

# Miniature 2-Point Probe & Adapter Resistance Fixture Set PRF-922B, PRF-922A-B & PRV-913B



Operations Manual

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**PRF-922B, PRF-922A-B & PRV-913B Two-Point Miniature Concentric Ring Fixture Set**

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FIXTURE SET**

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## PRF-922B, PRF-922A-B & PRV-913B Two-Point Miniature Concentric Ring Fixture Set

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### I. Introduction & Description

The PRF-922B Miniature 2-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 PSI-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.



#### 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.

**Figure 1: PRF-922B Miniature 2-Point Resistance Fixture Measurement Set**

1. The resistance measurement range of the PRF-922B fixture is 0.9 ohms at <10 volts to  $1.0E+12$  ( $1.0 \times 10^{12}$ ) 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

PRF-922B Standard accessories include protective cover, one RG-174 cable, a BNC/banana adapter and instructions

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**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.

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**.

**A. Use of Measurement Power Supply**

1. The PRF-922B is a high performance micro probed designed for use with a **maximum input voltage of 100 volts**. As such, it is capable of delivering an annoying shock to any person touching the spring-loaded contacts when they are energized.
  - a. If used with the PROSTAT PRS-801 Resistance System, the current capability of the micro probe instrument combination is limited to a very low, typically harmless level. However, a distinct hazard exists in the operator's **reaction** to a possible shock.
  - b. To avoid shock, operating personnel should not touch the electrodes, or any exposed metallic part of the PRF-922B fixture or cable assembly when power is applied to the probe.

**CAUTION**

To avoid electrical shock, **Do Not Touch** the fixture test electrodes, test bed, or exposed metal BNC connections when power is being applied to the probe.

- c. The designed operating voltage limit for normal auditing and laboratory measurements is 100 volts. Exceeding 100 volts greatly increases the risk of personnel shock hazards.

**WARNING**

**Never** exceed the maximum applied operating test voltage of 100 volts.

- d. Only qualified instrument repair and test personnel should exceed the 100-volt operation limit, and then do so **only under controlled conditions using maximum precautions against personnel shock**.
      - e. *Never, under any conditions, exceed 500 volts during fixture test or repair.*

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## B. Other Operational Precautions

1. **Do Not Use the PRF-922B Micro Probe** if it fails to function during its continuity inspection test.
2. **Do Not Use the PRF-922B Micro Probe** if it becomes damaged in any way
3. **Only Prostat Corporation authorized**, qualified repair personnel may open PRF-922B housing, terminal assemblies, or perform product repair. Unauthorized opening of fixture or instrument housings, device tampering, or attempted repair will absolutely void product warranty and completely absolve Prostat Corporation, its employees, suppliers and representatives of any responsibility, liability, or other, whatsoever.

**WARNING**

Unauthorized opening of fixture or instrument housings, device tampering, or attempted repair **will absolutely void product warranty** and completely absolve Prostat Corporation of any responsibility, liability, or other, whatsoever.

4. **Do Not Touch Electrode Surfaces.** Electrodes will become contaminated with skin oils and salts, and may become damaged or rendered inaccurate.
5. **Do Not Use Or Store PRF-922B 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.

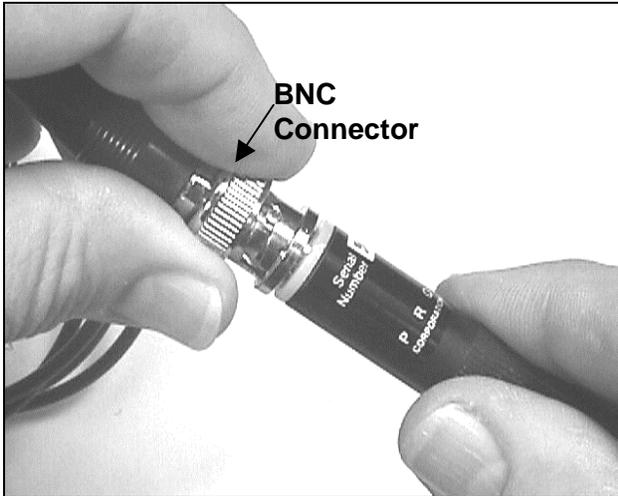
7. **Do not** attempt to measure energized materials, items or circuits with the PRF-922B

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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 Miniature 2-Point Micro Probe & PRV-913B Two-Point Verifier Operations

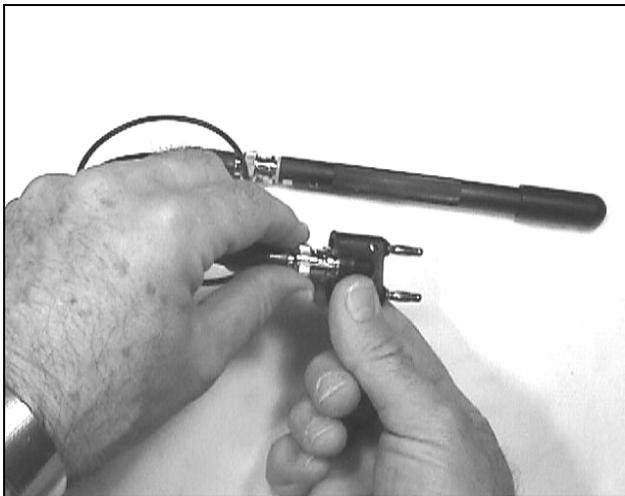
#### A. PRF-922B Setup



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

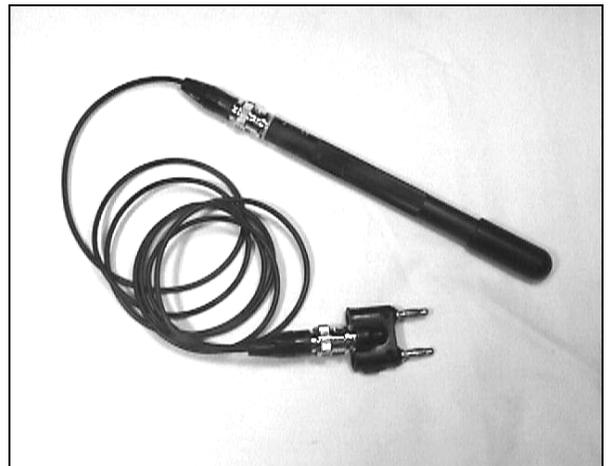
1. Connect measurement cable to PRF-922B
  - a. Remove black rubber protective cover from PRF-922B's BNC connection
  - b. Attach shielded cable to the probe's BNC connection (Figure 2).

Note that the BNC connection system is based on a "bayonet" design. Locate the 2 locking studs on the fixture's male connector. Match them to grooves of the female connector. Then simply push and twist the female clockwise until it locks on to the fixture.



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

2. Connect measurement cable to Dual Banana BNC Converter (Figure 3).



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

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3. Once the cable and BNC adapter are installed the PRF-922B is ready for continuity test, verification and use (Fig 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.

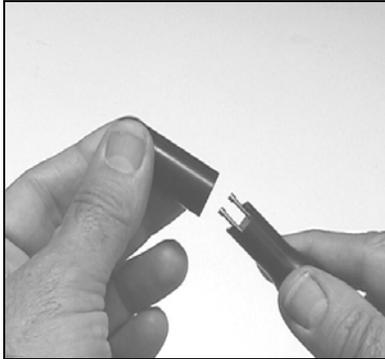
### B. Confirming Proper BNC Connections, Continuity & High Resistance Tests

The following confirms proper connections by checking continuity of the micro probe against a metal plate, and 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 Prostat PSI-870 Resistance Indicator, or  $<10^4$  ohms when using the Prostat PRS-800 analog Megohmmeter.
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 Prostat PSI-870 Resistance Indicator, or approximately  $10^{11}$  ohms when using the Prostat PRS-800 analog Megohmmeter.

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



**Figure 5: Remove Probe Cover**

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.

Remove PRF-922B Probe Cover (Figure 5).



**Figure 6: Insert PRF-922 Fixture into PRV-913 Verifier and Measure Verifier Resistance**

3. Position PRF-922B vertically into the PRV-913B 2 point verifier with its spring loaded pin electrodes making direct contact with the Verifier's gold plated test segments. (Figure 6)
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 2-point Verifier. Resistance should be  $1.0 \times 10^6$  ohms  $\pm 5\%$ .

### 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 electrodes makes direct contact with the material under test.
3. Apply sufficient pressure on the probe until the spring-loaded electrodes are partially compressed while in contact with the test material, and the outer housing "stops" contact the material under test.

#### **IMPORTANT NOTE:**

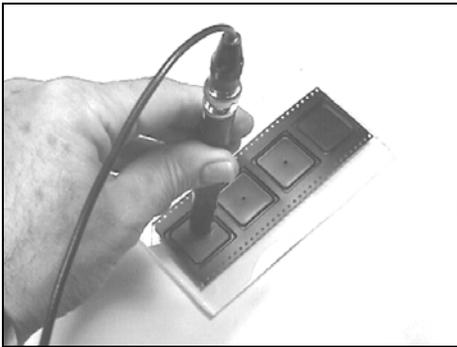
The outer housing "stops" help ensure consistent probe pressure with the material's surface and that the springs are **not fully compressed against their stops**. This will provide more reproducible measurements.

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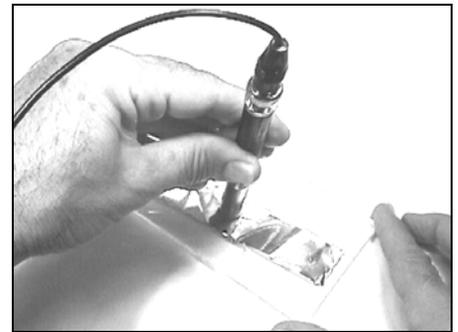
4. Select appropriate instrument test voltage and initiate resistance measurement. ESD Association S11.11 test voltage guidelines for measuring packaging materials are as follows:
  - a. For material resistance measurements of less than  $1.0 \times 10^4$  ohms, use <10 volts.
  - b. For measurements 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 [Exponential 1.0EXX/Ohms], or Mode 2 [Ohms] display). AUTOMATIC Mode will control test voltage, resistance range adjustment and electrification period automatically.

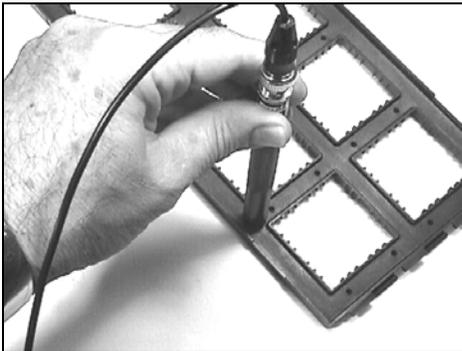


**Figure 7: Measuring Carrier Tape**

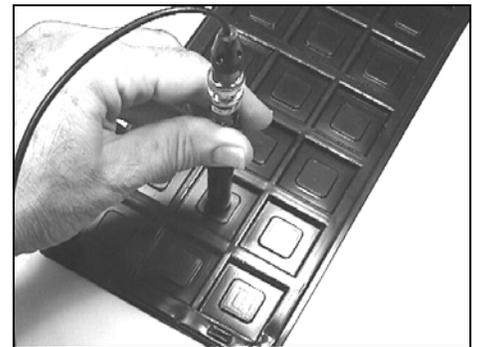
**Measurement  
Illustrations Using the  
PROSTAT PRF-922B  
Fixture**



**Figure 8: Measuring Tape & Foil**



**Figure 9: Measuring Device Tray**



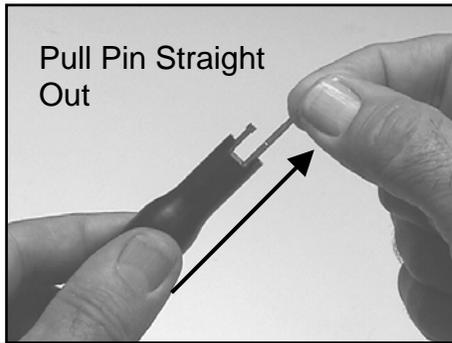
**Figure 10: Measuring Formed Tray**

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### IV. Handling & Maintenance

#### A. PRF-922B Miniature 2-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.



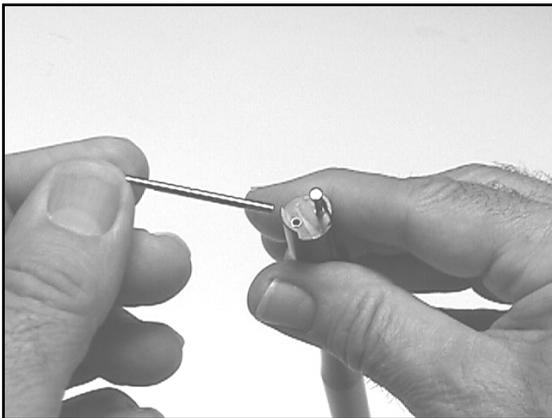
**Figure 11: Remove Spring-Loaded probe electrode by grasping firmly and pulling straight out of its socket.**

2. Periodically, remove the 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.

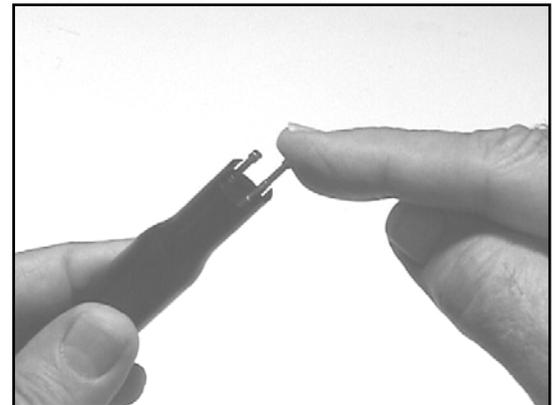
- a. Remove each test probe by grasping it firmly then pulling it straight out of its socket. (Figure 11)
- b. Inspect each probe for damage, and then clean with the alcohol solution. If a probe is damaged, i.e., bent, does not compress smoothly, or has deep

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 mounting disk twice to insure cleanliness
- d. Carefully re-install the spring-loaded test probes, and fully re-seat them in their sockets



**Figure 12: View of PRF-922B Spring-Loaded Test Pins and Socket**



**Figure 13: Insert Test Probe into its Socket and Press Firmly to fully seat**

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

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**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 14)
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 14: Installing Conductive Rubber Electrode “Boots”**

**C. PRV-913B Two-Point Resistance 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.

**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.

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**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.

|   |
|---|
| <p style="text-align: center;">DO NOT RETURN ANY ITEM WITHOUT HAVING FIRST<br/>RECEIVED A RETURN MATERIALS AUTHORIZATION<br/>(RMA) NUMBER FROM <b>PROSTAT</b></p> |
|---|

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.

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**PRF-922B, PRF-922A-B & PRV-913B Miniature Concentric Ring Fixture Set Specifications**PRF-922B Miniature 2-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: Contact Probes: 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

PRF-922A-B Miniature 2-Point Micro Probe Adapter

Physical Dimensions: Length: 1.9 inches (48mm) without probe cover. 2.7 inches (68mm) with probe cover. Probe diameter 0.5 inches (12.7mm). Probe cover outer diameter 0.63 inches (16mm).

Probe Weight: 1.0 ounces (26 grams)

Finish: Black anodized

Dielectric Material: Black Delran

Contact Dimensions: Contact Probes: 0.1 inches (2.54mm)

Minimum Sample Size: 0.32 inches (8.2mm) diameter

**PRF-922B, PRF-922A-B & PRV-913B Two-Point Miniature Concentric Ring Fixture Set**

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Probe Spring Force/Test: 1.5 pounds (0.68 kg)

Probe Total Travel: 0.25 inches (6.4mm)

Connection: To be used with PRF-912B or PRF-914B Micro Probes

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:  $\pm 2\%$  precision, 10-megohm resistors, total of 10 (Concentric Ring Side)  
 $\pm 2\%$  precision, 1 each 10-megohm resistor (2-Point Side)

Power: Not applicable. Powered by PRF-922B during test

Warranty: Prostat Corporation. Limited one year



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