



Automatic Twin-Jet Electropolisher General Instructions (Part Numbers 001-0001 and 001-0002)

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PN 483-0006 Rev.04

1.0 SET-UP

- 1.1 Plug the Connecting Cable into the socket located on the back of the Power Control.
- 1.2 Insert the Motor Plug into its socket on the Connecting Cable. For proper pump rotation, ensure that the wires are connected to their corresponding colors.
- 1.3 Insert the Light Socket and Photocell Socket into their respective Holder Slides (see page 6).
- 1.4 Tighten the common cathode leads under the Acorn Nuts on the Jet Assemblies.
- 1.5 Connect the anode clip lead onto the Specimen Holder Rod.

WARNING: Shock Hazard With the Power Control polishing voltage energized, never simultaneously touch the cathode leads and any uninsulated part of the anode lead or Specimen Holder Rod.

- 1.6 If required, cooling with tap water circulation can be accomplished by threading the Cooling Hose Fittings into the Box. Take care not to over tighten.

If further cooling is required, a mixture of LN₂ and methanol or isopropyl alcohol is recommended and should maintain a temperature of between -80 and -60 degrees C for approximately one hour. It is recommended that mixing is done within the optional Model 220 Low Temp Container. The liquid level should be equal to the electrolyte level within the dish. Place a funnel in the hole in the top cover of the Model 220 and add the alcohol until the liquid level is equal to the electrolyte level. Now SLOWLY add LN₂. Pause if there is significant boiling. Stop when the desired temperature has been achieved. It may be necessary to repeat the LN₂ filling procedure a few times before the temperature stabilizes. The best way to monitor temperature is to use a glass thermometer that reads in the low range. It can be placed through the hole in the top cover of the Model 220 into the coolant mixture.

2.0 ALIGNMENT PROCEDURE

- 2.1 To adjust the spacing between the Jet Assemblies, simply loosen the Thumb Screws, reposition the Jet Assemblies, then retighten the Thumb Screws. Experience has indicated that with a total jet separation of 1.5 cm, subsequent adjustment of motor speed and polishing voltage will provide optimum results.
- 2.2 The Light Conduits are factory adjusted so that the protruding ends are level with the opening in the Nozzle of the Jet Assembly. If readjustment is required, loosen the Set Screw in the Holder Slide, reposition the Light Conduit, then retighten the

Set Screw. Separation of the Light Conduits should be such that the protruding ends do not interfere with the flow of electrolyte.

NOTE: Care should be taken when handling the glass Light Conduits. Bumping or over tightening the Set Screw into the Holder Slide may result in Light Conduit breakage.

- 2.3 The position of the Specimen Holder should be adjusted so that the exposed specimen area is aligned with the Jet Assemblies and Light Conduits. The Specimen Holder should be perpendicular to the Jet Assemblies.
- 2.4 For final Specimen Holder adjustment, place the Specimen Holder into the Model 110 Twin-Jet Electropolisher. Remove the Photocell Socket of the Connecting Cable from its Holder Slide and turn the light source "ON". (For the Model 120 the light is activated by the Alarm Switch. For the Model 140, the Polish Switch will activate the light in either the AUTO or CONT mode.). When using the Model 120 it is necessary to cover the photocell with a piece of black tape to silence the audible alarm. The Alarm Silent Switch on the Model 140 should be used to silence the audible alarm.
- 2.5 While looking down into the Photocell Holder Slide, observe the light transmitted by the Light Conduits and perform the necessary vertical and lateral adjustments to center the Specimen Holder.
- 2.6 The Specimen Holder may be positioned even more precisely by placing a specimen with a centrally located hole (approximately 100 microns in diameter) into the Specimen Holder and repeating Step 2.5. A used electron microscope condenser aperture is ideal for this purpose.
- 2.7 With the Specimen Holder positioned correctly and the Photocell Socket back in place, the sensitivity should be reduced to a minimum setting such that the alarm is still activated when the light is turned on. Too high of a sensitivity setting may, in some cases, result in a premature alarm.

3.0 SPECIMEN PREPARATION

- 3.1 For best results, begin specimen preparation with an initial specimen thickness of between 25 and 50 microns.
- 3.2 Disks may be obtained by using a suitable metal punch. The Fischione Instruments Model 130 Specimen Punch is recommended for this application.

- 3.3 Insert the Disk into the Specimen Holder and ensure that electrical contact has been made with the Platinum Contact.

4.0 ELECTROPOLISHING

- 4.1 With the specimen installed and all connections and adjustments made, the polishing process can begin.

IMPORTANT: Always follow the electrolyte manufacturer's safety procedures for proper handling and ventilation.

- 4.2 Fill the Glass Dish with electrolyte until the level is just above the specimen area and below the top of the Specimen Holder Insert.

- 4.3 Adjust the Motor Speed Control to the lowest setting that enables the electrolyte to impinge upon the specimen. This should be observed by raising the electropolishing Lid unit until the Jet Assemblies and electrolyte flow are visible.

- 4.4 To begin current flow, turn the Polish Switch to the "ON" position for the Model 120.

- 4.4.1 For the Model 140 with the Polish Select Switch control in the "AUTO" mode, the photocell circuitry immediately stops the current flow by latching the internal relay "OFF" at the first sign of light penetration through the specimen. With the Polish control in the "CONT" mode, the photocell is ignored.

The push buttons for the Polish control and Pump control on the Model 140 work in this fashion:

To select either AUTO or CONT, depress the button that is next to the desired mode. To turn off that mode, depress either button.

It should be noted that when using the Model 140 Digital Power Control, the Polish control and the Pump control both interact identically with the photocell shut-off circuitry.

When either the Pump control or Polish control is operated in the "AUTO" mode, if the photocell detects light above the alarm threshold, the alarm is activated and the respective control (Pump and/or Polish) is automatically set to "OFF." The alarm must be reset by pressing the Alarm Reset pushbutton, before operation in the "AUTO" mode can be re-started. Operation in "CONT" mode is independent of the alarm.

- 4.5 The optimum voltage for polishing may be determined by examining the foil surface using an optical microscope. If etching is apparent, the voltage should generally be increased. The voltage required for best polishing conditions will vary with the electrolyte employed and the material being polished.
- 4.6 When the optimum polishing conditions have been determined, polishing may be continued until specimen perforation occurs. After perforation, the specimen should be removed to a rinse solution as quickly as possible to minimize contamination.

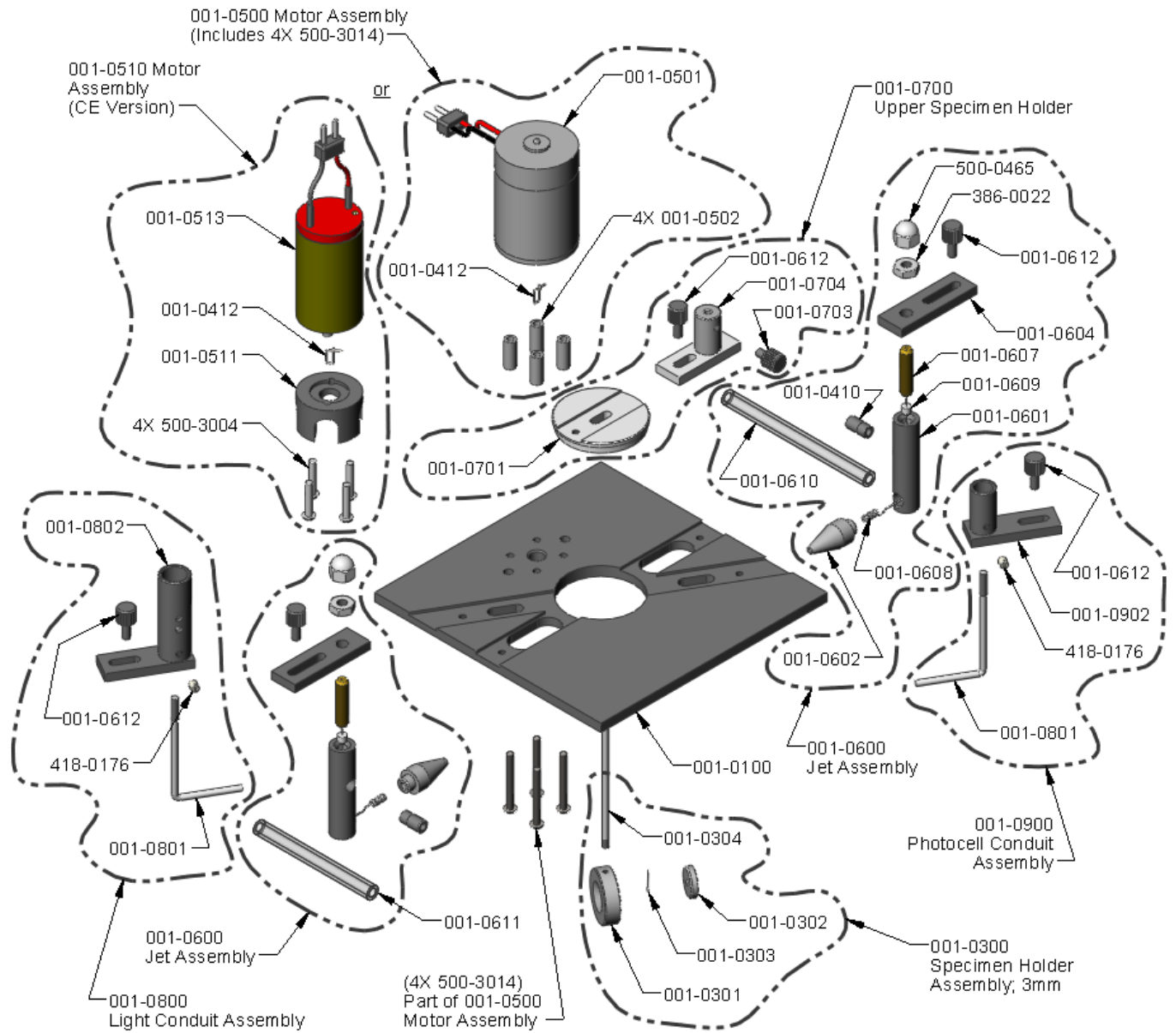
DO NOT USE ACETONE

After each day's use, it is essential to flush the Electropolisher with water and then alcohol (methyl or isopropyl) and allow to dry overnight. (For best results, the Electropolisher should always be kept clean.)

A complete, updated list of electrolytes can be found at:

http://www.fischione.com/product_support/model_110_application_notes.asp

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