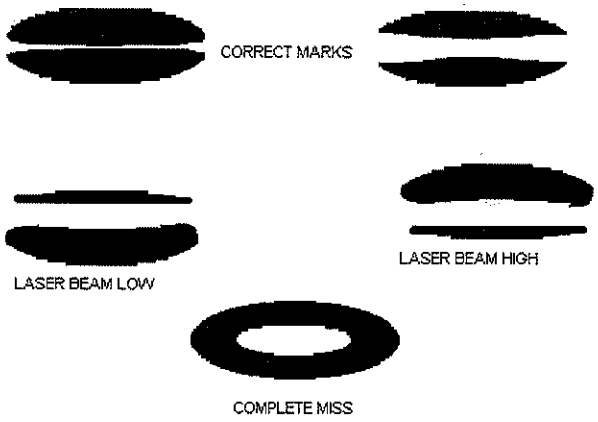


Figure 3. Scanning Mirror Adjustment Using Thermal Paper

6. If the burn pattern is asymmetric, turn the tilt adjustment micrometer about 1/4 turn then repeat the instructions #4-6 until the burn pattern is symmetric.

7. When the burn pattern is symmetric, note the micrometer setting and clean the retro-mirror. The mirror is gold plated, and may be cleaned with a soft, clean cloth wetted with a solvent that produces no residue. You may be able to see a darkened area of contamination, which should come off quickly. Replace the shroud and insert the screws. Before you tighten the screws check the position of the through-holes on the shroud to insure that the glass can be loaded without hitting the shroud. Tighten the screws firmly before putting the unit back in service.

P2000 THERMAL PAPER MARKS



TYPICAL SAMPLE PROGRAMS FOR THE P-2000

QUARTZ 1.0 mm O.D. x 0.7 mm I.D.

PROGRAM #0: Micro-Electrode

Line 1	HEAT: 700	FIL: 4	VEL: 60	DEL: 145	PUL: 175

PROGRAM #2: Large Patch Pipette

Line 1	HEAT: 700	FIL: 4	VEL: 55	DEL: 130	PUL: 55

PROGRAM #4: Small Patch Pipette

Line 1	HEAT: 700	FIL: 4	VEL: 55	DEL: 130	PUL: 65

QUARTZ 1.0 mm O.D. x 0.5 mm I.D.

PROGRAM #1: Patch Pipette

Line 1	HEAT: 700	FIL: 4	VEL: 55	DEL: 132	PUL: 55
Line 2	HEAT: 750	FIL: 4	VEL: 50	DEL: 127	PUL: 55

PROGRAM #6: Long Micropipette

Line 1	HEAT: 825	FIL: 5	VEL: 50	DEL: 145	PUL: 175

QUARTZ 1.5 mm O.D. x 0.75 mm I.D.

PROGRAM #9: Patch Pipette

Line 1	HEAT: 925	FIL: 4	VEL: 40	DEL: 130	PUL: 40
Line 2	HEAT: 875	FIL: 4	VEL: 60	DEL: 126	PUL: 60

BOROSILICATE 1.0 mm O.D. x 0.5 mm I.D.

PROGRAM #10: Micro-Electrode

Line 1	HEAT: 350	FIL: 4	VEL: 50	DEL: 225	PUL: 150

PROGRAM #11: Patch Pipette

Line 1	HEAT: 350	FIL: 4	VEL: 30	DEL: 200	PUL: 0

ALUMINOSILICATE 1.0 mm O.D. x 0.58 mm I.D.

PROGRAM #20: Micro-Electrode

Line 1	HEAT: 400	FIL: 4	VEL: 50	DEL: 225	PUL: 150

PROGRAM #21: Patch Pipette

Line 1	HEAT: 400	FIL: 4	VEL: 30	DEL: 200	PUL: 0

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CLEANING THE GOLD PLATED RETRO-MIRROR

The retro-mirror surface is close to the target glass and may become coated by materials liberated by the heating of the glass. This is very likely to happen if the glass is dirty, covered with oil from the fingers, or partially coated. **With daily use, the retro-mirror should be cleaned every two to three weeks.** The mirror is mounted in a shroud that prevents operator access to the laser beam. **The enclosure should be removed for maintenance only.**

The shroud is fastened to a cover plate that is, in turn, fastened to the base plate. Simply remove the 2 slot head screws holding the shroud to the cover plate and the shroud should lift out. **Make sure that you do not disturb the mirror or its adjustable mount.** The mirror has a gold coating, and may be cleaned with a soft, clean cloth wetted with a solvent that produces no residue such as rubbing alcohol or methanol. You may be able to see a darkened area of contamination, which should come off quickly. Do not remove the mirror or press hard against the mirror. The mirror position is sensitive.

Check the mirror surface again after the solvent has evaporated completely. If the surface is clean and uniform in appearance, replace the shroud and insert the screws. If not, repeat the cleaning. **Never use an abrasive cleaner or a motorized tool for cleaning the retro-mirror.**

Before you tighten the screws check the position of the through-holes on the shroud to insure that the glass can be loaded without hitting the shroud. Tighten the screws firmly before putting the unit back in service.

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