



**Agilent Technologies**

*Vacuum Products Division*

# ***IMG-100 Inverted Magnetron Gauge***

**CE**

*INSTRUCTION MANUAL*

Manual No. 699908220

Revision B

May 2004

# IMG-100 Inverted Magnetron Gauge



# 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, replace, or refund 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.

3/1/00

## IMG-100 Inverted Magnetron Gauge

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## IMG-100 Inverted Magnetron Gauge

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



**Agilent Technologies**

We  
Wir  
Nous  
Nosotros  
Wij  
Noi

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declare under our sole responsibility that the product,  
erklären, in alleniniger Verantwortung, daß dieses Produkt,  
déclarons sous notre seule responsabilité que le produit,  
declaramos, bajo nuestra sola responsabilidad, que el producto,  
verklaren onder onze verantwoordelijkheid, dat het product,  
dichiariamo sotto nostra unica responsabilità, che il prodotto,

**IMG-100 Inverted Magnetron Gauge**

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) beantwoordt.  
a cui se riferisce questa dichiarazione è conforme alla/e sequente/I norma/o documento/I normativo/i.

- EN 55011**  
1991 ..... Group 1 Class A ISM emission requirements
- EN 61010-1**  
1993 ..... Safety requirements for electrical equipment for measurement, control, and laboratory use incorporating Amendments Nos 1 and 2.
- EN 50082-2**  
1995 ..... EMC heavy industrial generic immunity standard

John Ehmann  
Operations Manager  
Vacuum Products Division  
Agilent, Inc.  
Lexington, Massachusetts, USA

October 2003



# Preface

## Hazard and Safety Information

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

This manual uses the following standard safety protocols:

**WARNING**



*Warnings indicate a particular procedure or practice, which if not followed correctly, could lead to serious injury.*

**CAUTION**



*Cautions indicate a particular procedure or practice, which if not followed, could cause damage to the equipment.*

**NOTE**



*Notes contain important information.*

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.

## IMG-100 Inverted Magnetron Gauge

### Grounding the IMG-100 Inverted Magnetron Gauge Controller

Be certain that the IMG-100 Inverted Magnetron Gauge Controller and vacuum system are separately grounded to a common ground.

#### WARNING



- ❑ Do not place a ground wire between the vacuum chamber and the controller chassis; large continuous currents could flow through it.
- ❑ Personnel can be killed by high voltages (160 to 900 V may be present in an improperly grounded system).
- ❑ Make absolutely sure that the vacuum system is grounded as shown in Figure 1.
- ❑ Test the system ground to be sure that it is complete and capable of supporting at least 10 A.

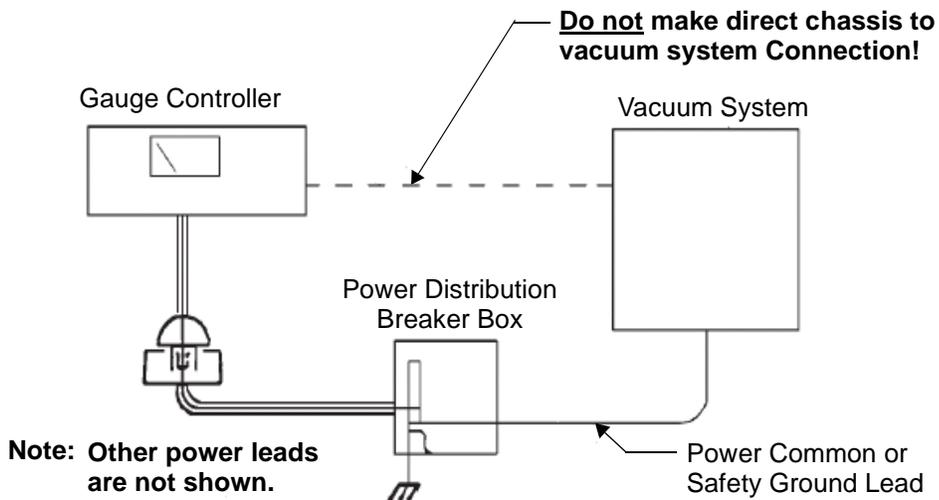


Figure 1 Ion Gauge and Vacuum System Connections

### Use with Combustibles and Mixtures

#### WARNING



As with all ionization gauges, this device is not intrinsically safe. Exercise extreme care when using this vacuum gauge while pumping or backfilling a system or in any other system condition which contains combustible gases or mixtures. The filament, the end of a hot filament ion gauge and the high voltage discharge of a cold cathode gauge can be ignition sources.

When such a gas or mixture is present, do not turn on any such vacuum gauge. Failure to follow this instruction could result in serious injury to personnel and damage to equipment.

## IMG-100 Inverted Magnetron Gauge

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### Vacuum Equipment and Cleanliness

Cleanliness is vital when servicing any vacuum equipment.

**CAUTION**



*Do not use silicone oil or silicone grease.*

*Use powder-free butyl or polycarbonate gloves to prevent skin oils from getting on vacuum surfaces.*

*Do not clean any aluminum parts with Alconox. Alconox is not compatible with aluminum and will cause damage.*

**NOTE**



*Normally, it is unnecessary to use vacuum grease. However, if it must be used, do not use silicone types, and use it sparingly. Apiezon L grease is recommended (Agilent Part Number 695400004).*

### EMC Warnings

#### EN 55022 Class A Warning

This is a Class A product. In a domestic environment this product may cause radio interference. In such cases, the user will be required to correct the interference at his own expense.

#### FCC

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation.



*The equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is also likely to cause harmful radio communications interference in which case, the user will be required to correct the interference at his own expense.*

### 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>.

## IMG-100 Inverted Magnetron Gauge

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# IMG-100 General Purpose Inverted Magnetron Gauge

## Description

The IMG-100 is a 1" diameter inverted magnetron cold cathode ionization gauge that measures vacuum pressure from 1 mT to  $5 \times 10^{-9}$  T.

Advantages include:

- ❑ An inverted magnetron design that ensures fast, reliable starting and good linearity throughout the pressure range as compared to traditional cold cathode/magnetron type gauges.
- ❑ Minimized outgassing at high vacuum due to temperature increases because there is no hot filament.
- ❑ Greater ruggedness with the IMG-100 than Bayard-Alpert type gauges because there is no delicate filament to break or burnout due to high-pressure exposure.
- ❑ An all-welded stainless steel shell that is virtually unbreakable compared to that of typical glass Bayard-Alpert gauges.
- ❑ A lack of excess electrons, photons, and heat which can be important in some applications.

A standard SHV connector and coaxial cable provides for a safe, easy connection to a Multi-Gauge. Attachment to the vacuum system is made using either a KF or ConFlat flange. All materials exposed to the vacuum system are high vacuum compatible with no elastomers used in IMG-100 construction.

## Application

Use the IMG-100 wherever an extremely rugged high vacuum gauge is desired or where the presence of stray electrons and photons can cause problems in the vacuum system. While the inverted magnetron design ensures good linearity as compared to a standard cold cathode type gauge, the IMG-100, like other cold cathode type gauges, is generally not as stable and linear as a well-maintained Bayard-Alpert type.

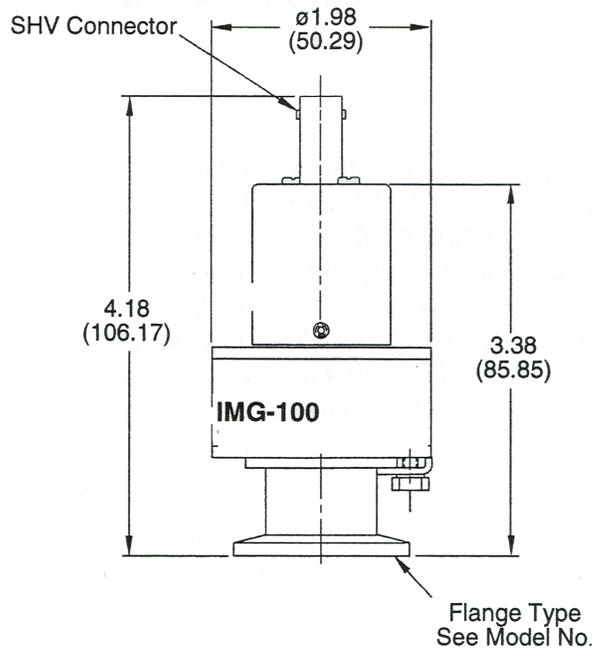
The IMG-100 with CFF handles bakeout temperatures of up to 150 °C, with the cable unplugged. The temperature limit of the KF versions depends on the O-ring material and the clamp used.

Due to the IMG-100 start time, no specific starting accessory is required under normal conditions. However, very cold temperatures and contamination build-up can result in extended starting times, especially at high vacuum.

## IMG-100 Inverted Magnetron Gauge

As with all cold cathode devices, the magnet generates a field external to the device. When installing the IMG-100, follow these guidelines (Figure 1-1):

- ❑ Do not mount the IMG-100 closer than a few inches to any magnetic material.
- ❑ If no magnetic force from the IMG-100 can be felt, it is sufficiently far away.
- ❑ Exercise care in mounting and handling to prevent the gauge from contacting other objects.
- ❑ Avoid rough handling or prolonged contact with the metal surface which can cause a decrease in magnet strength and result in a calibration change.



**Figure 1-1 Outline Drawing, IMG-100 Inverted Magnetron Gauge**

The calibration of the IMG-100 may be maintained under the STARRS service program. STARRS allows simple, periodic service and calibration for all of your Agilent gauging equipment. Contact Agilent Customer Service at 1 800 882 7426 for more information on the STARRS program.

## Technical Specifications

Table 1-1 lists the gauge technical specifications.

**Table 1-1 IMG-100 Technical Specifications**

Specification	Definition
Operating voltage (HV range)	3 kv
Sensitivity	2 A/Torr nominal $\pm 20\%$ @ $5 \times 10^{-6}$ T
Measurement Range	1 mT to $5 \times 10^{-9}$ Torr
Maximum Operating Temperature	150 °C, no cable, CFF metal gasket
Electrical Connector	SHV style, 5kV rated
Feedthrough/HV Seal	Glass compression seal
Ignition Time	< 5 seconds at pressures <1E-6 Torr
Material Exposed to the Vacuum	Stainless steel, Nickel alloy 52 and glass

## Ordering Information

Table 1-2 lists the part numbers for the IMG-100.

**Table 1-2 IMG-100 Parts**

Part Number	Description
R0310301	IMG-100 NW-25
R0310302	IMG-100 NW-40
R0310303	IMG-100 2.75 CFF
R03113xxx	Cable, xxx is the length in feet

## Fringe Field Contours

Figure 1-2 and Figure 1-3 represent fringe field contours.

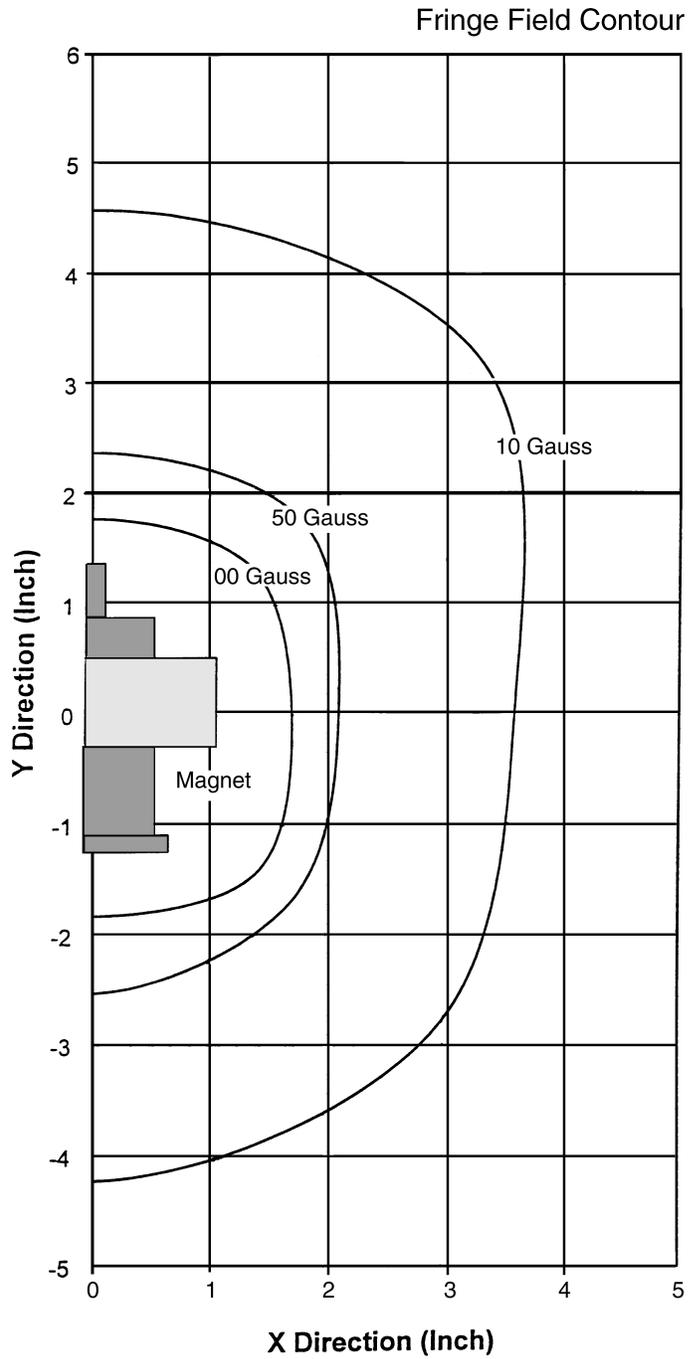
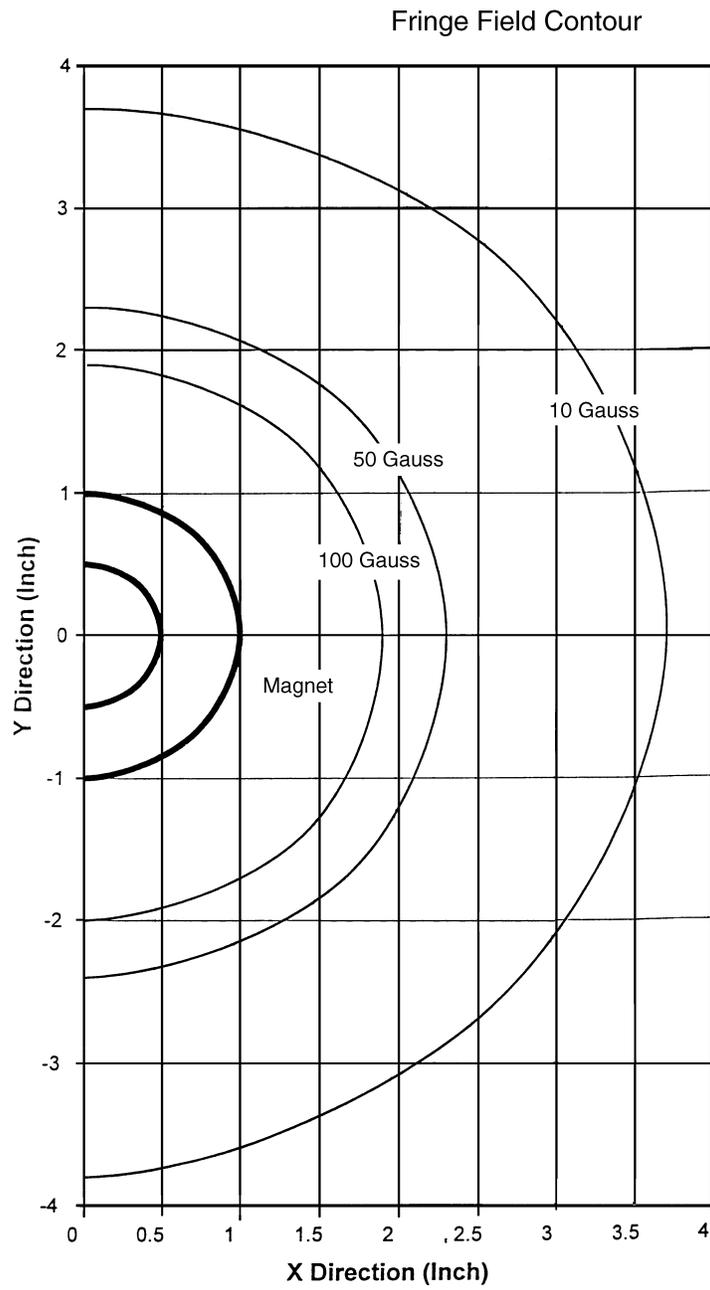


Figure 1-2 Fringe Field Contour

# IMG-100 Inverted Magnetron Gauge



**Figure 1-3 Fringe Field Contour**

## IMG-100 Inverted Magnetron Gauge

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## 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:**  
Fax: 00 39 011 9979 330  
Fax Free: 00 800 345 345 00  
Toll Free: 00 800 234 234 00  
[vpt-customer@agilent.com](mailto:vpt-customer@agilent.com)

**NORTH AMERICA:**  
Fax: 1 781 860 9252  
Toll Free: 800 882 7426, Option 3  
[vpl-ra@agilent.com](mailto:vpl-ra@agilent.com)

**PACIFIC RIM:**  
please visit our website for individual  
office information  
<http://www.agilent.com>



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

**1) CUSTOMER INFORMATION**

<b>Company Name:</b>		<b>Contact Name:</b>	
<b>Tel:</b>	<b>Email:</b>	<b>Fax:</b>	
<b>Customer Ship To:</b>		<b>Customer Bill To:</b>	
Europe only: <b>VAT reg. Number:</b>		USA/Canada only: <input type="checkbox"/> <b>Taxable</b> <input type="checkbox"/> <b>Non-taxable</b>	

**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):

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



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

**ION PUMPS/CONTROLLERS**

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

**VALVES/COMPONENTS**

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

**LEAK DETECTORS**

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

**INSTRUMENTS**

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

**SCROLL AND ROTARY VANE PUMPS**

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

**DIFFUSION PUMPS**

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

## IMG-100 Inverted Magnetron Gauge

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