NOTICE: This document contains references to Varian. Please note that Varian, Inc. is now part of Agilent Technologies. For more information, go to **www.agilent.com/chem.**

Agilent Technologies

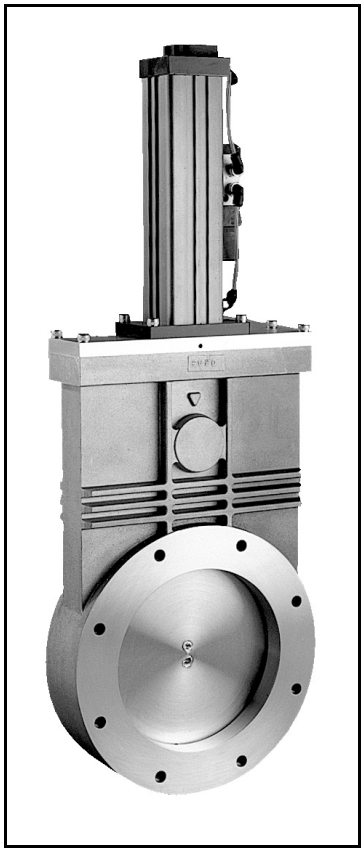
CE

GVA Series Aluminum Gate Valve

INSTRUCTION MANUAL

Manual No. 699912114
Revision F
August 2004

GVA Series Aluminum Gate Valve



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Viton is a registered trademark of E.I. DuPont de Nemours & Co.

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.

3/1/00

Voiding the Warranty

GVA series valves described in this manual are designed to be used in a clean system. Minute particles such as a piece of lint can seriously affect the ability of the valve to produce a vacuum-tight seal. Therefore, opening the valve before it is to be used, storing it, or operating it in any environment other than as a clean system is considered by Vacuum Technologies as misuse of the equipment and will render the warranty null and void.

When a GVA series valve is used with toxic chemicals, or in an atmosphere that is dangerous to the health of humans, or is environmentally unsafe, it will be the responsibility of the Customer to have the valve cleaned by an independent agency skilled and approved in handling and cleaning contaminated materials before the valve will be accepted by Vacuum Technologies for repair.

Therefore, all details of the Vacuum Technologies “Request for Return Health and Safety Certification” (attached) must be complied with including the requirement that a notarized certificate from the cleaning agency certifying that the valve has been cleaned and is harmless to humans and environmentally safe before Vacuum Technologies will accept the returned valve. The certificate must accompany all other shipping papers, including the completed Request for Return Health and Safety Certification, and be attached securely to the outside of the box containing the valve. Improper and/or incomplete documentation will result in the unopened, unrepaired valve being returned to the Customer at the Customer's expense.

Vacuum Technologies will ship a replacement valve at no charge to assist the Customer and to minimize downtime. However, if the malfunctioning valve is not returned to Vacuum Technologies within 30 days and meeting all of the requirements of paragraphs 2 and 3 above, the Customer will be billed for the replacement valve at the then current rate plus shipping charges.

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

VARIAN

We
Wir
Nous
Nosotros
Wij
Noi

Varian, Inc.
Vacuum Technologies
121 Hartwell Avenue
Lexington, MA, 02421-3133 USA

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,

Aluminum GVA Valves	**NW100, NW160, NW200, NW250,**
Aluminum Butterfly Valves	**NW63, NW100, NW160, NW200, NW250,**
Aluminum Block Valves	**NW16, NW25, NW40, NW50, NW63, NW80,**
Stainless Steel Block Valves	**NW16, NW25, NW40,**
Stainless Steel Tube Valves	**NW16, NW25, NW40**

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

Frederick C. Campbell

Frederick C. Campbell
Operations Manager
Vacuum Technologies
Varian, Inc.
Lexington, Massachusetts, USA

April 2002

CE

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 Vacuum Technologies. 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 Vacuum Technologies office.

Contacting Vacuum Technologies

In the United States, you can contact Technologies Customer Service at 1-800-8VARIAN.

Internet users:

- Send email to Customer Service & Technical Support at vpl.customer.support@varianinc.com
- Visit our web site at www.varianinc.com/vacuum
- Order on line at www.evarian.com

See the back cover of this manual for a listing of our sales and service offices.

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Introduction

The new GVA Aluminum Gate Valve is an economical, reliable vacuum shut-off device that provides a low-particle, low profile means of isolating a vacuum pump.

This valve employs a cast aluminum body, a linear drive mechanism, a counter-plate sealing mechanism that minimizes metal-on-metal contact, and an elastomer shaft seal. The result is a clean, economical, smoothly actuated valve. The body is cast using the VaPore® process that tightly controls material as it is input at each process step. This method eliminates valve porosity so that very few particles are generated within the valve. A reliable high vacuum shaft seal eliminates the need for a bellows or adjustment screws.

The aluminum gate valve has a small flange face-to-face profile. ISO/F flange details are machined into the cast body to provide the convenience of standard ISO connections.

Specifications

Table 1 Physical and Operational Specifications

Valve Size	100 mm	160 mm	200 mm	250 mm	4" ASA	6" ASA
Conductance @ Molecular Flow in l/s	2,000	7,000	15,000	26,000	7,000	15,000
Flanges (ISO/F Bolted Tapped)	NW100	NW160	NW200	NW250	ASA type	ASA type
Weight in lbs (kg)	10 (4.5)	16 (7)	40 (18)	48 (22)	16 (7)	40 (18)
Pneumatic Operation in psi	55 to 120 Actuation: Compressed air Normally closed; Valve closes on power loss					
Vacuum Range	Atmosphere to below $1x10^{-7}$ mbar					
Maximum Differential Pressure on Gate in Either Direction (bar)	1.6	1.6	1.6	1.2	1.6	1.6
Maximum Differential Pressure at Opening (mbar)	30					
Sealing Mechanism Type	Linear drive with seal plate and backing plate					
Feedthrough Type	Viton shaft seal					
Leak Rates	Valve Body: < $1x10^{-9}$ std cc/sec helium					
	Main Seal: < $1x10^{-9}$ std cc/sec helium					
Seal Material	Gate: Viton, molded; Viton, O-ring Bonnet: Viton					
Open/Close Time	<2 seconds					
Mounting Position	Any					
Bakeable to:	Valve Body: 150 °C (302 °F) Pneumatic actuator and solenoid: 80 °C (176 °F)					
Position Indication	Remote position indication switches (contact closures) for open and closed position are standard					

Installation

Unpacking

Unpack the valve from the shipping container and inspect it for obvious damage. Retain the shipping container for evidence and call the carrier. If practical, inspect the valve without removing it from its plastic bag. Protect the valve before and during installation. Make sure that machined surfaces, gasket grooves, and valve interior surfaces remain clean and that no foreign matter enters the valve.

If not required for immediate installation, repack the valve carefully and store it until needed. Store the valve in an environment that prevents condensation in the valve.

Mounting Orientation

The valve can be operated in any orientation. A triangle cast into the valve body denotes the seal plate side (Figure 1). The seal plate side of the valve must face the vacuum chamber. Do not open the valve when there is high pressure on either side and vacuum on the opposite side.

CAUTION

Do not open the valve with more than 30 mbar of differential pressure across the valve.

Mechanical Connections

Apply a high temperature lubricant such as Fel-Pro C-100 on the connecting bolt threads to prevent galling.

Air and Electrical Connections

The valves are set up at the factory to operate with compressed air. The air inlet to the solenoid valve is 1/8–27 FNPT. The solenoid is optional at purchase and is actuated by a source that can be ordered using the following available specifications:

- ❑ 120/110 VAC or 240/220 VAC
- ❑ 60/50 Hz
- ❑ 24 VDC operation

WARNING *The valve closes on loss of power to the solenoid valve.*

NOTE *The valve maintains its current position on loss of compressed air.*

Wiring Instructions - Position Indicators

1. Locate the position indicators mounted on each end of the air cylinder (Figure 1 on page 5).
2. Remove the screws from the position indicator covers, remove the covers, and turn them over.

   The switches, which are installed in the covers, are now visible.

   Switches are activated by means of a conical shaft, ball bearing and switch arm. As the valve moves from the fully open to the fully closed position, and vice versa, the small conical shaft is extended, moving the bearing against the switch arm.
3. Solder the leads to the common and NC or NO contacts as desired (Figure 2 on page 5):

   - ❑ Normally Open (NO)
   - ❑ Normally Closed (NC)

   For example, if contact closure is desired when the valve is in the *fully closed* or *fully open* position, wire both switches through the *normally open* contact. This causes a closure when the valve moves into either extreme position and activates the switch.
4. Return the cover and switch assemblies to their original positions, and screw them in place.

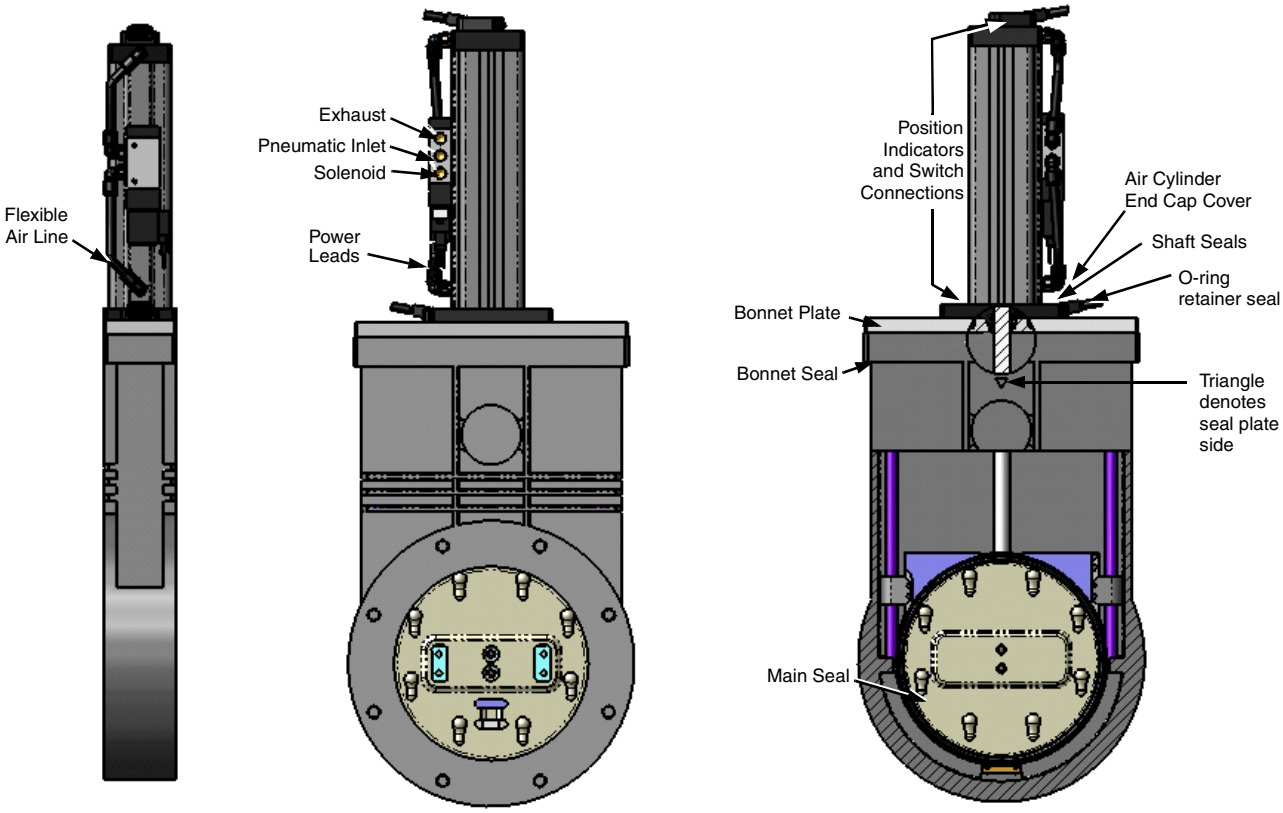

Figure 1 Pneumatic Valve Outline Drawing

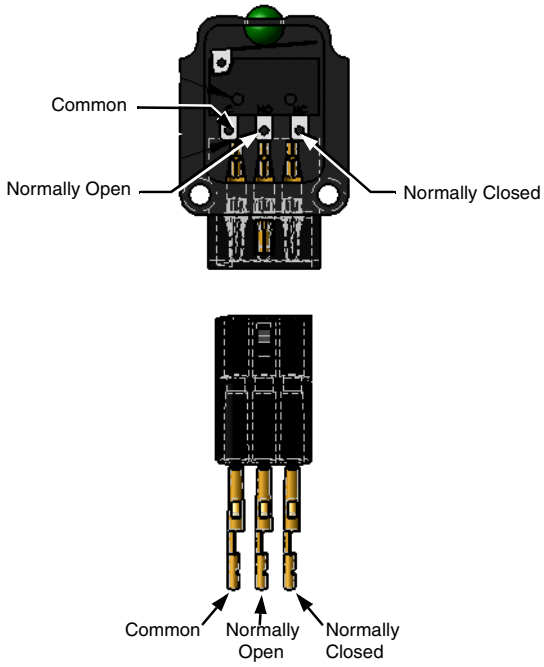

Figure 2 Wiring Connections

Operation

Manually Operated Valve

The manual valve operates via lever action:

1. Slide the locking plate to unlock the lever.

   Keep fingers out of the hinged mechanism.

2. Pull the handle until the shaft is fully extended; hinged plates open to 180°.

Pneumatically Operated Valve

WARNING

Keep fingers and hands out of the gate opening at all times when the air supply lines are connected to the valve. The valve could unexpectedly close, resulting in serious injury to the operator.

The pneumatically-actuated valves (Figure 1 on page 5) are air-opened, and air-closed. When electrical power is applied to the solenoid (optional), air is supplied to the pneumatic cylinder and the valve opens. When the electrical power is removed, air is supplied to the opposite side of the pneumatic cylinder and the valve closes. If the valve is already closed, it remains closed if there is a loss of power to the valve and the air supply is removed.

WARNING

The valve closes on loss of power to the solenoid valve. Keep all body parts clear of the gate opening at all times when the air supply lines are connected to the valve.

Service

Servicing the valve is comprised of the following major tasks:

- ❑ “Removing the Valve for Service”
- ❑ “Removing the Bonnet Assembly” on page 8
- ❑ “Cleaning” on page 8
- ❑ “Assembly” on page 9

Refer to Figure 1 on page 5 while performing valve service.

Removing the Valve for Service

The valve can be serviced without removing the body from the system, however, the valve must not be under a vacuum. The valve main seal, on valves with bonded plates, are not replaceable.

CAUTION

The pneumatic valve must be in the open position to safely disassemble it. Since the valve closes on power loss, air pressure must be disconnected before disconnecting power.

To perform this procedure:

1. Disconnect the air pressure.
2. Disconnect the power.
3. Retract the valve mechanism to the open position.

Removing the Bonnet Assembly

To remove the bonnet assembly:

1. Remove the eight bolts from the rectangular bonnet flange.
2. Extract the bonnet assembly from the body.

   Be careful not to scuff the main seal while withdrawing the mechanism.

Disassembling the Seal Plate and Cage Assembly

To disassemble the seal plate and cage assembly:

1. With the seal facing down, lay the assembly on a table.
2. Remove the two screws on the backplate and slowly lift the backplate off.

   The ball rollers may stick to the plate; be careful not to lose them.
3. Remove the remaining ball rollers.

   There are two ball rollers per guide bushing.
4. Lift the air cylinder and cage off the seal plate.
5. Remove the nut at the end of the cylinder shaft and the socket head screw on the front of the air cylinder end cap cover.

Smaller valves may require the removal of guide brackets from the cage so that the cage can be unscrewed from the shaft.

6. Slide the air cylinder out of the bonnet flange.
7. Remove the O-ring retaining bushing.
8. Inspect and replace the O-rings, if required.
9. Slide the cage off the guide rails.
10. Inspect and replace the bearing, if required.

Cleaning

Clean the valve components with alcohol.

Assembly

These instructions are for both the bonded seal and O-ring seal configurations.

CAUTION *This procedure requires two people (step 20).*

NOTE *Use Dupont Krytox GPL 207 lubricant on ball rollers and O-rings. Do not lubricate the main seal.*

To assemble the valve:

1. With the air cylinder resting on the end cap, pull the piston shaft out to full length.
2. Liberally lubricate the shaft down to the adapter flange.
3. Slide the O-ring retaining bushing into the bonnet flange assembly.
4. Apply another layer of lubricant to the piston shaft.
5. Push and pull the shaft in and out of the air cylinder several times, then wipe off the excess lubricant.
6. Inspect the bonnet flange with the guide rails and lubricate and install the O-rings.
7. Slide the bonnet flange over the shaft and onto the O-ring retaining bushing.

   Be careful not to damage the outer O-ring.
8. Lubricate the bearings.
9. Before installing the bearings into the guide brackets, inspect both the cage and guide brackets.
10. Slide the guide brackets onto the guide rails, reconnect the cage to the end of the air cylinder shaft, and tighten the nut.
11. Reconnect the guide bracket with the appropriate screw.
12. Inspect the seal plate and place it, depending on the configuration, seal side or O-ring groove down.

    Use something to raise the seal plate off the table up to the level of the cage.
13. Place the cage and air cylinder assembly on top of the seal plate and align the bushing with the corresponding groove in the seal plate.

14. Inspect the ball rollers, apply a light film of lubricant, and place them into the bushing (2 ball rollers per bushing).
15. Place the backplate over the cage, aligning the corresponding grooves to the ball rollers.
16. Install the two nuts to fasten the backplate to the spring assembly.
17. Actuate the assembly by hand to ensure that no binding occurs.
18. Remove any excess lubricant from the guide shafts.
19. Apply a light film of lubricant to the main seal.

The installation of the O-ring is completed after the seal plate and backplate are assembled.

20. Lightly lubricate the O-ring and carefully insert it into the dovetail groove. Avoid rolling the O-ring.
21. Look at the O-ring at 10x power to ensure there are no nicks or scratches present.
22. Inspect the valve body casting and remove any scratches from the seal surfaces.
23. Using two people, place the bonnet assembly on the air cylinder end cap facing out.

    Orient the triangle mark of the valve casting body outward and slowly lower it over the seal plate assembly. Do not scuff the main seal O-ring.
24. Fasten the bonnet flange to the valve body cast using the required bolts.

Ordering Information

In Table 2, *xxx* in the part number refers to the solenoid actuation voltage:

- ❑ 115 = 115 VAC
- ❑ 220 = 220 VAC
- ❑ 024 = 24 VDC

Table 2 Parts and Accessories

Valve Size	Manually Operated Gate Valve	Pneumatically Operated Gate Valve	Pneumatically Operated Gate Valve with Solenoid	Spare Seals Kit (Includes gate, stem shaft, and bonnet seals)
ISO Flanged Versions				
100 mm (4")	VGA100IM	VGA100IEP	VGA100IExxxP	VGA100SEALS
160 mm (6")	VGA160IM	VGA160IEP	VGA160IExxxP	VGA160SEALS
200 mm (8")	–	VGA200IEP	VGA200IExxxP	VGA200SEALS
250 mm (10")	–	VGA250IEP	VGA250IExxxP	VGA250SEALS
ASA Flanged Versions				
4” ASA	VGA4AM	VGA4AEP	VGA4AEExxxP	VGA160SEALS
6” ASA	VGA6AM	VGA6AEP	VGA6AEExxxP	VGA200SEALS
Insertable Versions				
100 mm (4")	VGA100NM	VGA100NEP	VGA100NExxxP	VGA100SEALS
Accessories				
Position Indicator Assembly		VGAPOSIND		
Solenoid Valve, 115 VAC		626771210		
Solenoid Valve, 220 VAC		626771211		
Solenoid Valve, 24 VDC		626771212		

Interface Seals	
Valve Size	**Parker #**
4” ASA	2–258
6” ASA	2–265
100 mm insertable	2–248

NOTE

Interface seals are not included with the valve or seals kit.

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VARIAN

Request for Return Health and Safety Certification

ISO 9001 REGISTERED

1. Return authorization numbers (RA#) **will not** be issued for any product until this Certificate is completed and returned to a Varian, Inc. Customer Service Representative.
2. Pack goods appropriately and drain all oil from rotary vane and diffusion pumps (for exchanges please use the packing material from the replacement unit), making sure shipment documentation and package label clearly shows assigned Return Authorization Number (RA#) VVT cannot accept any return without such reference.
3. Return product(s) to the nearest location:

North and South America	**Europe and Middle East**	**Asia and ROW**
Varian, Inc. Vacuum Technologies 121 Hartwell Ave. Lexington, MA 02421 Fax: (781) 860-9252	Varian S.p.A. Via F.lli Varian, 54 10040 Leini (TO) – ITALY Fax: (39) 011 997 9350	Varian Vacuum Technologies Local Office

For a complete list of phone/fax numbers see www.varianinc.com/vacuum

4. If a product is received at Varian, Inc. in a contaminated condition, **the customer is held responsible** for all costs incurred to ensure the safe handling of the product, and **is liable** for any harm or injury to Varian, Inc. employees occurring as a result of exposure to toxic or hazardous materials present in the product.

CUSTOMER INFORMATION

Company name: .....

Contact person: Name: ..... Tel: .....

Fax: ..... E-mail: .....

Ship method: Shipping Collect #: ..... P.O.#: .....

Europe only: VAT Reg Number: ..... *USA only:* ❒ Taxable ❒ Non-taxable

Customer ship to: ..... Customer bill to: .....

....

....

PRODUCT IDENTIFICATION

Product Description	Varian, Inc. Part Number	Varian, Inc. Serial Number

TYPE OF RETURN (check appropriate box)

❒ Paid Exchange	❒ Paid Repair	❒ Warranty Exchange	❒ Warranty Repair	❒ Loaner Return
❒ Credit	❒ Shipping Error	❒ Evaluation Return	❒ Calibration	❒ Other

HEALTH and SAFETY CERTIFICATION

VACUUM TECHNOLOGIES CANNOT ACCEPT ANY BIOLOGICAL HAZARDS, RADIOACTIVE MATERIAL, ORGANIC METALS, OR MERCURY AT ITS FACILITY. CHECK ONE OF THE FOLLOWING:

❒ I confirm that the above product(s) has (have) **NOT** pumped or been exposed to any toxic or dangerous materials in a quantity harmful for human contact.

❒ I declare that the above product(s) has (have) pumped or been exposed to the following toxic or dangerous materials in a quantity harmful for human contact (Must be filled in):

Print Name..... Signature ..... Date .....

PLEASE FILL IN *THE FAILURE REPORT SECTION* ON THE NEXT PAGE

Do not write below this line

Notification (RA) #: ..... Customer ID #: ..... Equipment #: .....

VARIAN

Request for Return Health and Safety Certification

ISO 9001 REGISTERED

FAILURE REPORT
(Please describe in detail the nature of the malfunction to assist us in performing failure analysis):

TURBO PUMPS AND TURBOCONTROLLERS

Claimed Defect		**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		Operation Time:	
Describe Failure:				
Turbocontroller Error Message:				

ION PUMPS/CONTROLLERS

❒ Bad feedthrough	❒ Poor vacuum
❒ Vacuum leak	❒ High voltage problem
❒ Error code on display	❒ Other .....
Describe failure:	
Customer application:	

VALVES/COMPONENTS

❒ Main seal leak	❒ Bellows leak
❒ Solenoid failure	❒ Damaged flange
❒ Damaged sealing area	❒ Other .....
Describe failure:	
Customer application:	

LEAK DETECTORS

❒ Cannot calibrate	❒ No zero/high background
❒ Vacuum system unstable	❒ Cannot reach test mode
❒ Failed to start	❒ Other .....
Describe failure:	
Customer application:	

INSTRUMENTS

❒ Gauge tube not working	❒ Display problem
❒ Communication failure	❒ Degas not working
❒ Error code on display	❒ Other .....
Describe failure:	
Customer application:	

ALL OTHER VARIAN, INC.

❒ Pump doesn't start	❒ Noisy pump (describe)
❒ Doesn't reach vacuum	❒ Overtemperature
❒ Pump seized	❒ Other .....
Describe failure:	
Customer application:	

DIFFUSION PUMPS

❒ Heater failure	❒ Electrical problem
❒ Doesn't reach vacuum	❒ Cooling coil damage
❒ Vacuum leak	❒ Other .....
Describe failure:	
Customer application:	

Sales and Service Offices

Argentina
Varian Argentina Ltd.
Sucursal Argentina
Av. Ricardo Balbin 2316
1428 Buenos Aires
Argentina
Tel: (54) 1 783 5306
Fax: (54) 1 786 5172

Benelux
Varian Vacuum Technologies
Rijksstraatweg 269 H,
3956 CP Leersum
The Netherlands
Tel: (31) 343 469910
Fax: (31) 343 469961

Brazil
Varian Industria e Comercio Ltda.
Avenida Dr. Cardoso de Mello 1644
Vila Olimpia
Sao Paulo 04548 005
Brazil
Tel: (55) 11 3845 0444
Fax: (55) 11 3845 9350

Canada
Central coordination through:
Varian Vacuum Technologies
121 Hartwell Avenue
Lexington, MA 02421
USA
Tel: (781) 861 7200
Fax: (781) 860 5437
Toll Free: (800) 882 7426

China
Varian Technologies - Beijing
Room 1201, Jinyu Mansion
No. 129A, Xuanwumen Xidajie
Xicheng District
Beijing 1000031 P.R. China
Tel: (86) 10 6641 1530
Fax: (86) 10 6641 1534

France and Wallonie
Varian s.a.
7 avenue des Tropiques
Z.A. de Courtaboeuf – B.P. 12
Les Ulis cedex (Orsay) 91941
France
Tel: (33) 1 69 86 38 13
Fax: (33) 1 69 28 23 08

Germany and Austria
Varian Deutschland GmbH
Alsfelder Strasse 6
Postfach 11 14 35
64289 Darmstadt
Germany
Tel: (49) 6151 703 353
Fax: (49) 6151 703 302

India
Varian India PVT LTD
101-108, 1st Floor
1010 Competent House
7, Nangal Raya Business Centre
New Delhi 110 046
India
Tel: (91) 11 5548444
Fax: (91) 11 5548445

Italy
Varian Vacuum Technologies
Via F.lli Varian, 54
10040 Leini, (Torino)
Italy
Tel (39) 011 997 9 111
Fax (39) 011 997 9 350

Japan
Varian Vacuum Technologies
Sumitomo Shibaura Building, 8th Floor
4-16-36 Shibaura
Minato-ku, Tokyo 108
Japan
Tel: (81) 3 5232 1253
Fax: (81) 3 5232 1263

Korea
Varian Technologies Korea, Ltd.
Shinsa 2nd Building 2F
966-5 Daechi-dong
Kangnam-gu, Seoul
Korea 135-280
Tel: (82) 2 3452 2452
Fax: (82) 2 3452 2451

Mexico
Varian S.A.
Concepcion Beistegui No 109
Col Del Valle
C.P. 03100
Mexico, D.F.
Tel: (52) 5 523 9465
Fax: (52) 5 523 9472

Taiwan
Varian Technologies Asia Ltd.
14F-16 No.77, Hsin Tai Wu Road Sec. 1,
Hsi Chih, Taipei Hsien
Taiwan, R.O.C.
Tel: (886) 2 2698 9555
Fax: (886) 2 2698 9678

UK and Ireland
Varian Ltd.
28 Manor Road
Walton-On-Thames
Surrey KT 12 2QF
England
Tel: (44) 1932 89 8000
Fax: (44) 1932 22 8769

United States
Varian Vacuum Technologies
121 Hartwell Avenue
Lexington, MA 02421
USA
Tel: (781) 861 7200
Fax: (781) 860 5437

Other Countries
Varian Vacuum Technologies

Via F.lli Varian, 54
10040 Leini, (Torino)
Italy
Tel: (39) 011 997 9 111
Fax: (39) 011 997 9 350

Customer Support and Service:

North America
Tel: 1 (800) 882-7426 (toll-free)
vtl.technical.support@varianinc.com

Europe
Tel: 00 (800) 234 234 00 (toll-free)
vtl.technical.support@varianinc.com

Japan
Tel: (81) 3 5232 1253 (dedicated line)
vtj.technical.support@varianinc.com

Korea
Tel (82) 2 3452 2452 (dedicated line)
vtk.technical.support@varianinc.com

Taiwan
Tel: 0 (800) 051 342 (toll-free)
vtw.technical.support@varianinc.com

Worldwide Web Site,
Catalog and On-line Orders:
www.varianinc.com

Representatives in most countries

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