Model PTR-2000

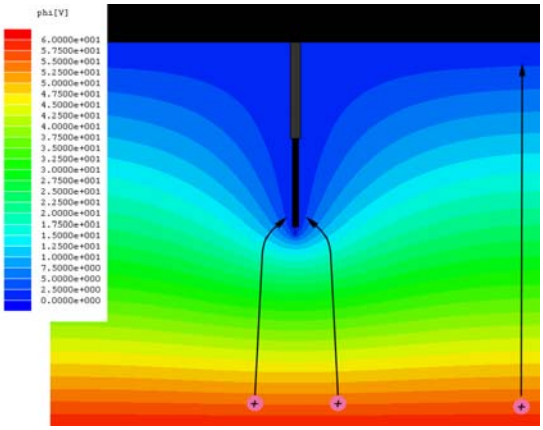
Plasma Trimming™ Rod
Patent Pending

TEM Sample Preparation

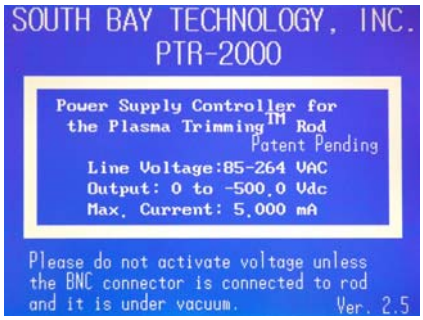
The PTR-2000 Plasma Trimming™ Rod System

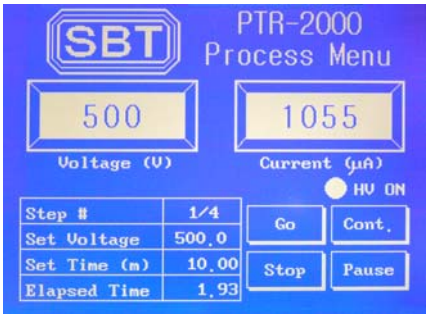
The PTR-2000 is a system that allows Plasma Trimming™ a TEM sample prepared by FIB or tripod polishing to be thinned by very low energy ions extracted from a plasma. After FIB milling the sample in a modified Fortress™ holder, it is transferred to the PTR-2000 and the rod with sample is inserted into the plasma cleaner adapter. The plasma is ignited and the sample is negatively biased with an external programmable power supply. This bias will extract ions from the plasma and accelerate them to the sample. The geometry of the sample shapes the electric field which causes the ions to bend in towards the sample. The programmable power supply allows up to four steps to be programmed with voltage and time in sequence up to 500 V and up to 24 hr for each step. The program can be paused and continued at any point during the run. For plasmas with high plasma potentials, the sample should be shielded from sputtered material by withdrawing it into the adapter shroud. With the appropriate adapter, the PTR-2000 can be used with any plasma cleaning system. SampleSaver™ system preserves Plasma Trimmed™ samples.

PTR-2000 on a SBT PC-2000

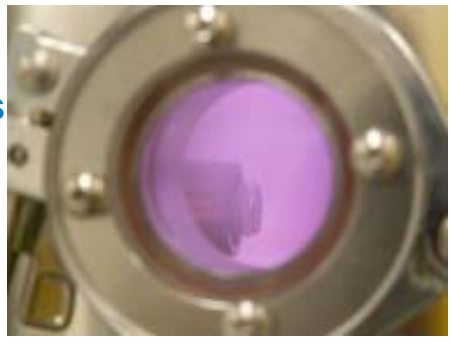


Equipotential Lines (H-bar)





- **Easy to use**
- **Programmable with up to 4 steps**
- **0 to -500 Volts, 0 to 5 mA**
- **Use with any plasma cleaner**
- **Includes SS-100 SampleSaver™**
- **Includes 5 modified Fortress™ holders**
- **Compatible with all FIB instruments**



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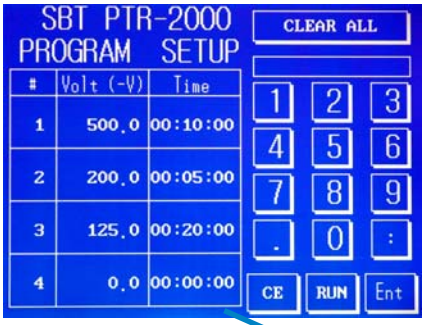
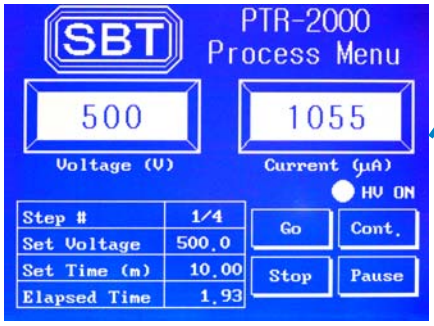
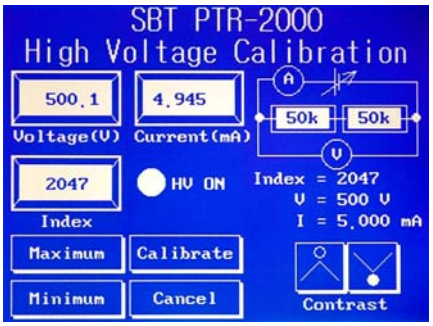


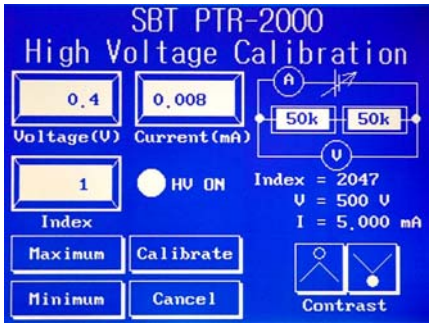
Operation:

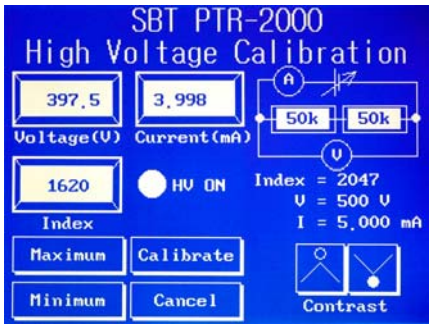
The computer controlled power supply with touch screen is simple to use. When powered on, a saved program will be automatically recalled. Use this program, as is, modify it, or clear all and program a new one. Save it for the next time, or only use it temporarily. From the calibration page, users can check voltages and current values and set the contrast settings of the screen. The contrast setting is recalled when the supply is turned on. Several short cuts are available when entering values from the keypad. For example, when entering leading zeros for the hour, touching ":" first will enter "00:". When the program is running, the actual high voltage and current values are measured and displayed. The elapsed time is displayed in minutes. The program can be paused and then continued as many times as needed. A high voltage indicator shows the current status of the power supply.



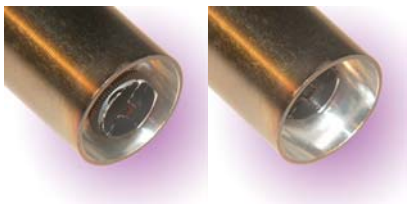
The calibration page is also used for service personnel to calibrate the voltage and current meters and to adjust the voltage linearity of the power supply.







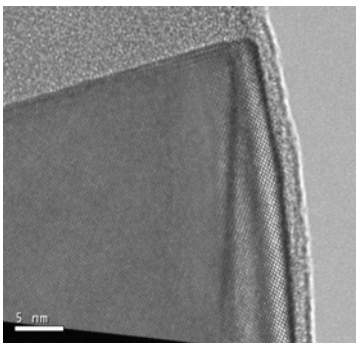
The PTR-2000 uses modified Fortress™ holders to securely hold samples in the FIB for processing and then directly transferred to the rod for processing in a plasma cleaner. If a low power plasma is used, then the sample can be exposed directly to the plasma without any problems. However, if the plasma potential is high, as it is with some plasma cleaning systems, then sputtered material from the system can be deposited onto the sample. This can be prevented by withdrawing the rod inside the grounded adapter shield at the cost of decreasing the ion current. The surface of the modified Fortress holder is coated with graphite paint to prevent material from being sputtered from it onto the sample.



The low energy ions remove the damage from the surface of Tripod Polished or FIB-prepared TEM samples so that the familiar "salt and pepper" contrast seen in BF and HREM images is removed to reveal an image with a uniform background. Oxidation of the samples after Plasma Trimming™ is prevented by storing the samples in SampleSaver™ containers.

Standard Package:

- Plasma Trimming™ Rod and Power Supply
- Vacuum Rod Plug
- Five Modified Fortress™ Holders
- SS-100 SampleSaver™ with SS100-FIB rack
- Fortress™ Sample Loader
- Graphite Paint and Paintbrush



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