Agilent Technologies

Vacuum Products Division

Power Probe

INSTRUCTION MANUAL

PART NUMBER
0991-K9565-301

Manual No. 699909560
Revision D
December 1999

Power Probe

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Agilent Inc.

Warranty

Products manufactured by Seller are warranted against defects in materials and workmanship for twelve (12) months from date of shipment thereof to Customer, and Seller's liability under valid warranty claims is limited, at the option of Seller, to repair, to replace, or refund of an equitable portion of the purchase price of the Product. Items expendable in normal use are not covered by this warranty. All warranty replacement or repair of parts shall be limited to equipment malfunctions which, in the sole opinion of Seller, are due or traceable to defects in original materials or workmanship. All obligations of Seller under this warranty shall cease in the event of abuse, accident, alteration, misuse, or neglect of the equipment. In-warranty repaired or replaced parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced parts. After expiration of the applicable warranty period, Customer shall be charged at the then current prices for parts, labor, and transportation.

Reasonable care must be used to avoid hazards. Seller expressly disclaims responsibility for loss or damage caused by use of its Products other than in accordance with proper operating procedures.

Except as stated herein, Seller makes no warranty, express or implied (either in fact or by operation of law), statutory or otherwise; and, except as stated herein, Seller shall have no liability under any warranty, express or implied (either in fact or by operation of law), statutory or otherwise. Statements made by any person, including representatives of Seller, which are inconsistent or in conflict with the terms of this warranty shall not be binding upon Seller unless reduced to writing and approved by an officer of Seller.

Warranty Replacement and Adjustment

All claims under warranty must be made promptly after occurrence of circumstances giving rise thereto, and must be received within the applicable warranty period by Seller or its authorized representative. Such claims should include the Product serial number, the date of shipment, and a full description of the circumstances giving rise to the claim. Before any Products are returned for repair and/or adjustment, written authorization from Seller or its authorized representative for the return and instructions as to how and where these Products should be returned must be obtained. Any Product returned to Seller for examination shall be prepaid via the means of transportation indicated as acceptable by Seller. Seller reserves the right to reject any warranty claim not promptly reported and any warranty claim on any item that has been altered or has been returned by non-acceptable means of transportation. When any Product is returned for examination and inspection, or for any other reason, Customer shall be responsible for all damage resulting from improper packing or handling, and for loss in transit, notwithstanding any defect or non-conformity in the Product. In all cases, Seller has the sole responsibility for determining the cause and nature of failure, and Seller's determination with regard thereto shall be final.

If it is found that Seller's Product has been returned without cause and is still serviceable, Customer will be notified and the Product returned at Customer's expense; in addition, a charge for testing and examination may be made on Products so returned.

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Declaration of Conformity
Konformitätserklärung
Déclaration de Conformité
Declaración de Conformidad
Verklaring de Overeenstemming
Dichiarazione di Conformità

Agilent Technologies

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Wij
Noi

Agilent, Inc.
121 Hartwell Avenue
Lexington, MA, 02421-3133 USA

declare under our sole responsibility that the product,
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Power Probe

to which this declaration relates is in conformity with the following standard(s) or other normative documents.
auf das sich diese Erklärung bezieht, mit der/den flogenden Norm(en) oder Richtlinie(n) übereinstimmt.
auquel se réfère cette déclaration est conforme à la (auz) norme(s) ou au(x) document(s) normatif(s).
al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).
waamaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoodt.
a cui se rifersce questa dichiarazione è conforme alla/e sequente/I norma/o documento/I normativo/i.

98/37/EEC, Machinery Directive

EN 60204-1	Electrical equipment of industrial machines; general requirements

John Ehmann
General Manager
Agilent, Inc.
Vacuum Product Division
Lexington, Massachusetts, USA

December 2010

Preface

Hazard and Safety Information

This manual uses the following standard safety protocols:

WARNING

The warning messages are for attracting the attention of the operator to a particular procedure or practice which, if not followed correctly, could lead to serious injury.

CAUTION

The caution messages are displayed before procedures, which if not followed, could cause damage to the equipment.

NOTE

The notes contain important information.

This product must only be operated and maintained by trained personnel.

Before operating or servicing equipment, read and thoroughly understand all operation/maintenance manuals provided by Agilent. Be aware of the hazards associated with this equipment, know how to recognize potentially hazardous conditions, and how to avoid them. Read carefully and strictly observe all cautions and warnings. The consequences of unskilled, improper, or careless operation of the equipment can be serious.

In addition, consult local, state, and national agencies regarding specific requirements and regulations. Address any safety, operation, and/or maintenance questions to your nearest Agilent office.

Contacting Agilent

In the United States, you can contact Agilent Customer Service at 1-800-882-7426. See the back cover of this manual for a listing of our sales and service offices.

Visit our web site at: http://www.chem.agilent.com/en-US/Products/Instruments/vacuum/pages/default.aspx.

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Description

The Power Probe is an accessory for the Agilent 936-70SP 936-71SP 938-41, 947/948, and 956 Contra-Flow Leak Detectors. It is a *sniffer* probe designed to locate leaks of helium from (for example) sealed containers internally pressurized with helium. It is completely adjustable for tests involving varying sensitivities and response times. This probe may be used with different size mechanical vacuum pumps. It is extremely rugged and can be easily disassembled for cleaning if it becomes plugged with dirt or liquids. It has a built-in hook for hanging the probe when not in use.

The Power Probe may also be used with a 936-65SP or 936-GGSP (conventional leak detectors) in the *GROSS LEAK* mode only.

Figure 1 Power Probe

Applications

The probe is best used to leak-test devices or systems that have one or more of the following limitations.

- ❑ The device does not have structural strength to allow evacuation or enclosure in a vacuum chamber.
- ❑ The device or system is too large to enclose or to evacuate to low pressure.
- ❑ The expense of a vacuum-tight enclosure would be prohibitive.
- ❑ The device requires a low sensitivity test.
- ❑ Access to the suspected point of leakage requires a small probe.
- ❑ Background signals of other trace gasses or signals prevent use of alternate test methods.

- Use of alternate methods such as soap solution, immersion tests, or dyes would either mask small leaks in subsequent tests or cause cosmetic damage or corrosion. If liquids must be used to prove structural strength, the parts must be carefully cleaned and dried before helium testing. The helium test may be performed prior to introducing liquids.

Probing Tips

The magnitude of the smallest leak that can be found with the Power Probe depends on a number of factors:

- Most important is the traverse speed: The rate at which the operator *sweeps* the probe along a seam or other suspect zone.
- The distance of the probe from the workpiece.
- Fluctuations of the background signal determine the smallest leak which can be distinguished from background.

The response time of the probe is approximately two seconds. In. use, it is advisable to keep the tip of the Power Probe very slightly removed from the surface of the test piece to avoid sucking in materials clinging to the surface. The Power Probe is resistant to plugging in normal use; however, direct exposure to liquids will plug it, at least temporarily. Refer to “Troubleshooting” on page 4.

To enhance response time, remove the tip from the Power Probe. Use this technique for locating larger leaks quickly.

Use the audible alarm on the leak detector if probing areas are out of sight of the leak rate meter or bar graph.

Check helium response of probe occasionally by applying very small amounts of helium to the probe tip, preferably using a helium standard leak in the 10^{-3} to 10^{-4} cc/sec range.

CAUTION

The green FIL lamp on the leak detector must remain lit. If it goes out, the leak detector will not be sensitive to helium. Refer to “Troubleshooting” on page 4.

Setup

Contra-Flow Leak Detectors in TEST Mode

1. Fit the test port adapter, which is assembled to the clear plastic tubing of the Power Probe, into the leak detector test port.
2. Close the Power Probe valve by turning its knob clockwise through the 1/4″ diameter hole in the rear of the probe head. Use a small straight blade screwdriver. *DO NOT OVERTIGHTEN*. This adjustment is designed to be used by a Setup person.
3. Cycle the leak detector into the TEST mode with the transfer pressure set at 100 milliTorr. Slowly adjust the probe knob CCW (counterclockwise) until the *TEST PORT PRESSURE* reads approximately 80 milliTorr.

   The LEAK RATE meter displays a signal of approximately 10^{-6} to 10^{-7} std cc/sec. This is the leak detector's response to the helium naturally occurring in air (helium is about 5 parts per million in air).

The probe is now ready for use. If the background (residual) helium signal is steady, it can be reduced by use of the *COARSE ZERO* and *ZERO* adjustments on the leak detector, permitting the leak detector to operate on a more sensitive range and enabling it to find a smaller leak. The smallest leak which can be found with this setup is about 10^{-6} std cc/sec range. Use Table 1 as a guide for setup vs. leak rate requirements.

Table 1 TEST Mode Setup vs. Leak Rate Requirements

Approximate Required Leak Rate	DP Control Setting (Position)			Test Port Pressure	Set Probe Helium Background	*Residual Response Time
	938-41	936-70SP 936-71SP	Others			
Large (>10^{-2} cc/sec)	Full CCW	Low	ON	50 mTorr	Minimal	Fast
Medium (10^{-4} cc/sec)	Full CCW	Low	ON	100 mTorr	Medium	Fast
Small (10^{-6} cc/sec)	1 o'clock	7 o'clock	ON	100 mTorr	Medium	Medium

*Residua helium background is very dependent upon the amount of helium in the room atmosphere. Extreme care must be taken not to add any helium in the area of the leak detector or the Power Probe tip.

When testing indoors, any increase in helium background in the test area should be avoided by preventing leakage of helium from the storage containers. Do not vent the helium-filled device in the test area. If gross leaks are detected, repair them immediately so that testing can continue and the helium background minimized. Do not try to leak-test devices in small, unventilated rooms. Be sure there is adequate ventilation with no strong drafts at the test site.

Conventional Leak Detectors in GROSS LEAK TEST Mode

1. Fit the test port adapter, which is assembled to the clear plastic tubing of the Power Probe, directly into the test port of the leak detector.
2. Close the Power Probe valve by turning its knob CW (clockwise) through the 1/4" diameter hole in the rear of the probe head. Use a small straight blade screwdriver. *DO NOT OVERTIGHTEN*. This adjustment is designed to be used by a Setup person.
3. On the leak detector, set the *GROSS LEAK* switch to *ON* and turn the *TRANSFER PRESSURE* adjustment to *HOLD*.
4. Cycle leak detector to *GROSS LEAK TEST.*
5. Slowly adjust the probe knob CCW until the *TEST PORT PRESSURE* reads approximately 300 milliTorr. There should be very little response from atmospheric helium even on the most sensitive range. The probe is now ready for use. The smallest leak which can be found with this setup is about 10^{-4} atm cc/sec range. Use Table 2 as a guide for setup vs. leak rate requirements.

Table 2 GROSS LEAK TEST Mode Setup vs. Leak Rate Requirements

Approximate Required Leak Rate	Set Probe Test Port Pressure	*Residual Helium Background	Response Time
Large (>10^{-2} cc/sec)	150 mTorr	None	Fast
Medium (10^{-4} co/sec)	300 mTorr	None	Fast

Troubleshooting

Symptom: Test port pressure suddenly moves toward *O.*

Probable cause: Probe is plugged.

Remedy:

1. Check that hose is not kinked.
2. Remove probe tip. If plug still exists, proceed as follows.
3. Turn probe screwdriver adjustment on the back of the handle CCW while watching the *TEST PORT PRESSURE* meter. Open the adjustment fully to clear the plug. If the pressure does not rise with the adjustment turned fully CCW, the probe valve must be taken apart for cleaning.

NOTE

On 956 leak. detectors, vent the leak detector then cycle it to the START position.

On conventional cabinet (as opposed to Contraflow) leak detectors, set the GROSSLEAK switch to OFF, vent the leak detector then cycle it to the START position.

4. Remove the three (3) screws that hold the handle together.
5. Remove the valve from the handle using a 9/16″ open end wrench.
6. Clamp the valve body in a vise.
7. Remove the valve bonnet and stem using a 9/1s inch open end wrench.
8. Clean the valve body with high-pressure air.
9. Reassemble taking care not to bend the delicate stem. Be sure the valve bonnet is clean and tightly assembled as a vacuum leak could cause erroneous readings.
10. Verify probe operation as in step 3 before assembling the valve to the handle.

Symptom: Green filament lamp will not stay on Probable cause: Spectrometer tube pressure is above the green band.

Remedy:

Set the probe screwdriver adjustment CW 1/4 turn to lower the test port pressure or set the diffusion pump power control to a larger leak rate setting (refer to Table 1). Wait 30 minutes whenever the diffusion pump control is reset before using the probe.

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Agilent Technologies

Vacuum Products Division
Instructions for returning products

Dear Customer:

Please follow these instructions whenever one of our products needs to be returned.

1) Complete the attached Request for Return form and send it to Agilent Technologies (see below), taking particular care to identify all products that have pumped or been exposed to any toxic or hazardous materials.

2) After evaluating the information, Agilent Technologies will provide you with a Return Authorization (RA) number via email or fax, as requested.
   Note: Depending on the type of return, a Purchase Order may be required at the time the Request for Return is submitted. We will quote any necessary services (evaluation, repair, special cleaning, eg).

3) Important steps for the shipment of returning product:
   - Remove all accessories from the core product (e.g. inlet screens, vent valves).
   - Prior to shipment, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
   - If ordering an Advance Exchange product, please use the packaging from the Advance Exchange to return the defective product.
   - Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
   - Agilent Technologies is not responsible for returning customer provided packaging or containers.
   - Clearly label package with RA number. Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.

4) Return only products for which the RA was issued.

5) Product being returned under a RA must be received within 15 business days.

6) Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information. Customer is responsible for freight charges on returning product.

7) Return shipments must comply with all applicable Shipping Regulations (IATA, DOT, etc.) and carrier requirements.

RETURN THE COMPLETED REQUEST FOR RETURN FORM TO YOUR NEAREST LOCATION:

EUROPE:	NORTH AMERICA:	PACIFIC RIM:
Fax: 00 39 011 9979 330		
Fax Free: 00 800 345 345 00	Fax: 1 781 860 9252	please visit our website for individual office information
Toll Free: 00 800 234 234 00	Toll Free: 800 882 7426, Option 3	
vpt-customercare@agilent.com	vpl-ra@agilent.com	http://www.agilent.com

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please read important policy information on Page 3 that applies to all returns.

1) CUSTOMER INFORMATION

Company Name:	**Contact Name:**
Tel: **Email:**	**Fax:**
Customer Ship To:	**Customer Bill To:**
Europe only: **VAT reg. Number:**	USA/Canada only: ☐ **Taxable** ☐ **Non-taxable**

2) PRODUCT IDENTIFICATION

Product Description	Agilent P/N	Agilent S/N	Original Purchasing Reference

3) TYPE OF RETURN (**Choose one from each row** and supply Purchase Order if requesting a billable service)

3A. ☐ Non-Billable ☐ Billable ➡ New PO # (hard copy must be submitted with this form):

3B. ☐ Exchange ☐ Repair ☐ Upgrade ☐ Consignment/Demo ☐ Calibration ☐ Evaluation ☐ Return for Credit

4) HEALTH and SAFETY CERTIFICATION

AGILENT TECHNOLOGIES CANNOT ACCEPT ANY PRODUCTS CONTAMINATED WITH BIOLOGICAL OR EXPLOSIVE HAZARDS, RADIOACTIVE MATERIAL, OR MERCURY AT ITS FACILITY.
Call Agilent Technologies to discuss alternatives if this requirement presents a problem.

The equipment listed above (check one):

☐ **HAS NOT** pumped or been exposed to any toxic or hazardous materials. OR

☐ **HAS** pumped or been exposed to the following toxic or hazardous materials. If this box is checked, the following information must also be filled out. Check boxes for all materials to which product(s) pumped or was exposed:

☐ Toxic ☐ Corrosive ☐ Reactive ☐ Flammable ☐ Explosive ☐ Biological ☐ Radioactive

List all toxic/hazardous materials. Include product name, chemical name, and chemical symbol or formula:

_____

NOTE: If a product is received at Agilent which is contaminated with a toxic or hazardous material that was not disclosed, **the customer will be held responsible** for all costs incurred to ensure the safe handling of the product, and **is liable** for any harm or injury to Agilent employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.

Print Name: **Authorized Signature: .....** **Date:**

5) FAILURE INFORMATION:

Failure Mode (REQUIRED FIELD. See next page for suggestions of failure terms):
Detailed Description of Malfunction: (Please provide the error message)
Application (system and model):

I understand and agree to the terms of Section 6, Page 3/3.
Print Name: **Authorized Signature: .....** **Date:**

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please use these Failure Mode to describe the concern about the product on Page 2.

TURBO PUMPS and TURBO CONTROLLERS

APPARENT DEFECT/MALFUNCTION		POSITION	PARAMETERS	
- Does not start	- Noise	- Vertical	Power:	Rotational Speed:
- Does not spin freely	- Vibrations	-Horizontal	Current:	Inlet Pressure:
- Does not reach full speed	-Leak	-Upside-down	Temp 1:	Foreline Pressure:
- Mechanical Contact	-Overtemperature	-Other:	Temp 2:	Purge flow:
- Cooling defective	-Clogging	.....	OPERATING TIME:	

ION PUMPS/CONTROLLERS

- Bad feedthrough	- Poor vacuum
- Vacuum leak	- High voltage problem
- Error code on display	- Other

VALVES/COMPONENTS

- Main seal leak	- Bellows leak
- Solenoid failure	- Damaged flange
- Damaged sealing area	-Other

LEAK DETECTORS

- Cannot calibrate	-No zero/high backround
- Vacuum system unstable	- Cannot reach test mode
- Failed to start	- Other

INSTRUMENTS

- Gauge tube not working	- Display problem
- Communication failure	- Degas not working
- Error code on display	- Other

SCROLL AND ROTARY VANE PUMPS

- Pump doesn't start	- Noisy pump (describe)
- Doesn't reach vacuum	- Over temperature
- Pump seized	- Other

DIFFUSION PUMPS

- Heater failure	- Electrical problem
- Doesn't reach vacuum	- Cooling coil damage
- Vacuum leak	- Other

Section 6) *ADDITIONAL TERMS*

Please read the terms and conditions below as they apply to all returns and are in addition to the Agilent Technologies Vacuum Product Division – Products and Services Terms of Sale.

- Customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies **within 15 business days**. Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- A Special Cleaning fee will apply to all exposed products per Section 4 of this document.
- If requesting a calibration service, units must be functionally capable of being calibrated.

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Agilent Technologies

Vacuum Product Division

United States & Canada
Agilent Technologies
Vacuum Products Division
121 Hartwell Avenue
Lexington, MA 02421 USA
Tel: +1 781 861 7200
Toll-Free: +1 800 882 7426
Fax: +1 871 860 5437

Benelux
Agilent Technologies
Vacuum Products Division
Herculesweg 8
4338 PL Middelburg
THE NETHERLANDS
Tel: +31 118 671570
Fax: +31 118 671569

China
Agilent Technologies
Vacuum Products Division
Room 1648
Central Tower South Wing
Beijing Junefield Plaza
No. 10 XuanWuMenWai Street
Beijing 100052 P.R. CHINA
Tel.: +86 (10) 6310 8550
Toll-Free: 800 820 6556
Fax: +86 (10) 6310 0141

France
Agilent Technologies
Vacuum Products Division
7 avenue des Tropiques
Z.A. de Courtaboeuf - B.P. 12
91941 Les Ulis cedex FRANCE
Tel.: +33 (0) 1 69 86 38 84
Fax: +33 (0) 1 69 86 29 88

Germany & Austria
Agilent Technologies
Vacuum Products Division
Alsfelder Strasse 6
Postfach 11 14 35
64289 Darmstadt GERMANY
Tel.: +49 (0) 6151 703 353
Fax: +49 (0) 6151 703 302

India
Agilent Technologies
Vacuum Product Division
205-A, “A” wing of Galleria,
2nd floor, Hiranandani Gardens,
Powai, Mumbai-400 076, India
Tel.: +91 22-2570 8595 / 8597
Fax: +91 22- 2570 8599

Italy
Agilent Technologies
Vacuum Products Division
via F.lli Varian 54
10040 Leini, (Torino) ITALY
Tel.: +39 011 997 9111
Toll-Free: 00 800 234 234 00
Fax: +39 011 997 9350

Japan
Agilent Technologies
Vacuum Products Division
Sumitomo Shibaura Building 4-16-36
8th Floor
4-16-36 Shibaura Minato-ku
Tokyo 108 JAPAN
Tel.: +81 3 5232 1253
Toll-Free: 0120 655 040
Fax: +81 3 5232 1710

Korea
Agilent Technologies
Vacuum Products Division
Shinsa 2nd Bldg. 2F 966-5
Daechi-dong
Kangnam-gu, Seoul
KOREA 135-280
Tel.: +82 2 3452 2452
Toll-Free: 080 222 2452
Fax: +82 2 3452 2451

Mexico
Agilent Technologies
Vacuum Products Division
Concepcion Beistegui No 109
Col Del Valle C.P. 03100
MEXICO, D.F.
Tel.: +52 5 523 9465
Fax: +52 5 523 9472

Southeast Asia
Agilent Technologies
Vacuum Products Division
South East Asia (SEA) - Alex Ho
H/P: +601 2213 1253
Fax: +603 6733 8121

Singapore
Agilent Technologies
Vacuum Products Division
Singapore
Unit 10-04 Helios
Biopolis @ one-north
11 Biopolis Way, 138667
Singapore
H/P.: +65 92364988
Fax: +65 64789603

Taiwan
Agilent Technologies
Vacuum Products Division
14F-6, No. 77, Hsin Tai Wu Road,
Sec. 1
Hsi chih, Taipei Hsien, Taiwan,
R.O.C.
Tel.: +886 2 2698 9555
Toll Free: 0800 051 342
Fax: +886 2 2698 9678

UK & Ireland
Agilent Technologies
Vacuum Products Division
6 Mead Road
Oxford Industrial Park
Tel.: +44 (0) 1865 291570
Fax: +44 (0) 1865 291571

QUALITY SYSTEM ISO 9001 CERTIFIED

ENVIRONMENTAL MANAGEMENT SYSTEM ISO 14001 CERTIFIED

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