

ELECTROPREP[™] 053



micromeritics[®]

**Effective Solutions for
Material Characterization**

OPERATOR MANUAL

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June 2019
(Rev A)

TRADEMARKS

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CORPORATE PROFILE

Micromeritics Instrument Corporation is a leading global provider of solutions for material characterization with best-in-class instrumentation and application expertise in five core areas: density; surface area and porosity; particle size and shape; powder characterization; and catalyst characterization and process development. Founded in 1962, the company is headquartered in Norcross, Georgia, USA and has more than 300 employees worldwide. With a fully integrated operation that extends from a world class scientific knowledge base through to in-house manufacture, Micromeritics delivers an extensive range of high-performance products for academic research and industrial problem-solving. The implementation of tactical partnerships to incubate and deliver valuable new technologies exemplifies the company's holistic, customer-centric approach which extends to a cost-efficient contract testing laboratory – the Particle Testing Authority (PTA). The strategic acquisitions of Freeman Technology Ltd and Process Integral Development S.L. (PID Eng & Tech) reflect an ongoing commitment to optimized, integrated solutions in the industrially vital areas of powders and catalysis.

Freeman Technology (Tewkesbury, UK) brings market-leading powder characterization technology to Micromeritics' existing portfolio of particle characterization techniques. The result is a suite of products that directly supports efforts to understand and engineer particle properties to meet powder performance targets. With over 15 years of experience in powder testing, Freeman Technology specializes in systems for measuring the flow properties of powders. In combination with detailed application know-how these systems deliver unrivalled insight into powder behavior supporting development, formulation, scale-up, processing and manufacture across a wide range of industrial sectors.

PID Eng & Tech (Madrid, Spain) complements Micromeritics' renowned offering for catalyst characterization with technology for the measurement and optimization of catalytic activity, with a product range that extends to both standard and bespoke pilot scale equipment. Launched in 2003, PID Eng & Tech is a leading provider of automated, modular microreactor systems for the detailed investigation of reaction kinetics and yield. These products are supported by a highly skilled multidisciplinary team of engineers with in-depth expertise in the design, construction and operation of laboratory units and process scale-up.

The Particle Testing Authority (PTA) provides material characterization services for fine powders and solid materials using Micromeritics' instrumentation alongside complementary solutions from other vendors. With the certification and expertise to operate across a wide range of industries the PTA offering runs from single sample analysis to complex method development, method validation, new product assessment, and the analytical support required for large scale manufacturing projects. An experienced, highly trained team of scientists, engineers, and lab technicians works closely with every client to ensure that all analytical requirements are rapidly and responsively addressed.

Micromeritics has a strong global network with offices across the Americas, Asia, and Europe complemented by a dedicated team of distributors in additional locations. This ensures that local, knowledgeable support is available for every customer, in academia or industry. Micromeritics works across a truly diverse range of industries from oil processing, petrochemicals and catalysts, to food and pharmaceuticals, and at the forefront of characterization technology for next generation materials such as graphene, metal-organic-frameworks, nanocatalysts, and zeolites. Engineering solutions that work optimally for every user is a defining characteristic of the company.

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ABOUT THIS MANUAL

The following icons may be found in this manual:



NOTE — Notes contain important information applicable to the topic.



CAUTION — Cautions contain information to help prevent actions that may damage the analyzer or components.



WARNING — Warnings contain information to help prevent actions that may cause personal injury.

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1 ABOUT THE ELECTROPREP



The ElectroPrep recirculates electrolyte through a filter cartridge that retains particles greater than 0.1 to 0.2 micrometers in diameter. The electrolyte is contained in a 9 liter (2 gallon) container; it circulates at a rate of 0.5 L/min. It provides a supply of clean electrolyte which ensures a low baseline when conducting particle analyses using Micromeritics' Elzone II 5390 analyzer.

For electrolytes in which sample particles readily disperse — such as alumina in saline water — without having to employ an additional dispersing agent, the waste liquid can be poured back into the container and reused. In typical usage, one preparation of electrolyte will last several months before the filter cartridge requires replacing. This is also true with saturated electrolytes.

Waste liquid cannot be recycled when the sample material requires a special dispersing agent because putting it back in the electrolyte would change the electrolyte composition. The ElectroPrep is still useful in these situations by providing a ready source of clean electrolyte to fill instrument sample beakers and supply containers. The ElectroPrep can be used with either aqueous or organic electrolytes by selecting the appropriate cartridge. Refer to the Elzone operator manual for a discussion on electrolytes.

INTENDED USE AND PRECAUTIONS

The ElectroPrep 053 removes particles greater than 0.1 - 0.2 micrometers from electrolytes to be used with Micromeritics' Elzone analyzer or related equipment. By doing so, it allows tests to proceed without background interference. The ElectroPrep comes in two configurations — one for aqueous electrolytes and one for organic electrolytes. The models are identical except for the filtering cartridges.



An aqueous cartridge can only be used with aqueous electrolytes and an organic cartridge is suitable only for organic electrolytes. Do not attempt to use them interchangeably.

When making a small change in the composition of either an aqueous or an organic electrolyte by employing — such as a different dispersing agent — purge the ElectroPrep for an hour with the new preparation before using it in an analysis.

It is possible for circulating, combustible, non-conducting liquids to build up significant electrostatic charges — enough even to ignite such liquids. The ElectroPrep is intended for filtering electrolytes (conducting liquids) only.



Never use the ElectroPrep with electrically non-conducting liquids.

SPECIFICATIONS FOR THE ELECTROPREP 053

Specification	Description
Electrical	
Accommodates to standard power mains worldwide.	
Voltage	100/120, 220/240 VAC
Current	1.3 A (100/120 VAC) 0.7 A (220/230 VAC)
Frequency	50/60 Hz
Environment	
Temperature	15 - 30 °C (59 - 90 °F), storing and shipping
Exposed Materials	
Polypropylene, polyethylene, Viton, nylon (aqueous), Teflon (organic)	
Operating Parameters	
Typically filters 25 L/hr	
Physical	
Height	38 cm (15 in.)
Width	33 cm (13 in.)
Depth	30 cm (12 in.)
Weight	5.3 kg (11.6 lbs.)
Supplies	
Liquid	Aqueous or organic (depending on cartridge)
<i>In keeping with a policy of ongoing product improvement, specifications are subject to change without notice.</i>	

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2 INSTALLATION



To allow ready access to clean electrolyte, place the ElectroPrep near the Elzone II.

UNPACKING AND INSPECTION

When the equipment is received, unpack and inspect the contents of the shipping container(s). Use the packing list to verify that all products, accessories, software (if applicable), and documentation are received intact and in the correct quantity. The shipping container(s) and contents should be inspected within a few days of receipt in the event damage or loss has occurred. Sort through all packing material before declaring missing equipment or parts.



Micromeritics recommends saving all shipping containers until installation of the equipment is complete. All shipping containers where equipment is to be declared as damaged or lost must be examined by the claims investigator prior to completion of the inspection report.

SHIPPING DAMAGE

If equipment is damaged or lost in transit, you are required to make note of the damage or loss on the freight bill. The freight carrier, not Micromeritics, is responsible for all damage or loss occurring during shipment. If damage or loss of equipment is discovered during shipment, report the condition to the carrier immediately. Insurance claims **MUST** be made with the freight carrier, **NOT** Micromeritics.

- Keep all software, manuals, and accessories with the equipment.
- Report any shipping damage immediately to the carrier and follow their directions.
- Report missing or wrong parts to Micromeritics, in addition to any shipping damage, only after filing a claim with the carrier.
- **Micromeritics will NOT file a claim for shipping damage.**
- **Do not discard shipping boxes and containers until installation is complete. If space is available, it is recommended that shipping containers be saved for future use in the event of return to factory for repair.**

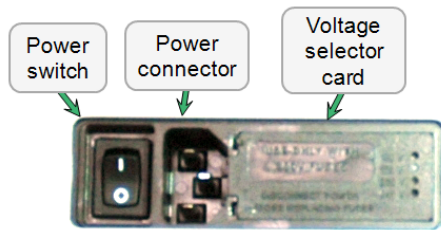
EQUIPMENT RETURNS

Micromeritics strives to ensure that all items arrive safely and in working order. If it is necessary to return equipment (damaged either during shipment or while in use) to Micromeritics for repair or replacement, follow these procedures:

1. Tag or identify the defective equipment, noting the defect and circumstances under which the defect is observed.
2. Reference the sales or purchase order and provide the date the equipment was received.
3. Call Micromeritics for a Return Material Authorization number.
4. Pack the equipment in the original shipping container, if possible. If the original container is unavailable, for a nominal fee, Micromeritics can provide another container for shipping.

SELECT INPUT POWER

All instruments leave the factory set for 120 VAC and with the line fuse removed. The correct setting of the universal power entrance must be checked and the appropriate fuse(s) installed before the ElectroPrep can be operated. The ElectroPrep is designed to operate with 100, 120, 220, or 230 VAC at 50 or 60 Hz. Voltage selection and fusing are made via the voltage selector card located near the power switch.



The power cord should be disconnected from the instrument before removing the cover from the input power connector. Failure to disconnect the power cord could result in electrical shock.

The input power connector can be used with either a single-fuse arrangement (100-120 VAC) or a double-fuse arrangement (200-240 VAC). Use the appropriate fuse(s) for the input power source.



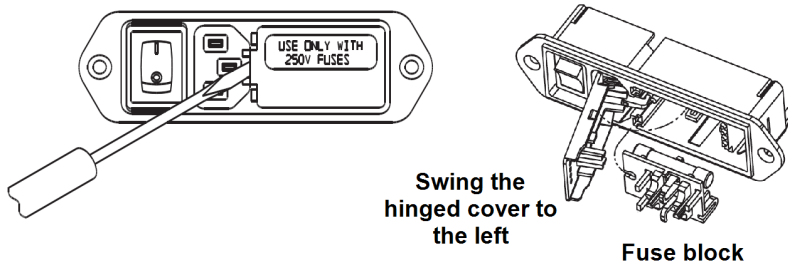
The fuses must be identical in type and rating to that specified. Use of other fuses could result in electrical shock and/or damage to the instrument.

Power Source	Required Fuses
100-120 VAC	1.0 Amp, slow-blow
200-230 VAC	0.5 Amp (slow-blow) 5 × 20 mm, Type T (required for double-fuse arrangement)

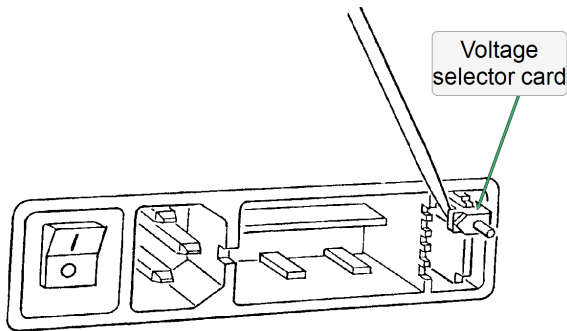
1. Ensure the power cord is disconnected from the instrument.
2. Check the voltage setting on the cover of the power entrance, then open the cover to remove the fuse block.
3. Insert the tip of a small pocket screwdriver (or pointed object) in the left side of the power module then gently pry the cover open.



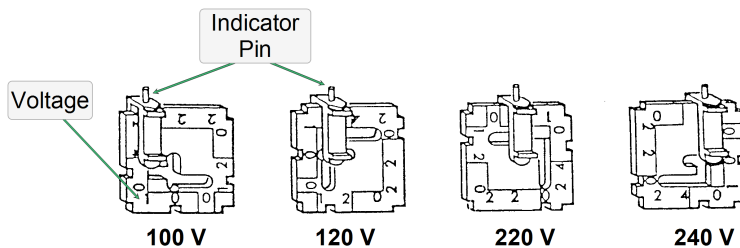
Do not pry in the middle of the cover near the hinges. Doing so may break the hinge.



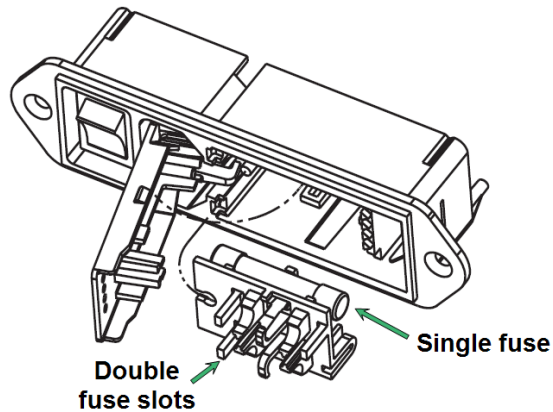
4. Gently lift until the cover lifts approximately 1/4 inch, then swing the cover to the left. The cover is hinged and cannot be removed.
5. Remove the fuse block. If necessary, use needle-nose pliers to grasp the block.
6. Position the fuse block so that the side containing the fuse(s) is facing the power module and insert it into the connector. Do not close the cover.
7. Pull the voltage selector card straight out of the power connector housing. If necessary, use needle-nose pliers to grasp the card.



8. Position the voltage selector card so that the voltage is indicated at the bottom. Position the indicator pin so that it points upward as shown in the following illustration.



9. Insert the voltage selector card into the power connector housing with the edge containing the correct voltage first and with the printed side facing the power switch switch.
 - a. If the single-fuse arrangement is used, the fuse block is positioned so that the side with the single-fuse slot and the jumper bar is away from the cover (as shown here).



- b. If the double-fuse arrangement is used, the fuse block is positioned so that the side with the double-fuse slots is away from the cover (insert just opposite of single-fuse arrangement).

10. Snap the fuse block into place.



When using the double-fuse arrangement, the fuse block will not snap into place. Position the fuse block properly. When the cover is closed, the fuse block will seat properly.

11. Close the cover to the power entry module. Ensure that the indicator pin is in the correct position.

POWER CORD

Insert one end of the power cord into the ElectroPrep input power connector and the other end into an appropriate power source. Do not power on the ElectroPrep until the water container has been prepared and operation is ready to begin. See [Operation on page 3 - 1](#).



Do not power on ElectroPrep until the electrolyte is prepared and ready for operation. Failure to have liquid circulating while the unit is turned on will damage the pump.

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3 OPERATION

FILTER THE ELECTROLYTE

A cartridge can be expected to operate satisfactorily in a typical application for several months. Eventually the discharge rate will diminish to an unacceptable level and the cartridge must be replaced. See [Replace the Cartridge on page 4 - 1](#). Aqueous electrolytes should have an antibacterial agent — such as sodium azide or formaldehyde — added to keep the electrolyte sterile. Growing bacteria or other organisms can greatly shorten the life of a filter cartridge.

Prepare 8 to 9 liters of electrolyte. If the electrolyte is to be aqueous, use distilled water if available.



Cartridges are specific and not interchangeable. The type of cartridge determines the solvent that can be used. Ensure the use of a suitable water cartridge when using water and the required cartridge if the continuous phase is organic.

1. Remove the cap on the ElectroPrep container and pour in the electrolyte. Replace the cap. It is not necessary for the cap to be screwed on tightly. Its purpose is primarily to prevent extraneous matter from falling into the container. Ensure the tube is not submerged into the electrolyte.



Do not allow tubing to submerge into the electrolyte. Typically the tubing is inserted 1 to 2 inches into the cap, approximately to the neck of the bottle.

2. Power on the ElectroPrep.
3. On the cartridge, turn the upper blue cap slightly counter-clockwise to allow a small amount of liquid to escape, then tighten the cap. This removes air from inside the cartridge which otherwise might block some of the filtering surface.



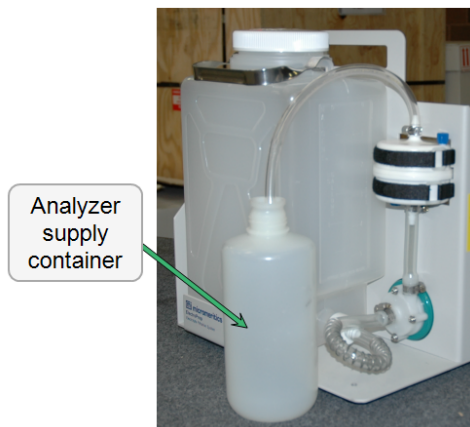
4. Allow the electrolyte to circulate for at least an hour before using.



The circulating pump is damaged if it runs dry. Ensure there is always adequate liquid in the container.

FILL THE SUPPLY CONTAINER OF THE ELZONE ANALYZER

1. Power off the ElectroPrep.
2. Remove the discharge tube from the electrolyte container and insert it into the analyzer supply container.



Analyzer
supply
container

3. Power on the ElectroPrep. Power it off when the supply container is filled.



To avoid overfilling, do not leave the ElectroPrep unattended when the supply container is being filled.

4. Return the discharge tube to the ElectroPrep container and power on the ElectroPrep to continue the circulation.
5. Wipe the cap to the electrolyte container to remove any electrolyte drips.



After performing analyses, the waste container from the Elzone analyzer will fill as the supply container is depleted and will need to be emptied. The waste can be returned to the ElectroPrep container for recleaning if the electrolyte has not been altered by using a different dispersing agent. If the electrolyte has been altered, discard the waste liquid.

FILL THE ANALYSIS BEAKER

1. Wash the beaker over a sink. Do not dry the beaker with a towel as this may deposit lint or fibers.
2. Holding the beaker over the mouth of the ElectroPrep container. Rinse it thoroughly with electrolyte allowing the excess to fall into the container for recirculation.



3. Collect the required quantity of electrolyte for analysis.



After analysis, return the contents of the beaker to the ElectroPrep container if no new particle dispersants were added to the sample. Otherwise the contents must be discarded.

4 TROUBLESHOOTING AND MAINTENANCE

For troubleshooting and maintenance items not listed, contact your local Micromeritics service representative.

CHECK THE FUSE

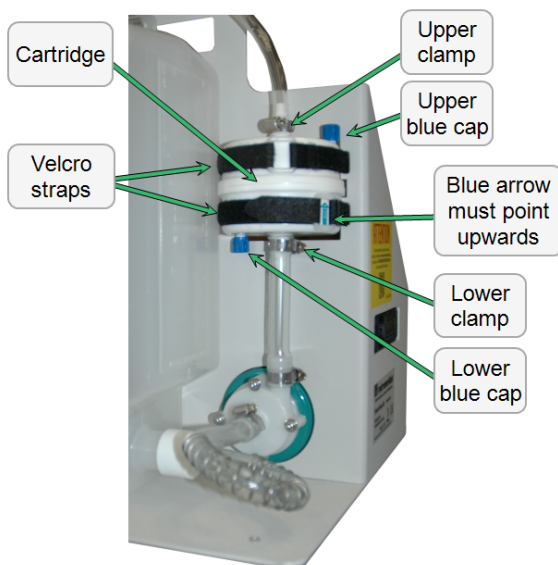
If the ElectroPrep fails to respond when the unit is powered on, first unplug the power cord and check the fuses(s); replace if necessary. See [Select Input Power on page 2 - 3](#). Check the power receptacle for its voltage to prevent recurrence of the problem.

REPLACE THE CARTRIDGE

Replace the cartridge when deterioration is detected. Deterioration is suspect when one or more of the following occurs:

- flow through the cartridge begins to diminish
- particle detection increases in background analyses
- bacteria is growing in the tube from the filter to the container

The typical life of a cartridge is 4 to 6 months. It is recommended to change the cartridge at least every six months before deterioration has a chance to begin.



1. Power off the ElectroPrep and unplug it from the power source
2. Remove the cap and tube from the electrolyte container.
3. Carefully pour the contents from the electrolyte container into a temporary container large enough to hold all of the contents of the electrolyte container.



The power cord should be disconnected from the ElectroPrep before replacing a cartridge. Failure to disconnect the power cord could result in electrical shock.

4. Use a flat-blade screwdriver to loosen the upper tube clamp. Disconnect the discharge tubing from the upper barbed fitting of the cartridge.
5. Release the two Velcro straps holding the cartridge in the frame.
6. Rotate the cartridge until the lower blue cap is on the right side of the ElectroPrep.
7. Place a beaker underneath the lower blue cap then loosen and remove the cap.
8. Loosen the upper blue cap to allow water to flow freely into the beaker.
9. Use a flat-blade screwdriver or nut driver to loosen the tube clamp at the base of the cartridge and remove the cartridge.
10. Replace with a new cartridge. Ensure the arrow on the cartridge points upward. Reconnect the tubing on both top and bottom of the cartridge and tighten clamps securely.
11. Refasten the two Velcro straps. Return the electrolyte from the temporary container to the container of the ElectroPrep.
12. Plug the power cord in to the power source and power on the ElectroPrep.
13. Open the upper blue cap until liquid starts to flow, then close the cap.
14. Allow the ElectroPrep to operate for an hour, opening occasionally the upper blue cap to discharge air.

5 PARTS AND ACCESSORIES

Order system components and accessories using one of the following methods:

- Call our Customer Service Department at 1-770-662-3636
- Email orders to Orders@Micromeritics.com
- Contact your local sales representative

Part Number	Item and Description
003-51130-00	Fuse, 1.0 Amp, 3 AG, slow-blow
003-51193-00	Fuse, 0.50 Amp, 5 x 20 mm, slow-blow (T1 delay)
004-25046-01	O-ring, 115, FKM, 75A 053 Carboy fitting
004-27002-00	Filter cartridge, aqueous
004-27003-00	Filter cartridge, organic
053-31120-00	Fitting, Carboy
053-31121-00	Spring, compression, 316SS
053-32800-00	Container, plastic; 9 liters
053-42801-00	Operator manual

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