MINIATURE TWO-POINT PROBE ADAPTER

PRF-922A-B

User Manual

PROSTAT®

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PROSTAT® PRF-922A-B MINIATURE TWO-POINT PROBE ADAPTER

I. Introduction & Description

The PRF-922A-B Miniature Two-Point Adapter Resistance Fixture is designed for use with Prostat's PRF-912B and PRF-914B Miniature Concentric Ring Resistance Fixtures. The PRF-922A-B 2-Point Adapter converts the PRF-912B and PRF-914B concentric fixtures to a 2-Point measurement fixture in accordance with the ANSI/ESD STM11.13 Two-Point Resistance Measurement standard test method. It will accurately measure surface resistance of small areas. It consists of a housing that fits over the concentric ring assembly of either the PRF-912B or PRF-914B miniature probe fixtures, two spring loaded measurement probes and built in spacer to prevent excess probe pressure. Removable conductive rubber probe covers are supplied to reduce contact resistance. A locking screw holds the adapter onto the host fixture and in contact with the PRF-912B or PRF-914B concentric ring test contacts.

Refer to the PRF-912B and PRF-914B Operating manuals for detailed instructions on use of those fixtures.

Figure 1: PRF-922A-B Miniature 2-Point Adapter Resistance Fixture Set.

A. 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-922A-B Adapter fixture is 0.9 ohms at <10 volts to 1.0E+12 ($1.0x10^{12}$) 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-922A-B Adapter is 0.50 inches in diameter by 2.7 inches long. This optimal size and shape make the fixture very comfortable and easy to handle. Its outer housing is made of black anodized aluminum.

5. The PRF-922A-B Standard accessories include a protective cover, 1 Allen Wrench for mounting and 1 extra pin.

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.

A. Use of Measurement Power Supply

1. The PRF-922A-B Adapter is a high performance micro probe designed for use with a host fixture supplying 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 by a measurement system (not supplied).

   a. If used with the 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 host 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.

B. Other Operational Precautions

1. Do Not Use the PRF-922A-B Micro Probe Adapter if it fails to function during its continuity inspection test.

2. Do Not Use the PRF-922A-B Micro Probe Adapter if it becomes damaged

3. Only Prostat Corporation authorized, qualified repair personnel may open PRF-922A-B housing, terminal assemblies, or perform product repair. Unauthorized opening of fixture or instrument housings, device tampering, or attempted repair will 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-922A-B In Damp Environments Always store devices with protective caps in place in a dry environment, preferably at ≤20% Rh.

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 or circuits with the PRF-922A-B

8. Do not use the PRF-922A-B with any host fixture other than a PRF-912B, or PRF-914B. The host fixture must meet all performance and safety elements outlined herein.

9. The PRF-922A-B is a precision fixture to be operated by experienced personnel familiar in the use and handling of devices employing energized power supplies.

10. Do Not Drop or cause mechanical damage to these devices.

III. PRF-922A-B Miniature Two-Point Adapter Mounting Operation

A. Mounting the PRF-922A-B Adapter to host fixture

1. Remove protective cover from the PRF-922A-B Two-Point Adapter.

2. Loosen PRF-922A-B Adapter locking screw. Loosen them by turning clock-wise (Do not remove screws all the way).

3. Slip PRF-922A-B onto host fixture until contact is made with host concentric ring

4. Hold host and adapter assembly vertically and in contact with hard table surface, press to compress both host fixture and 2-Point contacts

5. Tighten locking screw to hold adapter in place.

B. Setup host fixture for normal measurements according to PRF-912B or PRF-914B Miniature Probe instruction manual.

1. Connect measurement cable to host fixture

   a. Remove black rubber protective cover from host fixture BNC connection

   b. Attach shielded cable to the host probe's BNC connection (Figure 2).

2. Connect host measurement cable to measurement instrument according to host fixture manual instructions.

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

Figure 2: Connect shielded cable to host fixture BNC fitting

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

C. Confirming Proper BNC Connections, Continuity & High Resistance Tests

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

1. To confirm general setup and function of the PRF-922A-B and host assembly, place the electrodes against a clean metal surface. For example, the plated metal side of the PTB-920, Dual Surface Test Bed.

   a. Hold the PRF-922A-B and host fixture assembly 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 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 PSI-870 Resistance Indicator, or $<10^4$ ohms when using the Prostat 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-922A-B and host assembly 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 PRS-801 is the measurement instrument, it should measure $1.0x10^{12}$ 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 PSI-870 Resistance Indicator, or approximately 10^{11} ohms when using the PRS-800 analog Megohmmeter.

Figure 3: Remove Probe Cover

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

1. Connect the fixture assembly to the wide range, resistance measurement instrument.

2. Remove PRF-922A-B Probe Cover (Figure 3).

3. Position PRF-922A-B and host fixture vertically into the PRV-913B 2 point verifier aligning its spring loaded pin electrodes to make 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-922A-B probe and host fixture resistance while positioned in the PRV-913B 2-point Verifier. Resistance should be $1.0x10^6$ ohms ±5%.

E. Basic Measurements Using the PRF-922A-B 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-922A-B 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.

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 1.0x104 ohms, use <10 volts.

   b. For measurements of $1.0x10^4$ to $<1.0x10^6$ ohms, use 10 volts.

   c. For measurements greater than $1.0x10^6$ ohms, use 100 volts

   NOTE: For optimal performance and accuracy, use the PRS-801 Resistance System in its AUTOMATIC, or AUTO – MANUAL Mode. Either mode will control test voltage, resistance range adjustment and electrification period automatically.

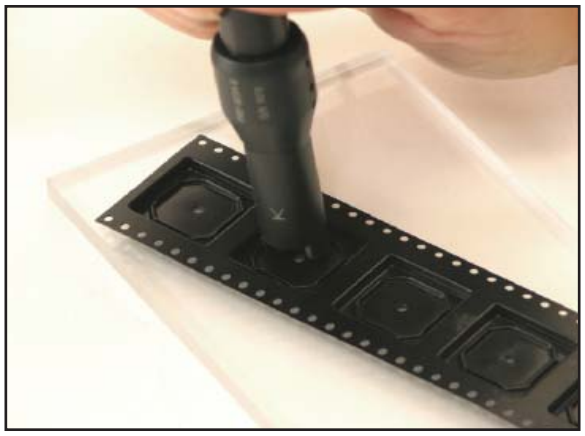

Figure 4: Measuring Carrier Tape

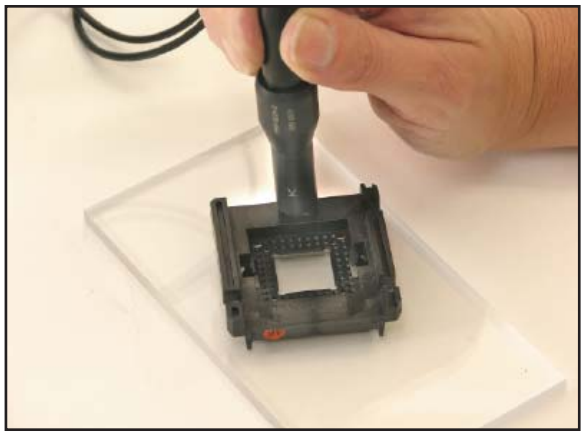

Figure 5: Measuring Device Carrier

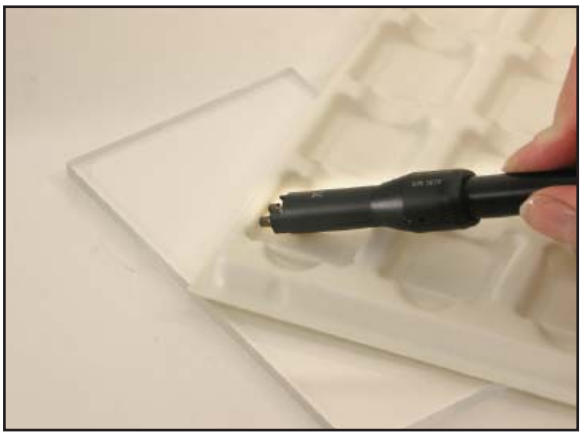

Figure 6: Measuring Formed Tray

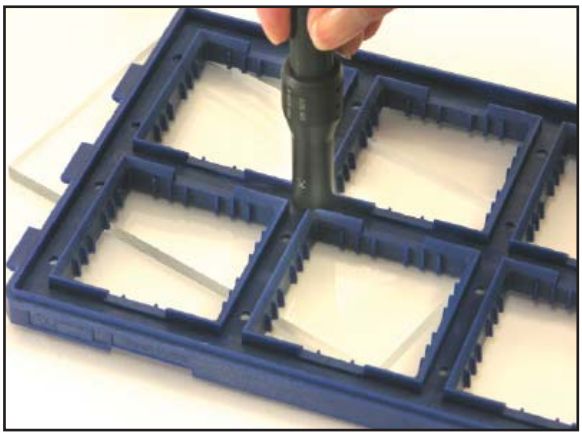

Figure 7: Measuring Jedec Tray

IV. Handling & Maintenance

A. PRF-922A-B Miniature 2-Point Adapter Fixture

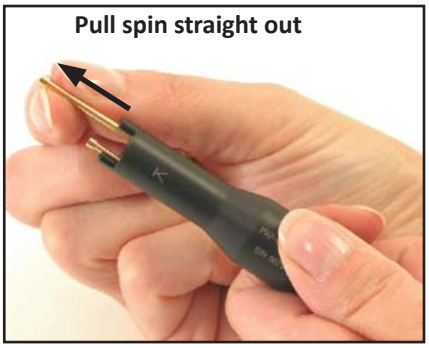

Figure 8: Remove Spring-Loaded probe electrode by grasping firmly and pulling straight out of its socket.

1. Store the PRF-922A-B in a clean, dry environment with probe cover installed for environmental and mechanical protection.

2. Periodically, remove the spring-loaded test pins. Clean the spring-loaded test probes and mounting disk with a solution of laboratory grade isopropyl alcohol and lint-less cloth, or laboratory quality swab. Allow components to dry thoroughly be fore re-assembling.

a. Remove each test probe by grasping it firmly then pulling it straight out of its socket. (Figure 8)

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 pin socket mounting disk twice to insure cleanliness and minimum leakage (maximum resistance) between pin sockets

d. Carefully re-install the spring-loaded test probes, and fully re-seat them in their sockets

Figure 9: Cleaning the spring-loaded test

Figure 10: Insert Test Probe into its Socket and

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 and somewhat irregular than those obtained using conductive rubber boots. (Figure 11)

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 and more stable than those obtained without boots.

   NOTE: ANSI/ESD STM11.13 Two-Point Resistance Standard Test Method specifies use of conductive rubber contact surfaces for making 2-Point probe measurements.

Figure 11: 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

Prostat Warranty

Prostat Corporation expressly warrants that for a period of one (1) year from the date of pur chase, 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.

F. 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-922A-B Miniature Two-Point Adapter & PRV-913B Verifier Specifications

PRF-922A-B Miniature Two-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
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:	±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-922B during test
Warranty:	Prostat Corporation. Limited one year

NOTES

Specifications are subject to change without notice.

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