

# MINIATURE TWO-POINT PROBE SET

PRF-922B

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User Manual





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## PROSTAT® PRF-922B MINIATURE TWO-POINT PROBE SET

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## I. Introduction & Description

The PRF-922B Miniature Two-Point Resistance Fixture Set accurately measures surface resistance of small areas. It consists of a PRF-922B Two-Point Resistance Fixture assembly, shielded cable equipped with BNC connectors; probe cover, and a BNC to male banana adapter.

The PRF-922B works in conjunction with a wide range resistance instrument, such as the Prostat PRS-801 Resistance System, PRS-812 Resistance Meter, or ESD Check ESI-870 Resistance Indicator, and an insulated test bed. This instrument and fixture combination provides direct point-to-point resistance measurements in ohms across the surface of small parts and assemblies.



**Figure 1: PRF-922B Miniature Two-Point Resistance Fixture Measurement Set.**

### A. PRF-922B Two-Point Resistance Fixture Description

This precision fixture consists of 2 gold plated, spring-loaded contact electrodes spaced 0.250 inches (6.35mm) apart, center-to-center. The electronic quality gold plated contact probes are 0.1-inch (2.54mm) in diameter, and are supplied with conductive synthetic rubber contact boots, which are 0.125-inch (3.18mm) diameter. The conductive boots are used to reduce contact resistance between the gold contact probes and materials under test in certain applications.

1. The resistance measurement range of the PRF-922B fixture is 0.9 ohms at <10 volts to 1.0E+12 (1.0x10<sup>12</sup>) ohms at 100 volts.
2. Contacts are pogo-pin type ATE quality probes made of beryllium Copper, coated with 60 micro inch of hard Gold. Spacing allows for measurement of items with surfaces approximately 0.125 inches wide having a length of 0.32 inches or larger.
3. The contact assembly's outer housing incorporates "stops" that insure consistent contact pressure during measurement.
4. Overall size of the PRF-922B is 0.50 inches in diameter by 7.0 inches (178 mm) long. This optimal size and shape make the fixture very comfortable and easy to handle. Its outer housing is made of black anodized aluminum.

## II. Cautions & Warnings

As with any electrical device, use proper electrical precautions and measurement practices to avoid personnel shock. Read this manual in its entirety before attempting to use these products.

### NOTE

This manual displays Cautions and Warnings alerting the user to hazardous operation and servicing conditions. **CAUTION** or **WARNING** headings throughout this publication flag this information, where appropriate. Follow all Caution and Warning instructions at all times.



5. **Do Not Use Or Store PRF-922B Or PRV-913B In Damp Environments.** Always store devices with protective caps in place in a dry environment, preferably at  $\leq 20\%$  Relative Humidity.

**CAUTION**

Storage or use of these instruments, fixtures and devices in damp or wet conditions may cause damage to electrical circuits, and contact surfaces, which may effect performance or increase the possibility of personnel shock or arc discharge.

6. Do not use these fixtures and devices in combustible or explosive environments.

**WARNING**

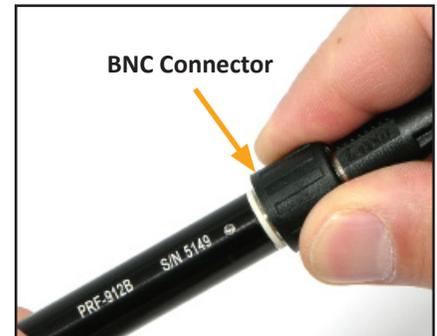
Improper handling and use of energized circuits may cause arc discharge, which in turn may cause the ignition of combustible materials or fumes. Do not use exposed energized circuits in flammable areas.

7. Do not attempt to measure energized materials, items or circuits with the PRF-922B
8. The PRF-922B is a precision fixture to be operated by experienced personnel familiar in the use and handling of devices employing energized power supplies.
9. Do Not Drop or cause mechanical damage to these devices.

**III. PRF-922B Micro Probe & PRV-913B Verifier Operations**

A. PRF-922B Setup

1. Connect measurement cable to PRF-922B
  - a. Remove black rubber protective cover from PRF-922B's BNC connection.
  - b. Attach shielded cable to the probe's BNC connection (Figure 2).
2. Connect measurement cable to Dual Banana BNC Converter (Figure 3).



**Figure 2: Connect shielded cable to PRF-922B's BNC fixture**



**Figure 3: Connect Cable to Banana Converter**



**Figure 4: PRF-922B with Cable & Banana Converter**

3. Once the cable and BNC adapter are installed the PRF-922B is ready for continuity test, verification and use (Figure 4).
4. To use, connect dual banana converter to wide range, resistance instrument with  $\frac{3}{4}$  inch terminal spacing. Flange side of dual banana should be connected to the Positive (+) power terminal.

**NOTE**

To remove BNC connections, apply slight pressure and twist connector counter clockwise

**B. Confirming Proper BNC Connections, Continuity & High Resistance Tests**

The following confirms proper connections by checking continuity of the micro probe against a metal plate, then confirms its ability to measure high resistance.

1. To confirm general setup and function of the PRF-922B, place the electrodes against a clean metal surface. For example, the plated metal side of the Prostat PTB-920, Dual Surface Test Bed.
  - a. Hold the PRF-922B vertically, and apply pressure to slightly compress the electrodes, making positive contact with the metal surface.
  - b. Activate the wide range, resistance instrument to obtain a measurement.
    - (1) In the case where the Prostat PRS-801 is the measurement instrument, it should measure approximately 1.0 ohm, or less.
    - (2) With other instruments, they should provide a LOW resistance indication. For example,  $<10^3$  ohms when using the ESD Check ESI-870 Resistance Indicator, or  $<10^4$  ohms when using the PRS-801 Resistance Meter.
2. Repeat the above procedure using the clean insulated surface (Black, labeled side) of the PTB-920, or an insulated acrylic plate.

- a. Hold the PRF-922B vertically, and apply pressure to compress the electrodes, making positive contact with the insulated surface.
- b. Activate the wide range, resistance instrument to obtain a measurement.
  - (1) In the case where the Prostat PRS-801 is the measurement instrument, it should measure  $1.0 \times 10^{12}$  ohms, or greater.
  - (2) With other instruments, they should provide a HIGH resistance indication. For example,  $10^{12}$  or  $>10^{12}$  ohms when using the ESD Check ESI-870 Resistance Indicator
  - (3) or approximately  $10^{11}$  ohms when using the PRS-801 Resistance Meter

C. PRF-922B Verification Using the PRV-913B Two-Point verification fixture

1. Connect the BNC/banana adapter to the wide range, resistance measurement instrument. Flange side of dual banana should be connected to the Positive (+) power terminal. This applies test voltage to the 10 outer ring electrodes.
2. Remove PRF-922B Probe Cover (Figure 5).
3. Position PRF-922B vertically into the PRV-913B Two-Point Verifier with its spring loaded pin electrodes making direct contact with the Verifier's gold plated test segments.
4. Depending on your resistance instrument select either 10V or 100V test voltage.
5. Measure PRF-922B probe resistance while positioned in the PRV-913B Two-Point Verifier. Resistance should be  $1.0 \times 10^6$  ohms  $\pm 5\%$ .



Figure 5: Remove Probe Cover

D. Basic Measurements Using the PRF-922B Micro Probe

1. Place material to be measured on an insulated test bed, the clean insulated surface (Black, labeled side) of the PTB-920, or an insulated acrylic plate.
2. Position the PRF-922B vertically directly over test area and lower it until the spring loaded center electrode makes direct contact with the material under test.
3. Apply sufficient pressure on the probe until the center and outer spring loaded electrode are partially compressed while in contact with the test material.



Figure 6: Insert PRF-922B Fixture into PRV-913B Two-Point Verifier and Measure Verifier Resistance

**IMPORTANT NOTE**

Adjust probe pressure to insure that the electrode springs are controlling the probe's connection with the material's surface and that the springs are not fully compressed against their stops. This will insure reproducible measurements.

4. Select appropriate instrument test voltage and initiate resistance measurement. ESD Association S11.11 test voltage guidelines for measuring packaging materials are as follows:
  - a. For material resistance measurements of less than  $1.0 \times 10^4$  ohms, use <10 volts.
  - b. For measurements of  $1.0 \times 10^4$  to  $<1.0 \times 10^6$  ohms, use 10 volts.
  - c. For measurements greater than  $1.0 \times 10^6$  ohms, use 100 volts

**NOTE:** For optimal performance and accuracy, use the Prostat PRS-801 Resistance System in its AUTOMATIC Mode (either Default Mode 1 [Ohms], or Mode 2 [Exponential 1.0EXX/Ohms] display). AUTOMATIC Mode will control test voltage, resistance range adjustment and electrification period automatically.

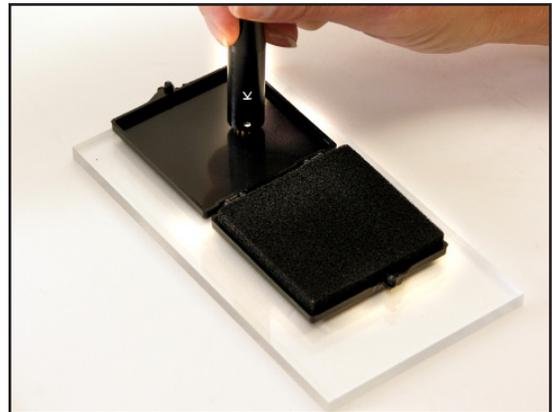
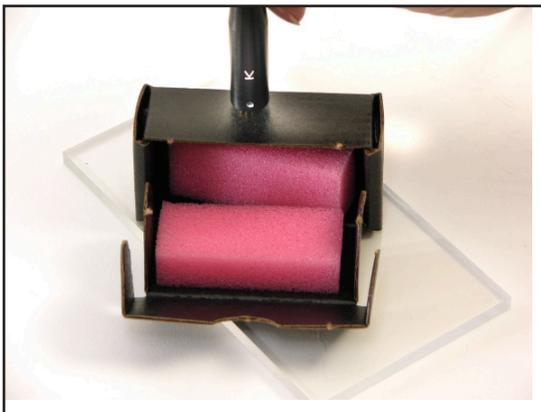
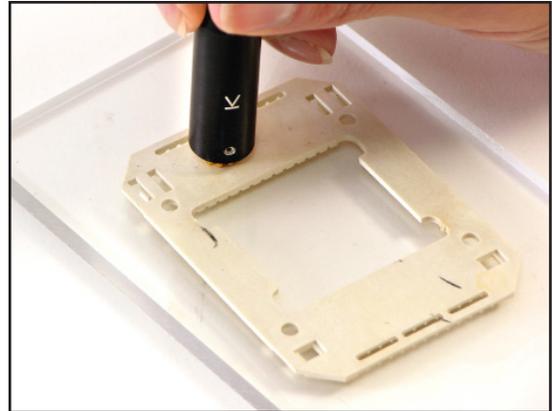
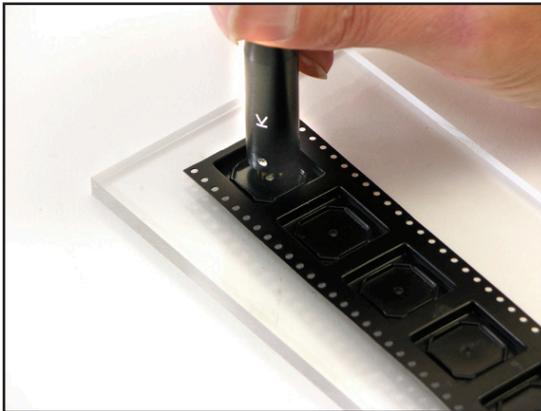


Figure 7: Measurement Illustrations Using the Prostat PRF-922B Fixture

## IV. Handling & Maintenance

### A. PRF-922B Miniature Two-Point Probe Fixture

1. Store the PRF-922B in a clean, dry environment with both BNC and Probe covers installed for environmental and mechanical protection.
2. Periodically, remove all spring-loaded test pins. Clean the spring-loaded test probes and Teflon mounting disk with a solution of laboratory grade isopropyl alcohol and a lint-less cloth, or laboratory quality swab. Allow components to dry thoroughly before re-assembling.



**Figure 8: Remove Spring-Loaded probe electrode by grasping firmly and pulling straight out of its socket.**

- a. Remove each test probe individually by grasping it firmly then pulling it straight out of its socket.
- b. Inspect each probe for damage, then clean with the alcohol solution. If a probe is damaged, i.e., bent, does not compress smoothly, or has deep surface scratches, replace it with a new probe of the same size and characteristics. (Contact Prostat Corporation, Customer Service for spare replacement probes.)
- c. Clean and dry the Teflon mounting disk twice to insure cleanliness
- d. Carefully re-install the spring-loaded test probes, and fully re-seat them in their sockets

3. After cleaning, perform Continuity, High Resistance and Verifier checks.

### B. Use of Conductive Rubber Electrode “Boots” to Reduce Contact Resistance

1. Measurements obtained without use of conductive rubber boots will simulate material contact by metal objects. In this situation, contact resistance is high and the resulting measurements will be higher than those obtained using conductive rubber boots. (Figure 9)
2. Conductive rubber boots are used to reduce contact resistance between the electrodes and material under test. Measurements made with boots installed are typically lower than those obtained without boots.



**Figure 9: Installing Conductive Rubber Electrode “Boots”**

### C. PRV-913B Two-Point Dual Verification Fixture

1. Store the PRV-913B in a clean, dry environment.
2. Periodically, clean and dry the gold fixture contact segments twice with a solution of laboratory grade isopropyl alcohol and laboratory quality swab.

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## V. Warranty Information

### A. Prostat Warranty

Prostat Corporation expressly warrants that for a period of one (1) year from the date of purchase, that Prostat instruments will be free from defects in material (parts) and workmanship (labor). If Prostat receives notice of such defect during the warranty period, Prostat will replace at its expense such parts that it determines to be defective. Any defective part must be returned to PROSTAT postage prepaid with proof of purchase date.

Warranty Exclusions – THE FOREGOING EXPRESS WARRANTY IS MADE IN LIEU OF ALL OTHER PRODUCT WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE SPECIFICALLY DISCLAIMED. The express warranty will not apply to defects or damage due to accidents, neglect, misuse, alterations, operator error, or failure to properly maintain, clean, or repair products. Limit of Liability – in no event will PROSTAT or any seller be responsible or liable for special, incidental, or consequential losses or damages, under any legal theory including but not limited to contract, negligence, or strict liability.

Fulfillment by Prostat of its express warranty obligations described above will be purchaser's exclusive remedy and will be Prostat's and seller's limit of liability for any breach of warranty or otherwise.

### B. Shipping of Warranty Returns

1. Obtain a Return Materials Authorization (RMA) number and shipping address from Prostat customer service. Pack the instrument carefully and ship it prepaid and insured to the proper destination provided by Prostat's customer service department.
2. For detailed shipping instructions and Return Materials Authorization (RMA), contact:

Prostat Corporation  
1072 Tower Lane  
Bensenville, IL 60106  
Telephone: (630) 238-8883  
Fax: (630) 238-9717

### C. Shipping Non-Warranty Items

1. Any Prostat product returned for non-warranty repair or calibration requires a Return Materials Authorization (RMA) number and should be packaged and shipped as described above, and as directed by Prostat's customer service department.
2. The following information must be included with the returned product:
  - a. Description of the problem
  - b. Customer's Purchase Order Number & Prostat's Materials Authorization (RMA) number
  - c. Name, telephone number and fax number of individual contact who can provide more information regarding the problem and related application(s).
  - d. Complete return address.

## **PRF-922B & PRV-913B Miniature Concentric Ring Fixture Set Specifications**

### PRF-922B Two-Point Micro Probe

Physical Dimensions:	Length: 5.9 inches (150mm) without probe cover. 6.5 inches (165mm) with probe cover. Probe diameter 0.5 inches (12.7mm). Probe cover outer diameter 0.63 inches (16mm).
Probe Weight:	1.5 ounces (43 grams)
Finish:	Black anodized
Dielectric Material:	Teflon
Contact Dimensions:	Inner (Center) Contact Probe: 0.1 inches (2.54mm)
Minimum Sample Size:	0.32 inches (8.2mm) diameter
Probe Spring Force/Test:	3.5 pounds (1.6 kg)
Probe Total Travel:	0.3 inches (7.8mm)
Connection:	BNC with outer source and inner sense connections
Cable:	RG-174 coaxial cable equipped with insulated BNC couplers, and BNC/Banana adapter for connection to Prostat PRS-801 Resistance System.
Power:	Not applicable. Fixture powered by resistance instrument.
Warranty:	Prostat Corporation, Limited one year

### PRV-913B Dual Verification Fixture

Physical Dimensions:	2.0 in x 2.0 in x 0.83 in (50.1mm x 50.1mm x 21mm)
Fixture Weight:	5.29 ounces (150 grams)
Finish:	Black anodized
Contact Pads:	Copper substrate with nickel and hard gold plating
Resistors:	±2% precision, 10-megohm resistors, total of 10 (Concentric Ring Side) ±2% precision, 1 each 10-megohm resistor (2-Point Side)
Power:	Not applicable. Powered by PRF-912B during test
Warranty:	Prostat Corporation, Limited one year

# NOTES

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