

***TriScroll™ 300 Series
Dry Scroll
Vacuum Pump***

*MODULE REPLACEMENT
MANUAL*

Varian TriScroll™ 300 Dry Scroll Vacuum Pump



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Loctite and PST are registered trademarks of Loctite Corporation.

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



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 alleiniger 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,

TriScroll Series Vacuum Pump

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 folgenden Norm(en) oder Richtlinie(n) übereinstimmt.
auquel se réfère cette déclaration est conforme à la (aux) 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).
waaraan deze verklaring verwijst, aan de volgende norm(en) of richtlijn(en) beantwoordt.
a cui se riferisce questa dichiarazione è conforme alla/e seguente/i norma/o documento/i normativo/i.

98/37/EEC, Machinery Directive

EN 1012-2:1996 Compressors and Vacuum pumps Safety Reqmts; Part 2 Vacuum Pumps
EN 1050:1996 Safety of machinery - principles for risk assessment
EN 60204-1 Electrical equipment of industrial machines; general requirements

73/023/EEC, Low Voltage Directive

EN 60034 part 1 Rotating electrical machines - Part 1: Rating and performance

89/336/EEC, Electromagnetic Compatibility Directive

EN 61000-4-2 Testing and Measurement Techniques - Electrostatic Discharge Immunity Test

A handwritten signature in cursive script that reads "Frederick C. Campbell".

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

March 2003



Preface


This manual provides the information you need to successfully perform replacement of the entire module of your Varian TriScroll™ Dry Vacuum Pump. Module replacement is performed as an alternative to performing a complete overhaul and rebuild (Major Maintenance) and is sold as one of the options recommended when the pump base pressure has risen to an unacceptably high level for your application. If you have questions that are not addressed in this manual, please contact the nearest Varian Vacuum Technologies service facility listed on the rear cover of this manual.

Safety Considerations


READ THE FOLLOWING INSTRUCTIONS. TAKE ALL NECESSARY PRECAUTIONS.

The following format is used in this manual to call attention to hazards:


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 taken from the text.*



Maintenance personnel must be aware of all hazards associated with this equipment. They must know how to recognize hazardous and potentially hazardous conditions, and know how to avoid them. The consequences of work performed by unskilled or improperly trained maintenance personnel, or careless operation of the equipment employed in the specified maintenance procedures can be serious. Every maintenance person must read and thoroughly understand the materials discussed and the instructions provided in this manual, as well as any additional information provided by Varian Vacuum Technologies.

All warnings and cautions must be read carefully, fully understood, and strictly observed. Consult local, state/province, and national agencies regarding specific requirements and regulations. Address any safety, operation, and/or maintenance questions to the nearest Varian Vacuum Technologies location.

TriScroll 300 Dry Scroll Vacuum Pump

WARNING



Disconnect power from the TriScroll 300 before performing any maintenance procedure.

Allow the pump to cool before performing any maintenance procedure. Approximate cool-down time is one to two hours.

CAUTION



Wipe all O-rings clean with a lint-free cloth before installation to ensure that no foreign matter is present to impair the seal.

Do not use alcohol, methanol or other solvents on O-rings. To do so causes deterioration and reduces their ability to hold a vacuum.

If applicable, apply a small amount of Krytox[®] GPL 224 grease and wipe the O-rings "shiny" dry.

NOTE



Varian Vacuum Technologies recommends replacing all O-rings during routine maintenance or during any maintenance procedure requiring that O-rings be removed.

Unless otherwise stated, apply Loctite[®] 242 or Loctite PST[®] 567 to the first few threads only. Apply just enough to obtain a seal.

WARNING



The TriScroll 300 weighs 26.4 kg (58 lbs). To avoid injury, use proper lifting techniques when moving the pump.

TriScroll 300 Dry Scroll Vacuum Pump

Related TriScroll Manuals

Manuals related to the installation and operation, tip seal replacement, and major maintenance for the TriScroll 300 series pumps are listed in the following table:

Title	Applicable TriScroll Model	Part Number
Major Maintenance Manual	All TriScroll 300 Series Models	699904260
Tip Seal Replacement Manual	All TriScroll 300 Series Models	699904280
Installation and Operation Manual	All TriScroll 300 Series Models	699904265

Maintenance and Tool Kits

Material and tooling required to perform maintenance on TriScroll pumps is provided in kit form. A description of each kit and ordering information is provided in the following table:

Description	Contents	Applicable TriScroll Model	Part Number
Major Maintenance Kit	All bearings, bearing seals, bearing lubricant, O-rings, and tip seals required to rebuild TriScroll 300 Series pumps.	All TriScroll 300 Series models	PTSS0300MK
Maintenance Tooling Kit	All fixtures and tools required to perform any maintenance on TriScroll 300 Series pumps.	All TriScroll 300 Series models	PTSS0300TK
Replacement Tip Seal Set	Replacement tip seals and static O-rings for TriScroll 300 Series pumps.	All TriScroll 300 Series models	PTSS0300TS

NOTE: The Maintenance Tool Kit is also required for tip seal replacement.

TriScroll 300 Dry Scroll Vacuum Pump

Factory Service Options

Varian offers factory-rebuild service or advance exchange of complete TriScroll Pumps or TriScroll Pump Modules. Contact your nearest Varian Vacuum Technologies sales office for price and availability information. Select your preferred service option from the table below.

Factory Service Options	Part Number
Advance Exchange TriScroll 300 Single Phase	EXPPTS03001
Advance Exchange TriScroll 300 Three Phase	EXPPTS03003
Advance Exchange TriScroll 310 Single Phase	EXPPTS03101
Advance Exchange TriScroll 310 Three Phase	EXPPTS03103
Advance Exchange TriScroll 300 Pump Module Only	EXPTS0300SC
Advance Exchange TriScroll 310 Pump Module Only	EXPTS0310SC
Service/Rebuild TriScroll 300 Pump (Single or Three Phase)	PTS0300KMA
Service/Rebuild TriScroll 310 Pump (Single or Three Phase)	PTS0310KMA
Service/Rebuild TriScroll 300 Pump Module Only	PTS0300SCR
Service/Rebuild TriScroll 310 Pump Module Only	PTS0310SCR

Serial Numbers Notes

This manual applies to TriScroll 300 series with serial numbers beginning with LP, and ascending from LPB80124. For service on TriScroll series pumps with serial numbers J7000001 to A8000108, contact your nearest Varian Vacuum Technologies office.

TriScroll 300 series pumps with serial number above LPC80250 have 1/4-18 National Pipe Threads in the bearing purge, gas ballast, and exhaust ports. Pumps with serial numbers below LPC80250 were manufactured with 1/4-19 British Standard Pipe Threads. Contact your nearest Varian Vacuum Technologies office if mating hardware is required.

Contacting Varian Vacuum Technologies

In the United States, you can contact Varian Vacuum Technologies Customer Service at 1-800-8VARIAN. See the back cover of this manual for a listing of our sales and service offices.

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

TriScroll 300 Dry Scroll Vacuum Pump

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General Information

Varian TriScroll 300 series pumps are designed to provide years of trouble-free service if maintenance procedures and intervals are observed. Bearing grease replenishment and tip seal replacement is recommended when the pump base pressure has risen to an unacceptably high level for your application. Bearings, rotary seals and O-rings should also be replaced if the pump exhibits humming or grinding noises from the bearings. Main bearing life may be shortened if your application requires the pumping of high quantities of water vapor. Use of the bearing purge will keep this water from impacting bearing life.

Equipment Required to Install Pump Module

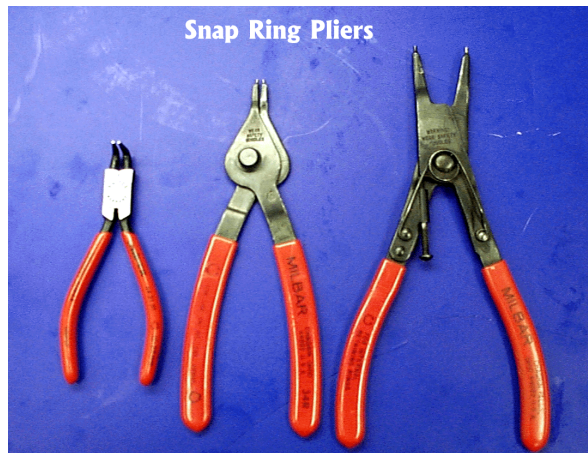
- ❑ Pump Module

Tools Required to Install Pump Module

- ❑ 4 MM Hex key
- ❑ 5 MM Hex key
- ❑ 6 MM Hex key

Included in **Maintenance Tool Kit: #PTSS0300TK** (page 2)

Maintenance Tool Kit



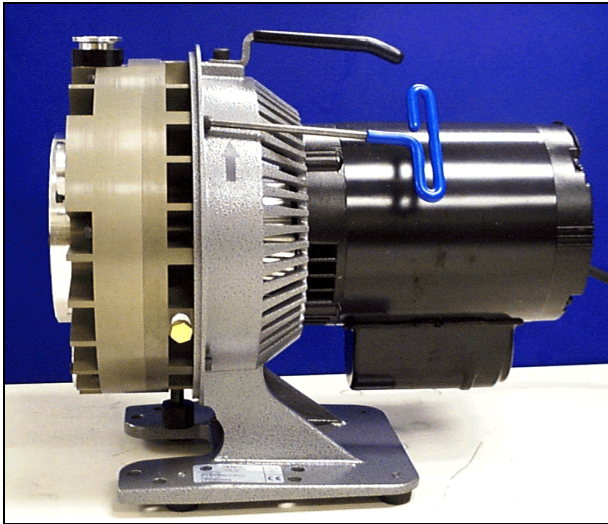
Maintenance Tool Kit (continued)



TriScroll Disassembly

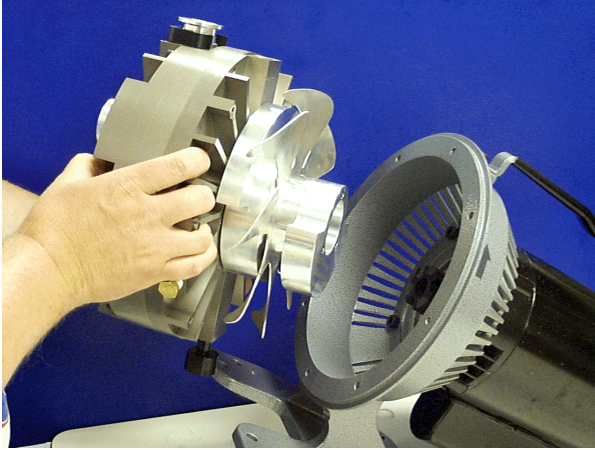


1. Remove three M5x16 screws attaching cowling to module.
2. Remove cowling.

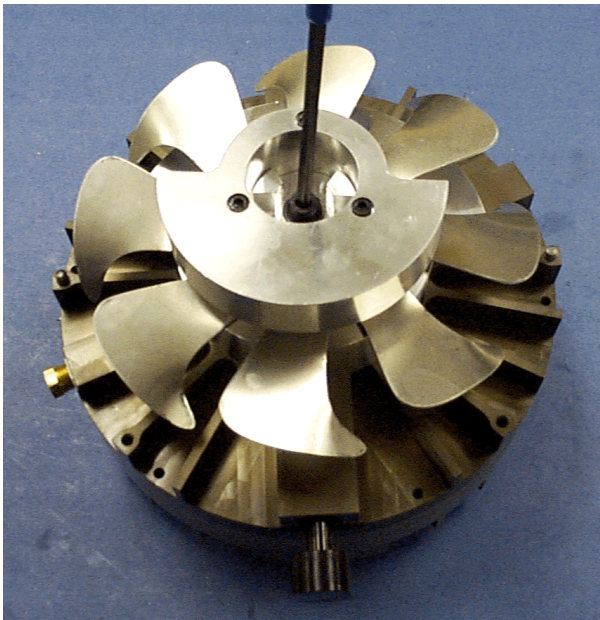


3. Remove the four M6x16 screws attaching pump module to the frame.

TriScroll Disassembly (continued)

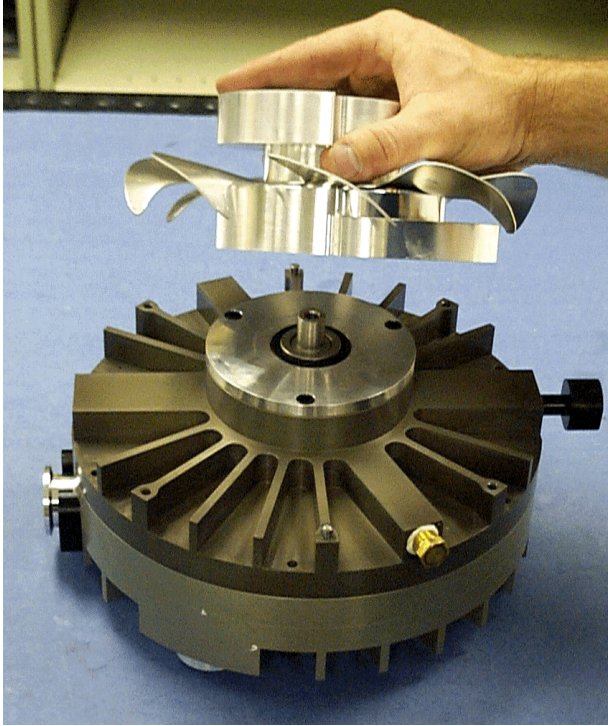


4. Remove pump module from the frame.



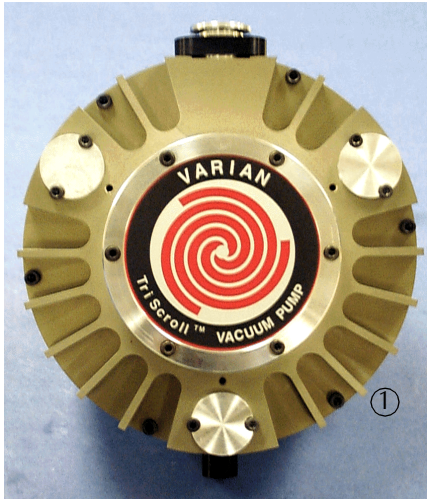
5. Remove M8x12 screw and washer attaching fan assembly to crankshaft.

TriScroll Disassembly (continued)



6. Remove fan assembly from crankshaft.
7. Remove key from slot in crankshaft.

TriScroll Reassembly

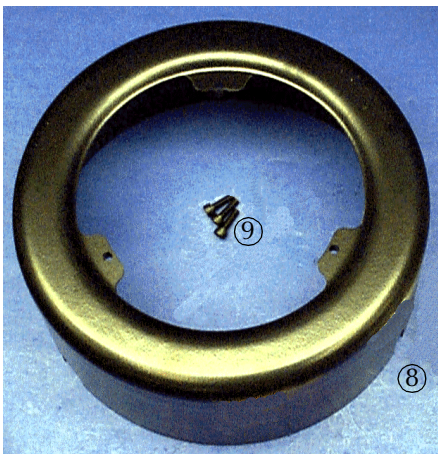
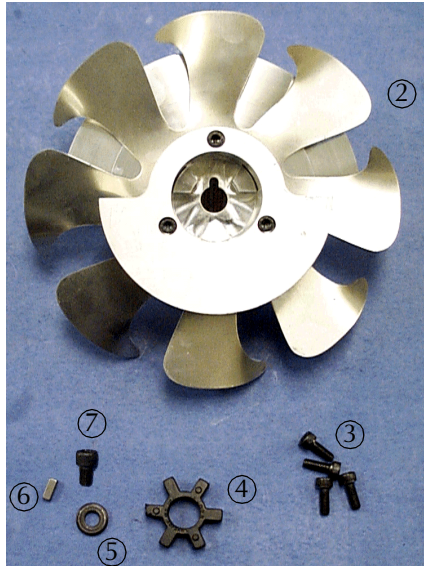


Tool required:

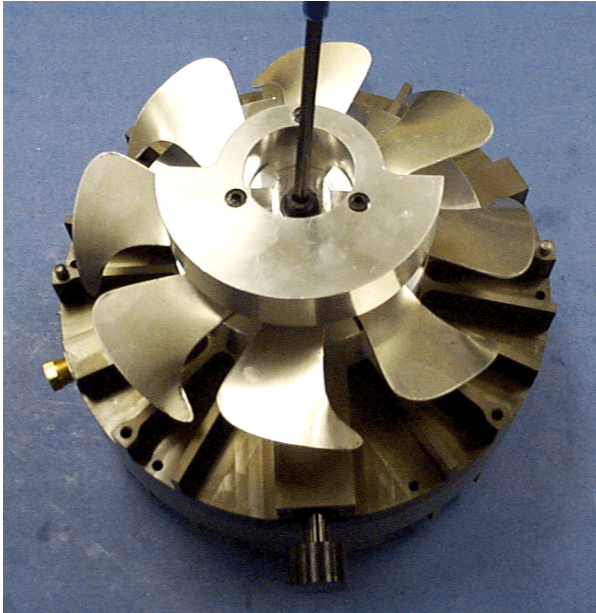
Allen wrench

Locate the following items shown in the photos on the left:

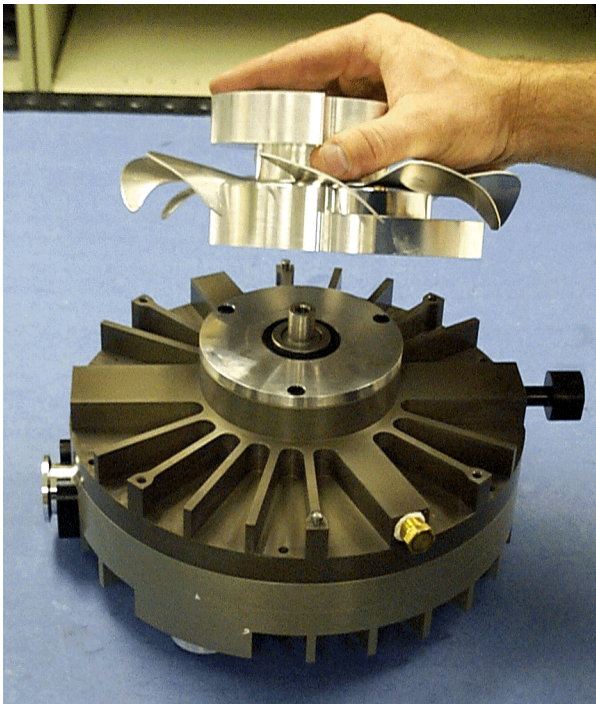
- ① Pump Module Assembly
- ② Fan Assembly
- ③ M6x16 screws (4)
- ④ Spider Coupling
- ⑤ Washer
- ⑥ Key
- ⑦ M8x12 screw
- ⑧ Cowling
- ⑨ M5x16 screws (3)



TriScroll Reassembly (continued)

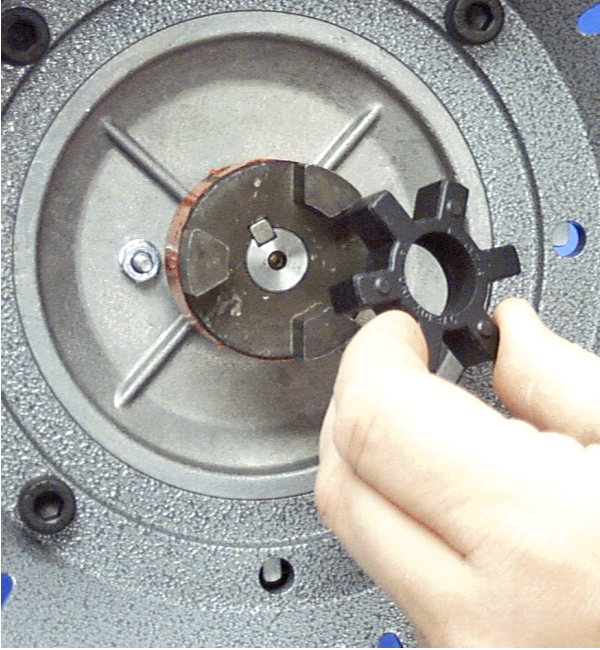


1. Install key in slot on crankshaft.

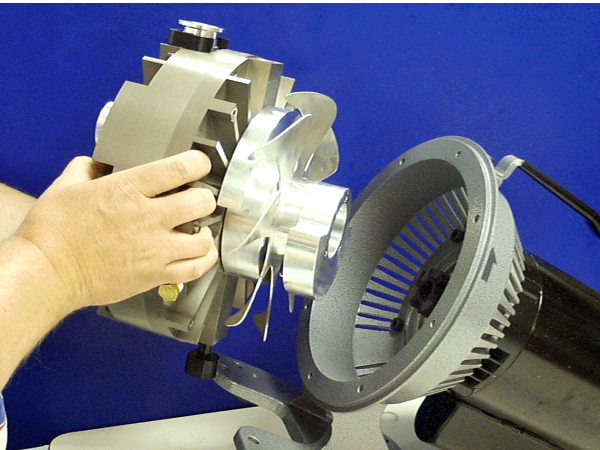


2. Slide fan assembly onto crankshaft engaging key and against seal spacer.
3. Secure fan assembly to crankshaft with M8x12 screw and washer previously removed in step 5 on page 5.

TriScroll Reassembly (continued)



4. Insert spider in motor coupling.



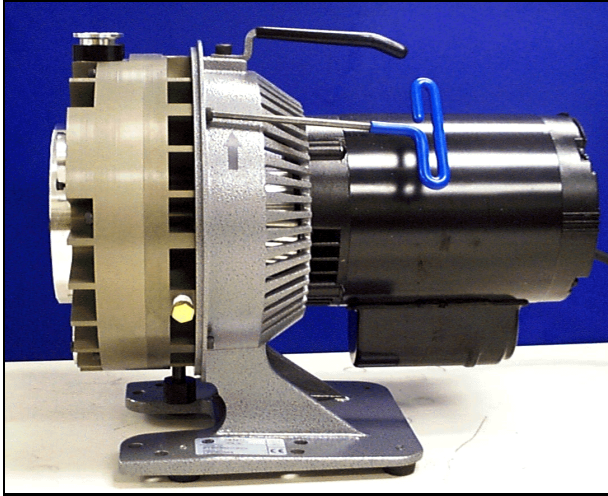
5. Install pump module on frame, aligning fingers on fan assembly with fingers on coupling. Assure proper fit of dowel pins on mating holes in frame.

NOTE



Exhaust fitting in the downward position.

TriScroll Reassembly (continued)



6. Secure pump module to frame with four M6x16 screws.



7. Install cowling over pump module. Secure with three M5x16 screws.

TriScroll Reassembly (continued)



This figure illustrates a fully reassembled TriScroll 300 Series Pump.

Pump Conditioning and Performance Verification

Pump Module conditioning and performance verification has been performed at Varian Vacuum Technologies factory.

Further conditioning or performance verification is not necessary.

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Request for Return Health and Safety Certification



- Return authorization numbers (RA#) **will not** be issued for any product until this Certificate is completed and returned to a Varian Customer Service Representative.
- 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.
- Return product(s) to the nearest location:

North and South America

Varian Vacuum Technologies
121 Hartwell Ave.
Lexington, MA 02421
Fax: (781) 860-9252

Europe and Middle East

Varian S.p.A.
Via F.lli Varian, 54
10040 Leini (TO) – ITALY
Fax: (39) 011 997 9350

Asia and ROW

Varian Vacuum Technologies
Local Office

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

- If a product is received at Varian 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 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.#:
<i>Europe only:</i> VAT Reg. Number:	<i>USA only:</i> <input type="checkbox"/> Taxable <input type="checkbox"/> Non-taxable
Customer Ship To:	Customer Bill To:
.....
.....

PRODUCT IDENTIFICATION

Product Description	Varian P/N	Varian S/N

TYPE OF RETURN (check appropriate box)

<input type="checkbox"/> Paid Exchange	<input type="checkbox"/> Paid Repair	<input type="checkbox"/> Warranty Exchange	<input type="checkbox"/> Warranty Repair	<input type="checkbox"/> Loaner Return
<input type="checkbox"/> Credit	<input type="checkbox"/> Shipping Error	<input type="checkbox"/> Evaluation Return	<input type="checkbox"/> Calibration	<input type="checkbox"/> Other

HEALTH and SAFETY CERTIFICATION

VARIAN 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 #:

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

TURBO PUMPS and TURBOCONTROLLERS

<p>CLAIMED DEFECT</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Does not start</td> <td><input type="checkbox"/> Noise</td> </tr> <tr> <td><input type="checkbox"/> Does not spin freely</td> <td><input type="checkbox"/> Vibrations</td> </tr> <tr> <td><input type="checkbox"/> Does not reach full speed</td> <td><input type="checkbox"/> Leak</td> </tr> <tr> <td><input type="checkbox"/> Mechanical Contact</td> <td><input type="checkbox"/> Overtemperature</td> </tr> <tr> <td><input type="checkbox"/> Cooling defective</td> <td><input type="checkbox"/> Clogging</td> </tr> </table>	<input type="checkbox"/> Does not start	<input type="checkbox"/> Noise	<input type="checkbox"/> Does not spin freely	<input type="checkbox"/> Vibrations	<input type="checkbox"/> Does not reach full speed	<input type="checkbox"/> Leak	<input type="checkbox"/> Mechanical Contact	<input type="checkbox"/> Overtemperature	<input type="checkbox"/> Cooling defective	<input type="checkbox"/> Clogging	<p>POSITION</p> <input type="checkbox"/> Vertical <input type="checkbox"/> Horizontal <input type="checkbox"/> Upside-down <input type="checkbox"/> Other:	<p>PARAMETERS</p> <table style="width:100%;"> <tr> <td>Power:</td> <td>Rotational Speed:</td> </tr> <tr> <td>Current:</td> <td>Inlet Pressure:</td> </tr> <tr> <td>Temp 1:</td> <td>Foreline Pressure:</td> </tr> <tr> <td>Temp 2:</td> <td>Purge flow:</td> </tr> </table> <hr/> <p>OPERATION TIME:</p>	Power:	Rotational Speed:	Current:	Inlet Pressure:	Temp 1:	Foreline Pressure:	Temp 2:	Purge flow:
<input type="checkbox"/> Does not start	<input type="checkbox"/> Noise																			
<input type="checkbox"/> Does not spin freely	<input type="checkbox"/> Vibrations																			
<input type="checkbox"/> Does not reach full speed	<input type="checkbox"/> Leak																			
<input type="checkbox"/> Mechanical Contact	<input type="checkbox"/> Overtemperature																			
<input type="checkbox"/> Cooling defective	<input type="checkbox"/> Clogging																			
Power:	Rotational Speed:																			
Current:	Inlet Pressure:																			
Temp 1:	Foreline Pressure:																			
Temp 2:	Purge flow:																			
Describe Failure :																				
TURBOCONTROLLER ERROR MESSAGE:																				

ION PUMPS/CONTROLLERS

<input type="checkbox"/> Bad feedthrough <input type="checkbox"/> Vacuum leak <input type="checkbox"/> Error code on display	<input type="checkbox"/> Poor vacuum <input type="checkbox"/> High voltage problem <input type="checkbox"/> Other
Describe failure:	
Customer application:	

VALVES/COMPONENTS

<input type="checkbox"/> Main seal leak <input type="checkbox"/> Solenoid failure <input type="checkbox"/> Damaged sealing area	<input type="checkbox"/> Bellows leak <input type="checkbox"/> Damaged flange <input type="checkbox"/> Other
Describe failure:	
Customer application:	

LEAK DETECTORS

<input type="checkbox"/> Cannot calibrate <input type="checkbox"/> Vacuum system unstable <input type="checkbox"/> Failed to start	<input type="checkbox"/> No zero/high background <input type="checkbox"/> Cannot reach test mode <input type="checkbox"/> Other
Describe failure:	
Customer application:	

INSTRUMENTS

<input type="checkbox"/> Gauge tube not working <input type="checkbox"/> Communication failure <input type="checkbox"/> Error code on display	<input type="checkbox"/> Display problem <input type="checkbox"/> Degas not working <input type="checkbox"/> Other
Describe failure:	
Customer application:	

ALL OTHER VARIAN PUMPS

<input type="checkbox"/> Pump doesn't start <input type="checkbox"/> Doesn't reach vacuum <input type="checkbox"/> Pump seized	<input type="checkbox"/> Noisy pump (describe) <input type="checkbox"/> Overtemperature <input type="checkbox"/> Other
Describe failure:	
Customer application:	

DIFFUSION PUMPS

<input type="checkbox"/> Heater failure <input type="checkbox"/> Doesn't reach vacuum <input type="checkbox"/> Vacuum leak	<input type="checkbox"/> Electrical problem <input type="checkbox"/> Cooling coil damage <input type="checkbox"/> Other
Describe failure:	
Customer application:	

Varian Vacuum Technologies Sales and Service Offices

Argentina

Varian Argentina Ltd.

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Av. Ricardo Balbin 2316
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Varian Vacuum Technologies

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Fax:(31) 343 469961

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Fax:(33) 1 69 28 23 08

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Postfach 11 14 35
64289 Darmstadt
Germany
Tel:(49) 6151 703 353
Fax:(49) 6151 703 302

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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

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Varian Vacuum Technologies

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

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Varian Vacuum Technologies

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Minato-ku, Tokyo 108
Japan
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Fax:(81) 3 5232 1263

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Kangnam-gu, Seoul
Korea 135-280
Tel:(82) 2 3452 2452
Fax:(82) 2 3452 2451

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Fax:(52) 5 523 9472

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Fax:(781) 860 5437
Toll Free: (800) 882 7426

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10040 Leini, (Torino)
Italy
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Fax:(39) 011 997 9350

Internet Users:

Customer Service and Technical

Support:

vpl.customer.support@varianinc.com

Worldwide Web Site:

www.varianinc.com/vacuum

Order On-line:

www.evarian.com

Representatives in most countries



VARIAN