

# LIQUID/POWDER RESISTIVITY TEST CELL

Models 828 and 828M



Model 828

Model 828M

## Instruction Manual

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## 1.0 DESCRIPTION

The standard Model 828 shown in Figures 1.0-1 A and B is a dual cell test chamber for measuring volume resistivity of powders and liquids. The Teflon™ cell dimensions automatically calculate the volume resistivity of the material being tested by multiplying the measured resistance by either x10 (large cell) or x100 (small cell). The stainless steel container acts as both an electrostatic shield and provides some containment of material overflow. The electrodes are stainless steel and incorporate Buna-N (nitrile) grade gaskets to provide a liquid-tight seal. The cell outer section incorporates a ¼" wide overflow cavity to capture excess material.



Figures 1.0-1A & -1B Standard Model 828 Test Cell

The Model 828M shown in Figure 1.0-2 provides the capability of adjusting both the multiplier and the degree of compression of the material being tested by incorporating a 25mm micrometer attached to the top electrode to precisely adjust the thickness of the material being measured. When the micrometer is set to 0 the two electrodes are in contact with each other and the thickness of the material is 0. When the micrometer is set to 25 (2.5cm) the thickness of the material is 25mm and the  $A/t$  calculation equals 10. Only the large chamber is normally used for this application. A 15mm calibrator is provided to calibrate the micrometer setting in the field.



Figure 1.0-2 Model 828M

The Model 828 and 828M can be used with any resistance meter capable of measuring over the range of the material resistance and having standard .061 banana plug cable termination. For high resistance measurements a ground connection is incorporated in the outer can.

## 2.0 OPERATION

Connect the resistance meter to the test cell (refer to Figures 2.0-1 and 2) as follows:

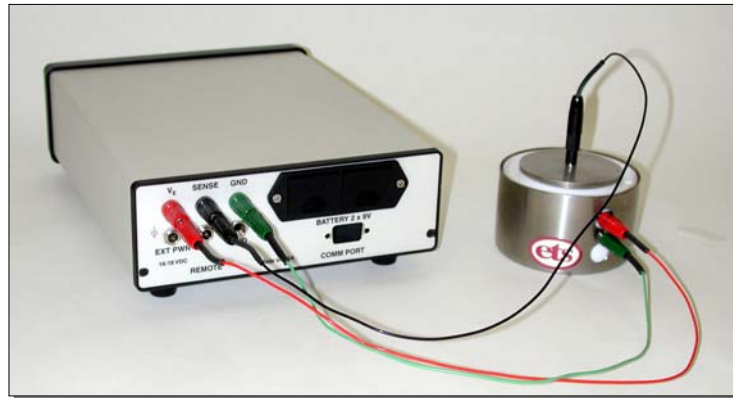


Figure 2.0-1 Model 828 Test Cell Set-up

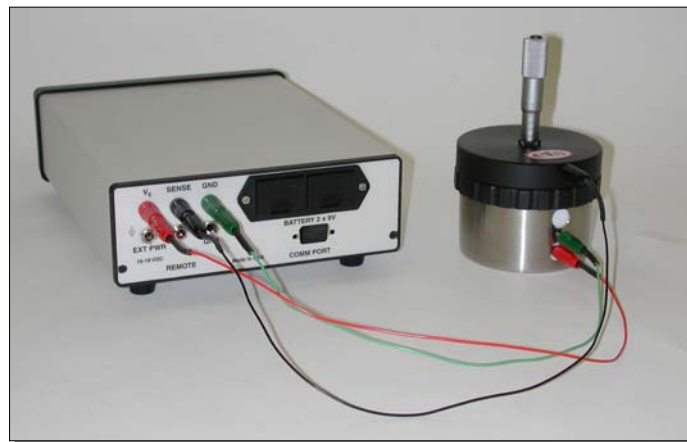


Figure 2.0-2 Model 828M Test Set-up

Red or  $V_E$  lead to the center electrode (30" cable incl.)

Black or SENSE lead to the top electrode (30" cable incl.)

Green GROUND lead to the small hole located between the banana plug access holes in the can to provide a shield to meter ground, if available, or house ground (30" cable incl.).

Insert the test chamber into the metal can making sure the hole in the center electrode lines up with the appropriate large hole on the side of the can. The large cell facing up is for  $\times 10R_m$  measurements and the small cell facing up is for  $\times 100R_m$ . For the Model 828M only the  $\times 10$  cell is normally used.

For the standard Model 828 fill the appropriate chamber with material. When testing liquids fill to approximately .031" (.75mm) from the top. When testing powders fill the chamber up to the top to allow a slight compression of the powder. Place the electrode on top then take a measurement.

For the Model 828M fill the  $\times 10$  cell to the desired level. Unscrew the micrometer sufficiently to be above the material level. Place the lid onto the stainless container. Make sure the lid is sitting evenly around the can. Adjust the micrometer until contact is made with the material. Do not use the ratchet knob located on top of the micrometer. The best way to determine this is to observe the resistance meter reading. For liquids no additional adjustment is necessary.

To determine the change in volume resistivity when compressing powders continue to adjust the micrometer. Record the micrometer setting and resistance reading for each measurement. To calculate volume resistivity,  $\rho_v$ , insert the micrometer reading and measured resistance into the formula below:

$$\rho_v = \frac{A \text{ cm}^2}{t \text{ cm}} R_m = \frac{25 \text{ cm}^2}{0.1 \times \text{mic reading (mm)}} R_m \text{ Ohms-cm.}$$

### 3.0 MAINTENANCE

Teflon™ and stainless steel plus 0.062" diameter, 2.125 ID x 2.25 OD Buna-N (nitrile) gaskets used in the construction of the Model 828 enable most powders and liquids to be tested. For normal applications the entire chamber assembly can be cleaned without dismantling using warm water, alcohol or the appropriate solvent for the product being tested. Figure 3.0-1 is an exploded view of a complete Model 828M.



Figure 3.0-1 Complete Model 828M system

For powder testing applications it is not necessary to secure the Teflon cells to the center electrode. It is also not necessary to secure the x10 cell when testing liquids. However, due to flexing of the smaller x100 cell it should be secured to the electrode using three (3) 6-32x .375" (10mm) 100°, flathead screws (provided) when testing liquids. To dismantle, push the electrode away from the cell. If secured, unscrew the 3 flat head screws securing the x10 section. The 3 components and gaskets can then be separated and cleaned individually. When reassembling, align the hole in the x10 cell with the hole in the electrode and apply equal force around the cell until the electrode and cell are evenly contacting each other. The 3 screws in the x10 cell are used to plug the additional holes in the cell in the event the cell must be secured to the electrode. Three 6-32 x 1.125", 100°, flat head screws are required.

To remove or adjust the Model 828M micrometer, first unscrew the white banana jack from the Delrin cover then remove the small spring. Using a 5/64" Allen wrench loosen the 8-32 set screw inside. The micrometer can then be adjusted. To remove the micrometer, first disassemble the electrode using a 1/16" Allen wrench to loosen the 6-32 set screw.

Included with the Model 828 are 30" (76cm) red, black and green cables plus a spare set of gaskets, three 6-32 x 1.125" and three extra 6-32x.375" screws.

## 4.0 WARRANTY

Electro-Tech Systems, Inc. warrants its equipment, accessories and parts of its manufacture to be and remain free from defects in material and workmanship for a period of one (1) year from date of invoice and will, at the discretion of Seller, either replace or repair without charge, F.O.B. Glenside, similar equipment or similar part to replace any equipment or part of its manufacture which, within the above stated time, is proved to have been defective at the time it was sold. All equipment claimed defective must be returned properly identified to the Seller (or presented to one of its agents for inspection). This warranty only applies to equipment operated in accordance with Seller's operating instructions.

Seller's warranty with respect to those parts of the equipment which are purchased from other manufacturers shall be subject only to that manufacturer's warranty.

The Seller's liability hereunder is expressly limited to repairing or replacing any parts of the equipment manufactured by the manufacturer and found to have been defective. The Seller shall not be liable for damage resulting or claimed to result from any cause whatsoever.

The warranty becomes null and void should the equipment, or any part thereof, be abused or modified by the customer or if used in any application other than that for which it was intended. This warranty to replace or repair is the only warranty, either expressed or implied or provided by law, and is in lieu of all other warranties and the Seller denies any other promise, guarantee, or warranty with respect to the equipment or accessories and, in particular, as to its or their suitability for the purposes of the buyer or its or their performance, either quantitatively or qualitatively or as to the products which it may produce and the buyer is expected to expressly waive rights to any warranty other than that stated herein.

ETS must be notified at 215-887-2196 x220 before any equipment is returned for repair. ETS will issue an RMA (Return Material Authorization) number for return of equipment.

Equipment should be shipped prepaid and insured in the original packaging. If the original packaging is not available, the equipment must be packed in a sufficiently large box (or boxes if applicable) of double wall construction with substantial packing around all sides. The RMA number, description of the problem along with the contact name and telephone number must be included in formal paperwork and enclosed with the instrument. Round trip freight and related charges are the owner's responsibility.

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