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Agilent Technologies

SH-100 Dry Scroll Vacuum Pump

INSTRUCTION MANUAL

MANUALE DI ISTRUZIONI

NOTICE DE MODE D'EMPLOI

BEDIENUNGSHANDBUCH

Manual No. 699904340
Revision E
May 2004

SH-100
Dry Scroll Vacuum Pump

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

VARIAN

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

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SH-100 Vacuum Pump Model Number – SH01001UNIV

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98/37/EC . . . . . Machine Directive
EN 61010-1
EN 60204-1 . . . . . Safety of Machinery/Electrical Equipment of Machine
EN 292-1
EN 292-2
EN 1012-2
89/336/EC and 91/263/EC . . . . . EMC Directive
EN55022
EN61000-4-3
EN61000-4-4
EN61000-4-2
EN61000-4-6
EN61000-4-5
EN61000-3-2
EN61000-3-3
EN61000-4-11

Frederick C. Campbell

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

March 2001

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, expressed 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, expressed 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 the Customer's expense; in addition, a charge for testing and examination may be made on Products so returned.

3/1/00

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Instructions for Use

General Information

This equipment is designed for use by professionals. The user should read this instruction manual and any other additional information supplied by Vacuum Technologies before operating the equipment. Vacuum Technologies will not be held responsible for any events that occur due to non-compliance with these instructions, improper use by untrained persons, non-authorized interference with the equipment, or any action contrary to that provided for by specific national standards.

The SH-100 is a hermetic, dry scroll vacuum pump. This pump is suitable for pumping air or inert gases. The pump is not intended to pump toxic, corrosive, explosive, or particulate-forming gases.

The following paragraphs contain all the information necessary to guarantee the safety of the operator when using the equipment. Detailed information is supplied in "Technical Information" on page 9.

This manual uses the following standard safety protocol:

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.

Storage

When transporting and storing the pump, the following environmental requirements should not be exceeded:

Temperature:	−20 °C to +60 °C (−4 °F to 140 °F)
Relative humidity:	0 to 95% (non-condensing)

Preparation for Installation

The pump is supplied in a special protective packing. If this shows signs of damage, which may have occurred during transport, contact your local sales office.

Total weight of the packing, SH-100 pump included, is approximately 20 kg (44 lbs).

WARNING

When unpacking the pump, be sure not to drop it and avoid any kind of sudden impact or shock vibration to it.

NOTE

Normal exposure to the environment cannot damage the pump. Nevertheless, it is advisable to keep the pump inlet closed until the pump is installed in the system.

Installation

Do not install or use the pump in an environment exposed to atmospheric agents (rain, snow, ice), dust, aggressive gases, or in explosive environments or those with a high fire risk.

During operation, the following environmental conditions must be respected:

Temperature:	+5 °C to +40 °C (41 °F to 104 °F)
Relative humidity:	0 to 95% (non-condensing)

CAUTION

Be certain that your electrical mains power voltage corresponds to that indicated on the white tab (110 or 220) adjacent to the On/Off switch on the rear of the pump.

If voltage changeover is required, use a small screwdriver to remove the tab holder from the power module. Position the white tab so that the correct voltage faces out and reinstall the tab holder.

Connect the pump to the power supply using an IEC-320 style power cord of at least 10 A capacity.

Use

In order to reach maximum vacuum, the pump must be left running for about an hour with the inlet sealed.

There are no special instructions for starting the pump; it need only be switched on using the On/Off switch.

The inlet valve will open 10 seconds after the pump is started.

WARNING

The pump is designed for operation with neutral or noncorrosive fluids. It is absolutely forbidden to use it with potentially explosive, inflammable or poisonous substances.

There are no special instructions for stopping the pump; it need only be disconnected from the electric power source by the On/Off switch.

The inlet valve will close immediately after the pump is stopped.

Maintenance

Personnel responsible for pump operation and maintenance must be well-trained and aware of the accident prevention rules.

WARNING

- ❑ *Death may result from contact with high voltages. Always take extreme care and observe the accident prevention regulations in force.*
- ❑ *When machine is powered up, be careful of moving parts and high voltages.*
- ❑ *If you have to perform maintenance on the pump after a considerable time in operation, allow it to cool as the temperature of the outer surface may be in excess of 60 °C.*
- ❑ *Always disconnect your power supply to the pump before beginning maintenance work.*

NOTE

Before returning the pump to the factory for repair, the "Health and Safety" sheet attached to this instruction manual must be completed and sent to the local sales office. A copy of the sheet must be inserted in the pump package before shipping.

If a pump is to be discarded, it must be disposed of in accordance with specific national standards.

Istruzioni Per L'uso

Informazioni Generali

Questa apparecchiatura è destinata ad uso professionale. L'utilizzatore deve leggere attentamente il presente manuale di istruzioni ed ogni altra informazione addizionale fornita dalla Vacuum Technologies prima dell'utilizzo dell'apparecchiatura. La Vacuum Technologies si ritiene sollevata da eventuali responsabilità dovute all'inosservanza totale o parziale delle istruzioni, ad uso improprio da parte di personale non addestrato, ad interventi non autorizzati o ad uso contrario alle normative nazionali specifiche.

La pompa a secco Scroll SH-100 è una pompa ermetica adatta a pompare aria or gas inerti.

Questa pompa non è adatta per pompare gas or particelle tossiche, corrosive or esplosive.

Nei paragrafi seguenti sono riportate tutte le informazioni necessarie a garantire la sicurezza dell'operatore durante l'utilizzo dell'apparecchiatura. Per informazioni dettagliate, vedere "Technical Information" a pagina 10.

Questo manuale utilizza le seguenti convenzioni:

PERICOLO

I messaggi di pericolo attirano l'attenzione dell'operatore su una procedura o una pratica specifica che, se non eseguita in modo corretto, potrebbe provocare gravi lesioni personali.

ATTENZIONE

I messaggi di attenzione sono visualizzati prima di procedure che, se non osservate, potrebbero causare danni all'apparec-chiatura.

NOTA

Le note contengono informazioni importanti estrapolate dal testo.

Immagazzinamento

Durante il trasporto e l'immagazzinamento della pompa non devono essere superate le seguenti condizioni ambientali:

Temperatura:	–20 °C a + 60 °C
Umidità relativa:	0 a 95% (non condensante)

Preparazione Per L'installazione

La pompa viene fornita in un imballo protettivo speciale; se si presentano segni di danni, che potrebbero essersi verificati durante il trasporto, contattare l'ufficio vendite locale.

Il peso dell'imballo, comprensivo della pompa SH-100, è di circa 20 kg.

PERICOLO

Durante l'operazione di disimballaggio, prestare particolare attenzione a non lasciar cadere la pompa e a non sottoporla ad urti o vibrazioni.

NOTA

La pompa non può essere danneggiata rimanendo semplicemente esposta all'atmosfera. Si consiglia comunque di mantenerla chiusa fino al momento dell'installazione sul sistema onde evitare eventuale inquinamento da polvere.

Installazione

Non installare e/o utilizzare la pompa in ambienti esposti ad agenti atmosferici (pioggia, gelo, neve), polveri, gas aggressivi, in ambienti esplosivi o con elevato rischio di incendio.

Durante il funzionamento è necessario che siano rispettate le seguenti condizioni ambientali:

Temperatura:	+5 °C a +40 °C
Umidità relativa:	0 a 95% (non condensante)

ATTENZIONE

Verificate che la tensione di rete corrisponda ai valori indicati sulla etichetta bianca (110 or 220) adiacente all' interruttore On/Off sul retro della pompa. Se il cambiamento di tensione è richiesto, utilizzate un piccolo cacciavite per togliere la linguetta bianca dal modulo di potenza. Posizionate la linguetta bianca in corrispondenza al voltaggio di rete e riinstallate il tutto.

Collegare la pompa alla rete utilizzando un cavo da 10 A con presa IEC-320.

Uso

Prima di mettere la pompa in servizio effettivo è necessario, per il raggiungimento del vuoto limite, scaldare la pompa per circa 60 minuti lasciandola lavorare con la flangia di ingresso chiusa.

Non ci sono particolari istruzioni per far partire la pompa; basta accenderla utilizzando l'interruttore On/Off.

La valvola di ingresso si apre 10 secondi dopo la partenza della pompa.

PERICOLO

La pompa è progettata per operare con fluidi neutri o non corrosivi. E' assolutamente vietato l'impiego con sostanze potenzialmente esplosive, infiammabili o velenose.

Lo spegnimento della pompa non richiede particolari manovre; è sufficiente scollegarla dall'alimentazione elettrica agendo sull'apposito interruttore.

NOTA

La valvola di ingresso si chiude immediatamente quando si spegne la pompa.

Manutenzione

Il personale addetto alla condotta ed alla manutenzione della pompa deve essere ben addestrato e deve avere una approfondita conoscenza delle norme antinfortunistiche.

PERICOLO

- ❑ *Le alte tensioni possono causare morte al contatto. Operare sempre con la massima cautela e secondo le norme antinfortunistiche in vigore.*
- ❑ *Quando la macchina è alimentata prestare attenzione per la presenza di parti in movimento e di alta tensione.*
- ❑ *Nel caso si debba procedere ad operazioni di manutenzione della pompa al termine di un periodo di esercizio, è necessario lasciarla raffreddare, poichè la temperatura esterna può superare i 60 °C.*
- ❑ *Escludere sempre l'alimentazione della pompa prima di compiere operazioni di manutenzione.*

NOTA

Prima di rispedire al costruttore una pompa per riparazioni, è indispensabile compilare e far pervenire al locale ufficio vendite la scheda "Sicurezza e Salute" allegata al presente manuale di istruzioni. Copia della stessa deve essere inserita nell'imballo della pompa prima della spedizione.

Qualora una pompa dovesse essere rottamata, procedere alla sua eliminazione nel rispetto delle normative nazionali specifiche.

Instructions D'utilisation

Indications Générales

Cet appareillage a été conçu en vue d'une utilisation professionnelle. Il est conseillé à l'utilisateur de lire attentivement cette notice d'instructions ainsi que toute autre indication fournie par Vacuum Technologies avant d'utiliser l'appareil. Vacuum Technologies décline par conséquent toute responsabilité en cas de non-respect total ou partiel des instructions fournies, d'utilisation incorrecte de la part d'un personnel non formé, d'opérations non autorisées ou d'un emploi contraire aux réglementations nationales spécifiques.

La pompe SH-100, est une pompe à vide sèche et hermétique. Cette pompe convient pour le pompage de l'air ou de gaz inertes. Elle n'a pas été conçue pour le pompage de gaz toxiques, corrosifs, explosifs, ou susceptibles de générer des particules.

Les paragraphes suivants fournissent toutes les indications nécessaires pour garantir la sécurité de l'opérateur pendant l'utilisation de l'appareillage. Les détails sont fournis en page 10 dans le paragraphe "Technical Information".

Cette notice utilise les signes conventionnels suivants:

DANGER

Les messages de danger attirent l'attention de l'opérateur sur une procédure ou une manœuvre spéciale dont la mauvaise exécution risque de provoquer de graves lésions au personnel.

ATTENTION

Les messages d'attention apparaissent avant certaines procédures dont le non-respect peut endommager sérieusement l'appareillage.

NOTENT

Les notes contiennent des renseignements importants, extrapolés du texte.

Emmagasinage

Pendant le transport et l'emmagasinage de la pompe, il faut veiller à respecter les conditions environnementales suivantes:

Température:	–20 °C à +60 °C
Humidité relative:	0 à 95% (non condensante)

Préparation Pour L'installation

La pompe est fournie dans un emballage de protection spécial; si l'on constate des marques de dommages pouvant s'être produits pendant le transport, contacter aussitôt le bureau de vente local.

Le poids total de l'emballage et de la pompe SH-100 est d'environ 20 kg.

DANGER

Pendant l'opération d'ouverture de l'emballage, veiller tout particulièrement à ne pas laisser tomber la pompe et à ne lui faire subir aucun choc ni aucune vibration.

NOTENT

La pompe ne peut être endommagée en restant simplement exposée à l'atmosphère. Il est de toute façon conseillé de la garder dans son emballage jusqu'au moment de sa mise en fonction afin d'éviter toute pollution due à la poussière

Installation

Ne pas installer et/ou utiliser la pompe dans des milieux exposés aux agents atmosphériques (pluie, gel, neige), à des poussières, à des gaz agressifs ainsi que dans des milieux explosifs ou à fort risque élevé d'incendie.

Pendant le fonctionnement, il est nécessaire de respecter les conditions environnementales suivantes:

Température: +5 °C à +40 °C

Humidité relative: 0 à 95% (non condensante)

ATTENTION

S'assurer que la tension fournie par votre générateur corresponde à celle indiquée sur l'étiquette blanche (110 ou 220) adjacente au bouton On/Off au rétro de la pompe. Pour changer la tension de travail, utilisez un petit tourne-vis pour retirer la protection de l'étiquette du module de tension. Positionner l'étiquette blanche en face de la tension désirée et remettre la protection.

Connecter la pompe au générateur de tension par le biais d'un cordon d'alimentation IEC-320 d'une capacité minimale de 10 ampères.

Utilisation

Avant la mise en service de la pompe, il est nécessaire, pour atteindre le vide maximum, que la pompe tourne environ une heure avec l'entrée hermétiquement fermée.

Il n'y a pas d'instructions spéciales pour démarrer la pompe; la mise en marche se fait à l'aide du commutateur On/Off.

La valve d'entrée s'ouvre 10 secondes après la mise en marche de la pompe.

DANGER

La pompe a été conçue pour fonctionner avec des fluides neutres ou non corrosifs. L'emploi de substances potentiellement explosives, inflammables ou vénéneuses est strictement interdit.

L'arrêt de la pompe ne requiert aucune manœuvre particulière; il faut seulement la déconnecter de l'alimentation électrique grâce au bouton On/Off.

NOTENT

La valve d'entrée se ferme immédiatement à l'arrêt de la pompe.

Maintenance

Le personnel chargé de la conduite et de la maintenance de la pompe doit avoir reçu la formation nécessaire et posséder une connaissance approfondie des normes de prévention des accidents du travail.

DANGER

- ❑ *Les hautes tensions peuvent entraîner la mort par contact. Veiller à toujours opérer avec le maximum de prudence et dans le respect des normes de prévention des accidents du travail en vigueur.*
- ❑ *Lorsque la machine est sous alimentation, faire attention à la présence d'organes en mouvement et de haute tension.*
- ❑ *En cas de nécessité de procéder à des opérations de maintenance de la pompe au terme d'une période de fonctionnement, il est indispensable de la laisser refroidir car sa température extérieure peut être supérieure à 60 °C.*
- ❑ *Avant toute opération de maintenance, il est impératif de toujours couper l'alimentation de la pompe.*

NOTENT

Avant de retourner une pompe au constructeur pour réparation, il est indispensable de remplir et d'adresser au bureau local de vente la fiche "Sécurité et Santé" jointe à la présente notice d'instructions. Une copie de celle-ci devra être mise dans l'emballage de la pompe avant expédition.

En cas de mise au rebut de la pompe, procéder à son élimination conformément aux réglementations nationales en la matière.

Gebrauchsanleitung

Allgemeine Hinweise

Dieses Gerät ist für den professionellen Gebrauch bestimmt. Vor dem Gebrauch soll der Benutzer dieses Handbuch sowie alle weiteren von Vacuum Technologies mitgelieferten Zusatzinformationen genau lesen. Bei vollständiger bzw. teilweiser Nichtbeachtung der enthaltenen Hinweise, unsachgemäßem Gebrauch durch ungeschultes Personal, nicht autorisierten Eingriffen und Benutzung unter Mißachtung der nationalen Bestimmungen übernimmt Firma Vacuum Technologies keinerlei Haftung.

Die Pumpe SH-100 ist eine hermetisch dichte trockenlaufende Vakuumpumpe (Scrollpumpe).

Diese Vorvakuumpumpe eignet sich für das Pumpen von Luft oder inerten Gasen. Die Pumpe ist nicht zum Abpumpen von toxischen, korrosiven oder explosiven Gasen geeignet. Ferner sind Partikel zu vermeiden.

In den folgenden Abschnitten sind alle erforderlichen Informationen für die Sicherheit des Bedieners bei der Verwendung des Geräts aufgeführt. Nähere Einzelheiten sind den "Technical Information" auf Seite 10 zu entnehmen.

In dieser Gebrauchsanleitung werden Sicherheitshinweise folgendermaßen hervorgehoben:

GEFAHR

Die Gefahrenhinweise richten die Aufmerksamkeit des Bedieners auf eine spezielle Prozedur oder Praktik, die bei unkorrekter Ausführung schwere Personenschäden zur Folge haben könnte.

ACHTUNG

Die Warnhinweise vor bestimmten Prozeduren machen den Bediener darauf aufmerksam, daß bei Nichteinhaltung Schäden am Gerät entstehen können.

ANMERKUNG

Die Anmerkungen enthalten wichtige Informationen, die aus dem Text hervorgehoben werden.

Lagerung

Während des Transports und der Lagerung der Pumpe sollen die folgenden Umgebungsbedingungen gegeben sein:

Temperatur:	−20 °C bis +60 °C
Relative Feuchtigkeit:	0 bis 95% (niederschlagsfrei)

Vor Der Installation

Die Pumpe wird in einer speziellen Schutzverpackung geliefert. Eventuelle Transportschäden sind der zuständigen örtlichen Verkaufsstelle zu melden.

Das Verpackungsgewicht beträgt, einschließlich der Pumpe SH-100, ungefähr 20 kg.

GEFAHR

Beim Auspacken ist darauf zu achten, daß die Pumpe nicht fallengelassen oder Stößen oder Vibrationen ausgesetzt wird.

ANMERKUNG

Die Pumpe kann, wenn sie einfach der Atmosphäre ausgesetzt ist, nicht beschädigt werden. Sie sollte jedoch bis zur Installation an der Anlage geschlossen bleiben, um Verunreinigungen durch Staub zu vermeiden.

Installation

Die Pumpe darf nicht in Umgebungen installiert und/oder benutzt werden, die ungeschützt vor Witterungsbedingungen (Regen, Frost, Schnee), Staub und aggressiven Gasen sind und in denen Explosions oder erhöhte Brandgefahr besteht.

Während des Betriebs sollen die folgenden Umgebungsbedingungen gegeben sein:

Temperatur: +5 °C bis +40 °C

Relative Feuchtigkeit 0 bis 95% (niederschlagsfrei)

ACHTUNG

Stellen Sie sicher, daß die Betriebsspannung mit der auf dem weißen Schild (110 oder 220) neben dem Einschalter On/Off auf der Rückseite der Pumpe übereinstimmt.

Falls ein Wechsel der Spannung erforderlich wird, nehmen Sie einen kleinen Schraubendreher üm das Abdeckschild zu entfernen. Drehen Sie nun den Spannungsselektor auf die gewünschte Spannung und schließen das Abdeckschild. Sie sehen jetzt auf einem weißen Hintergrund die von Ihnen gewählte Spannung.

Schließen Sie die Pumpe über ein Netzkabel (IEC-320 Typ) für mindestens 10 A an.

Gebrauch

Vor der eigentlichen Inbetriebnahme der Pumpe ist es zur Erreichung des Grenzvakuums erforderlich, die Pumpe ungefähr eine Stunde laufen zu lassen.

Die Einschaltung der Pumpe erfordert keine speziellen Schritte, es ist lediglich der Schalter On/Off zu betätigen.

Das Einlaßventil wird ca. 10 sec. Nach Einschalten der Pumpe öffnen.

GEFAHR

Die Pumpe ist für den Betrieb mit neutralen und nicht korrosiven Fluiden konzipiert. Der Einsatz mit potentiell explosions- oder feuergefährlichen oder giftigen Substanzen ist streng verboten.

Das Ausschalten der Pumpe erfordert keine speziellen Schritte, sie braucht nur durch Betätigung des Schalters On/Off abgeschaltet werden.

ANMERKUNG

Das Einlaßventil schließt unverzüglich nach Abschalten der Pumpe.

Wartung

Das für den Betrieb und die Wartung zuständige Personal soll geschult sein und über eine solide Kenntnis der Unfallschutzvorschriften verfügen.

GEFAHR

- ❑ *Hochspannungen können bei Kontakt tödliche Folgen haben. Es ist stets mit größter Vorsicht und gemäß der geltenden Unfallschutzvorschriften vorzugehen.*
- ❑ *Bei eingeschaltetem Gerät ist auf Bewegungs- und Hochspannungsteile zu achten.*
- ❑ *Falls die Pumpe im Anschluß an den Betrieb gewartet werden soll, ist abzuwarten, bis sie abgekühlt ist, da ihre Oberfläche eine Temperatur von 60 °C überschreiten kann.*
- ❑ *Vor Wartungsarbeiten ist die Pumpe stets energiefrei zu schalten.*

ANMERKUNG

Bevor dem Hersteller eine Pumpe zur Reparatur zurückgesandt wird, ist das Formular "Sicherheit und Gesundheit" in der Anlage zum vorliegenden Handbuch auszufüllen und der lokalen Verkaufsstelle zuzustellen. Eine Kopie des Formulars ist der Pumpenverpackung vor dem Versand beizulegen.

Bei eventueller Verschrottung einer Pumpe ist diese entsprechend der einschlägigen nationalen Vorschriften zu entsorgen.

Technical Information

Table 1 Specifications

Model	SH-100 Dry Scroll Single Hermetic Vacuum Pump
Interface dimensions	See Figure 1 on page 10
Peak pumping speed	50 Hz: 83 L/m, 5 m^3/hr (2.9 cfm) 60 Hz: 100 L/m, 6 m^3/hr (3.5 cfm) See Figure 2 on page 11 for details
Media	No toxic, corrosive, explosive or particulate forming gases
Ultimate pressure	5.0×10^{-2} Torr (6.6×10^{-2} mbar)
Maximum inlet pressure	1.0 atmosphere (0 psig)
Maximum outlet pressure	1.5 atmosphere (7.5 psig)
Inlet connection	NW25
Exhaust connection	Female 1/4" National Pipe Thread (NW16 adapter provided)
Gas ballast	Female 1/8" National Pipe Thread, (20 micron sintered plug provided)
Ambient operating temperature	5 °C to 40 °C (41 °F to 104 °F)
Storage temperature	–20 °C to 60 °C (–4 °F to 140 °F)
Motor rating	0.5 HP (0.37 kW)
Operating voltages	1 phase/50-60 Hz/100-115:200-230 VAC
Run current	See Table 3 on page 14
Motor thermal protection	Type U automatic
Operating speed	60 Hz: 1725 RPM, 50 Hz: 1425 RPM
Cooling system	Air-cooled
Weight	Pump only: 19.1 kg (42 lbs) Shipping weight: 20 kg (44 lbs)
Leak rate (with exhaust sealed)	$<1 \times 10^{-7}$ sccs helium
Noise Level (per ISO 11201)	56 dB(A)
Vibration level at inlet (per ISO 10816-1)	Class 1B, 1.5 mm/s
Fuse type	M5 x 20 mm, 10 A, Slo-Blo, Littelfuse Model H215010 or equivalent
Hour meter	Integral Hour Meter provided, displays running time to closest .1 hour
Conformance standards	Conforms to SEMI S2-0200 and applicable UL, C-UL, and CE standards.

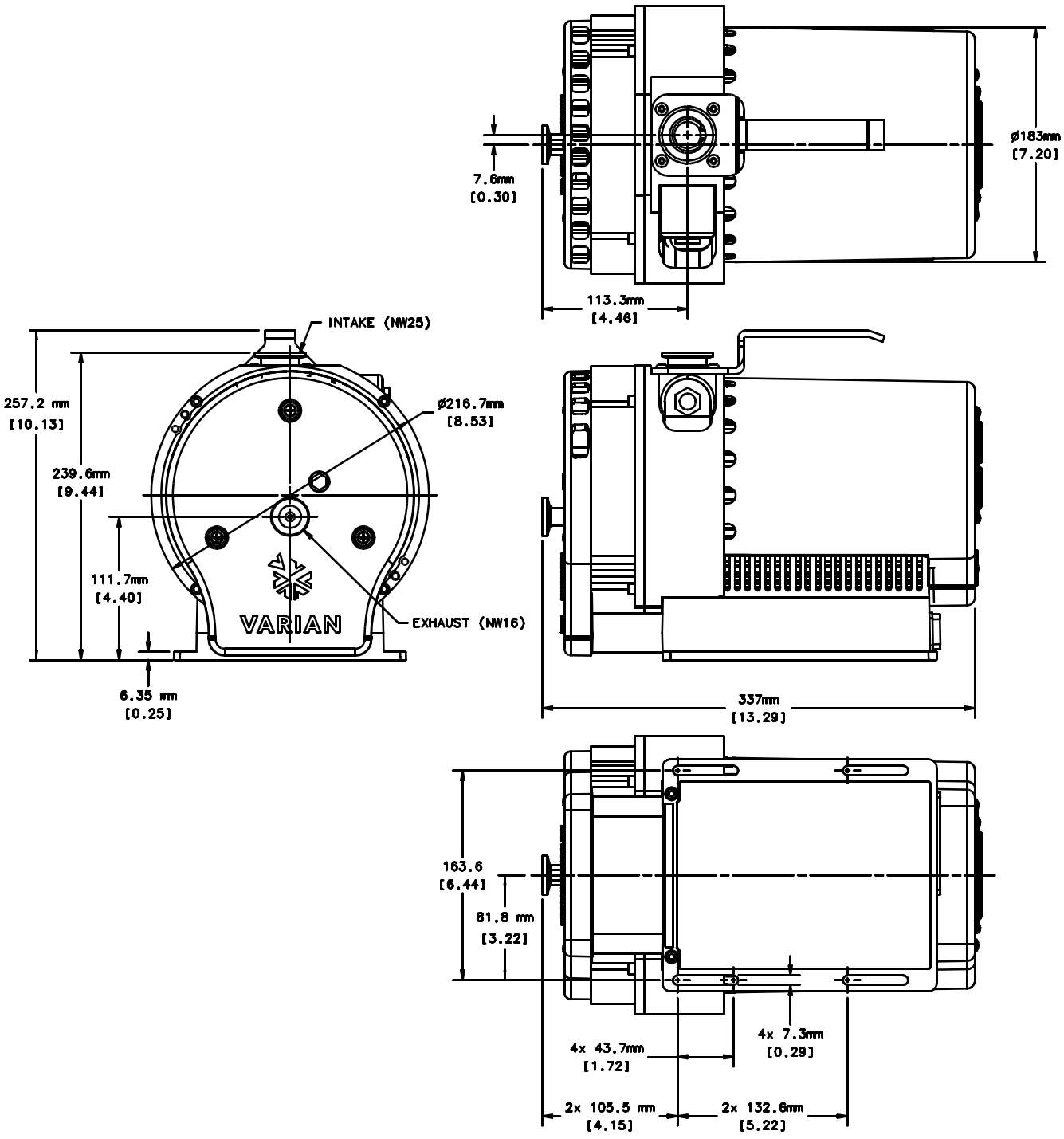

Figure 1 Interface Drawing with Dimensions

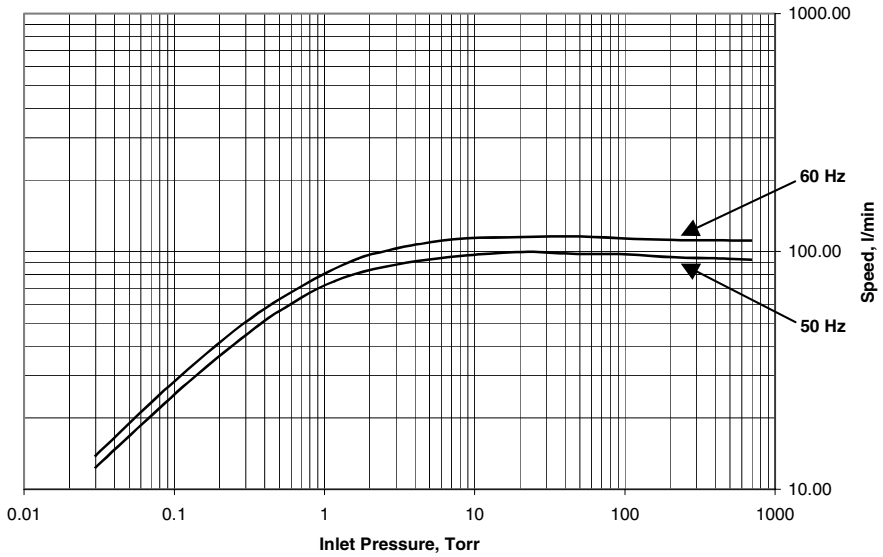

Figure 2 Pumping Speed Curves

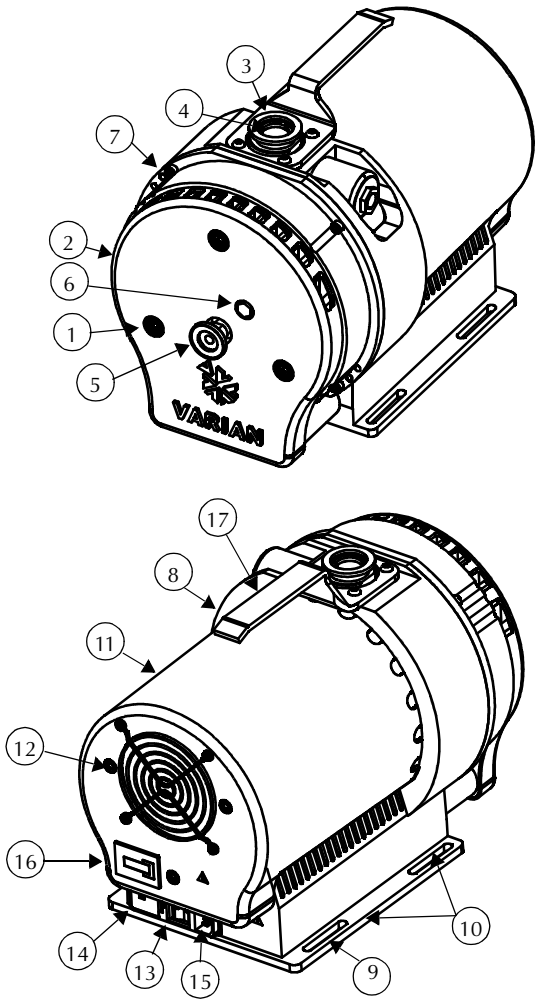

Figure 3 Outline Drawing and Principal Items

1. Front Cowling Screws; M5 (3)
2. Front Cowling
3. Inlet (NW25)
4. Inlet Screen
5. Exhaust Adapter NW16
6. Gas Ballast Port (1/8" National Pipe Thread)
7. Frame Bolts; M5 (4)
8. Frame
9. Base
10. Mounting Slots; (4) for 1/4" or M6 Hardware
11. Rear Cowling
12. Rear Cowling Screws: M5 (3)
13. On/Off Switch
14. Fuse Holder and Voltage Changeover Tab
15. Power Connection (IEC-320)
16. Hour Meter
17. Handle

Unpacking and Inspection

1. Orient the shipping container with “This End Up” on top.
2. Open the box and remove the upper foam block.
3. Carefully lift the SH-100 out of the box. Save the carton and all packing materials.
4. Inspect the pump for damage. If there is shipping damage, contact the freight carrier and your local Vacuum Technologies sales office immediately.

Installation

Safety

Do not remove or modify any safety or insulating equipment from the pump. To do so may create a serious safety hazard and may void the warranty.

WARNING

- ❑ *This pump is capable of pumping air and inert gases only. It is not designed to pump explosive, flammable, corrosive or particulate forming gases. They can cause bodily injury, explosion, or fire.*
- ❑ *Install in an area that is not exposed to rain, steam, or excessive humidity. They can cause electric shock, short circuits, and severe bodily injury.*
- ❑ *Before reconfiguring the pump voltage, or inspecting or servicing the pump, be sure the electrical supply is disconnected.*
- ❑ *The gas ballast must be sealed whenever pumping any gas not intended to be vented to the atmosphere.*

CAUTION

Although the pump can pump trace particulates normally found in the atmosphere, it is not designed to process solids, chemicals, powders, solvents, condensates, or other particulates. They can damage the equipment, degrade its performance, or shorten its useful life.

Startup

1. Check that the inlet screen is installed before beginning operation.

WARNING

Do not insert a finger or any foreign object in the path of the fan; serious personal injury may result or the pump may be damaged.

2. Operate the pump at an ambient temperature of 5 °C to 40 °C (41 °F to 104 °F), otherwise damage to the pump or shortened operating life may result.

CAUTION

Do not block the fan ducts. Blocking these ducts can cause pump overheating. A pump surface temperature in excess of 65 °C (150 °F) is potentially damaging. If such conditions are observed, turn the pump off and allow it to cool. Disassemble, inspect for damage, and repair, if necessary.

Electrical Connections

The pump can be configured for low voltage, 100 VAC to 115 VAC, or for high voltage, 200 VAC to 230 VAC.

The pump as delivered from the factory is configured for low voltage. To change the pump voltage follow this procedure:

WARNING

Risk of electric shock. Disconnect the pump from electrical power mains before attempting to change the voltage configuration.

1. Verify your electrical supply voltage.
2. Use a small flat blade screwdriver to release the fuse holder from the power entry module.
3. Carefully pop out the white plastic assembly and reinsert with the desired operating voltage showing outward.
4. Reinsert the fuse holder into the power entry module.

Power Cord

Several power cord options are available from your Vacuum Technologies dealer. Descriptions of the available power cords and their ordering numbers are given in Table 2.

NOTE

For high voltage operation, the pump must be connected to the power supply using a high voltage IEC-320 type power cord of at least 10 A capacity.

Table 2 SH-100 Power Cord Selection

Country	Power Cord Specification	Order
Europe	10 A / 220-230 VAC, 2.5 m	656494220
Denmark	10 A / 220-230 VAC, 2.5 m	656494225
Switzerland	10 A / 230 VAC, 2.5 m	656494235
UK/Ireland	13 A / 230 VAC, 2.5 m	656494250
India	10 A / 220-250 VAC, 2.5 m	656494245
Israel	10 A / 230 VAC, 2.5 m	656494230
Japan	12 A / 100 VAC, 2.3 m	656494240
North America	15 A / 125 VAC, 2.0 m	656458203
	10 A / 230 VAC, 2.5 m	656494255

Grounding Instructions

This product should be grounded. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This pump is equipped with a power cord that has a grounding wire with an appropriate grounding plug. The plug must be inserted into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER

Improper installation of the grounding plug can result in a risk of electrical shock.

For United States and Canadian installations:

- ❑ *When this product is configured for use on a nominal 120 V circuit, it must be used with a grounding plug that looks like the plug illustrated in Figure 4.*
- ❑ *If repair or replacement of the cord or plug is necessary, connect the grounding wire to the grounding terminal only.*
- ❑ *The grounding wire is insulated and its outer surface is green. It may or may not have yellow stripes.*
- ❑ *When this product is configured for use on a nominal 220 V circuit, it must be used with a factory supplied cord and plug that permits connection to the proper electric circuit. See "Electrical Connections" on page 12 for proper rating and type of cord set.*

WARNING

Check with a qualified electrician or serviceman if the grounding instructions are not completely understood, or if you are in doubt as to whether the product is properly grounded.

Do not modify the plug provided; if it does not fit the outlet, have the proper outlet installed by a qualified electrician.

Connect the product only to an outlet that has the same configuration as the plug.

Do not use an adapter with this product.

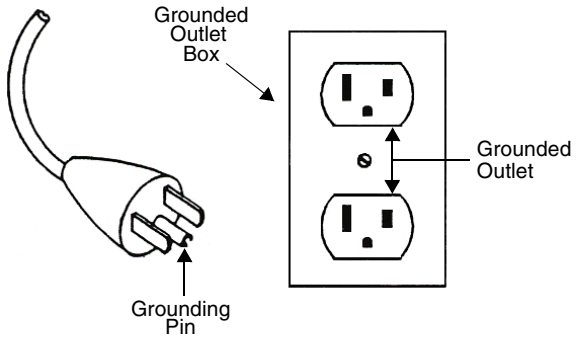

Figure 4 Grounding Plug and Outlet

WARNING

If the product must be reconnected for use on a different type of electric circuit, the connector should be replaced by qualified service personnel.

Extension Cords

If you must use an extension cord with this product:

- ❑ For this product, Vacuum Technologies recommends using only extension cords with a minimum of 16-gage wire and a maximum length of 25 feet (7.6 m).
- ❑ Use only a 3-wire extension cord that will accept the plug.
- ❑ Make sure your extension cord is in good condition.
- ❑ Be sure the extension cord is rated high enough to carry the current your product will draw. An undersized cord will cause a drop in line voltage resulting in loss of power and overheating.

Run Currents

Typical run currents listed in Table 3 are approximately constant from minimum to maximum intake pressure.

Table 3 SH-100 Typical Run Currents

Frequency	Low Voltage Range				High Voltage Range			
	90 V	100 V	115 V	126 V	180 V	200 V	230 V	252 V
60 Hz	3.8	3.8	4.2	4.9	1.9	1.9	2.1	2.5
50 Hz	4.2	4.7	6.3	8.5	2.1	2.4	3.2	4.3

Start Current

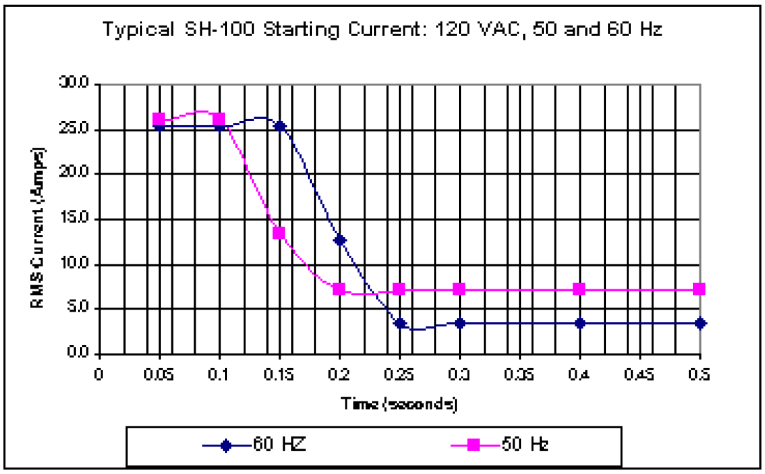

Figure 5 Starting Current (Typical)

Mechanical Connections

Isolation Valve

The SH-100 has an integral automatic isolation valve. An internal timer opens the valve 10 seconds after the pump is switched ON. If power is lost or the pump is switched OFF, the isolation valve will immediately close.

Pump Inlet

Use NW25, or larger, clean vacuum hardware with as short a length as practical between the pump and vacuum chamber.

Insert a bellows between the pump and vacuum chamber to provide both vibration isolation and strain relief.

Pump Exhaust

A female 1/4" National Pipe Thread exhaust fitting is located near the center on the front of the pump. Additionally, an NW16 male adapter with 1/4" National Pipe Thread is provided. To avoid overheating the pump, do not restrict the exhaust flow with long lengths of small diameter tubing. Use as short as practical lengths of NW16, or larger, diameter hardware.

Gas Ballast

The pump incorporates an automatic gas ballast to prevent water and other condensates from accumulating within the pump. The standard configuration has a solid plug installed in the 1/8" National Pipe Thread gas ballast port (item 6 on Figure 3 on page 11). This configuration can be used for relatively dry applications. A sintered filter plug is also supplied with the pump. The filter plug can be installed in the gas ballast port and will allow enough atmospheric air to enter the pump to purge condensates while not affecting pump ultimate pressure or pumping speed.

For applications where the ingress of atmospheric air is undesirable, dry nitrogen at a flow rate of approximately 2 L/m can be bled into the gas ballast port.

WARNING

The gas ballast must be sealed whenever pumping any gas not intended to be vented to atmosphere.

Operation

Cleaning the Pump

Unlike conventional oil-sealed pumps, Vacuum Technologies dry scroll pumps do not contain fluid for the cleansing of accumulated dust and debris. Run the pump periodically at atmosphere for a minute or two to flush it out. Until experience is gained on your specific process, flush the pump regularly and adjust this schedule according to your specific conditions.

Startup Procedure

1. Make sure that the pump is configured for the mains voltage to which the pump is connected.

NOTE

The pump ON/OFF switch is a rocker type switch that has symbols in accordance with IEC Publication 417 to represent the ON and OFF positions. Figure 6 shows a switch in the ON position.

Figure 6 ON/OFF Power Switch

2. Switch the pump ON.
3. The isolation valve will open automatically 10 seconds after starting the pump.

Shutdown Procedure

To shutdown the pump:

1. Switch the pump OFF.

   The isolation valve will close very quickly to isolate the vacuum chamber from the pump.

Troubleshooting

Use the Troubleshooting chart in Table 4 to assist in defining a problem, determining a possible cause, and defining action steps to remedy the situation.

Table 4 Troubleshooting Chart

Problem	Possible Causes	Corrective Actions
Will not start	One or both fuses blown	Replace fuses. Identify cause of overload. Check the line voltage and the voltage configuration of the pump.
	Motor thermal protector open	Allow motor to cool. Identify cause of overload.
	Excessive voltage drop	Check size and length of cable.
	Defective motor	Inspect. Contact Vacuum Technologies.
Poor ultimate pressure	System leak	Locate and repair leak.
	Water in pump	Flush pump with air or dry nitrogen.
	Gas ballast plugged	Replace breather vent. Contact Vacuum Technologies.
	Solvent in pump	Flush pump with air or dry nitrogen. Install trap or filter.
	Seals worn out	Rebuild pump.
	Poor conductance to pump	Replumb with shorter and/or larger diameter tubing.
Hammering noise	Pump overheated	Check ventilation to pump. Check ambient temperature.
	Debris in pump	Check intake screen. Flush pump. Disassemble pump and inspect.
Pump runs intermittently	Motor thermal protector is cycling open and closed.*	Allow the motor to cool. Identify the cause of the overload.

* *The SH-100 is equipped with an auto-reset thermal motor protector. This protector will automatically shut down the pump when it detects an overload condition, and will automatically restart the pump when the motor has cooled to within an acceptable temperature range.*

Maintenance

Kits and Service Options

Vacuum Technologies pumps will provide many years of trouble-free service if the maintenance procedures and intervals are observed. Cleaning and tip seal replacement are recommended when pump base pressure has risen to an unacceptably high level for your application. If your pump exhibits humming or grinding noises from the bearings, a major overhaul should be done by Vacuum Technologies or an authorized rebuild center. Advance exchange pumps are available to minimize downtime.

The parts needed for tip seal replacement on the SH-100 are available in the kit described in Table 5. This kit contains seals and O-rings, and can be obtained from your Vacuum Technologies dealer.

Table 5 Tip Replacement Kit

Part Number	Description	Contents
SH0100TS	Replacement Tip Seal Set	Replacement Tip Seals and O-rings for SH-100 pumps

Factory Service

Vacuum Technologies offers rebuilding service at our factory, or you can obtain advance exchange of complete SH-100 pumps. The service plans available and their ordering numbers are given in Table 6.

Table 6 Factory Service Options

Factory Service Plans	Model Number
Advance Exchange SH-100 Pump	EXSH01001UNIV
Service/Rebuild SH-100	PRSH01001UNIV
Tip Seal Replacement Only	PRSH02001UNIVTS

Cleaning

Exterior

The exterior surfaces of the SH-100 may be cleaned with alcohol or mild detergents only.

Interior

Run the pump periodically at atmosphere for a minute or two to flush it out. For more information, see "Cleaning the Pump" on page 15.

Tip Seal Replacement

The parts and tools required to replace tip seals are listed below:

- ❑ Maintenance Kit P/N SH0100TS
- ❑ Phillips-head screwdriver
- ❑ 4 mm Allen wrench
- ❑ Crescent wrench
- ❑ Razor blade or side-cutting pliers
- ❑ Compressed air (optional)

WARNING

If dangerous gases were being pumped, flush the pump with air or inert gas for at least 10 minutes prior to disassembly.

Figure 7 on page 18 shows the various components involved in a tip seal replacement procedure. Refer to Figure 7 as you follow the procedure.

To remove the worn tip seals:

1. Disconnect the pump from electrical power mains.
2. Remove 4 M5 bolts (item 4).
3. Pull the Scroll Housing (item 5) axially off the Frame (item 10).
4. Remove and discard the worn Tip Seals (items 6) and the main O-ring (item 7).
5. If compressed air is available, blow any remaining seal debris off the scroll parts. If seal debris is attached to the sides of the scroll walls, use a razor or Exacto knife to scrape this debris off.

To install the new seals and O-rings:

1. Unpack the Tip Seal.
2. Install the closed loop portion of the Tip Seal onto the Orbiting Scroll (item 9).
3. Sequentially insert the seal from center to the outer edge of the scroll wall.
4. Cut the Tip Seal about 1/8" from the groove end.
5. Use the remaining Tip Seal material to fill the seal groove on the Scroll Housing and again trim the excess Tip Seal so that a gap of about 1/8" remains.
6. Place the new main O-ring onto the Frame (item 10). Make sure the area where the O-ring sits is clean.
7. Carefully replace the Scroll Housing making sure to line up the Locating Pins. Be sure that the Tip Seal has not fallen out of its groove.
8. Reinstall 4 M5 bolts (item 4). Torque the 4 M5 bolts to approximately 4 N-m (40 in-lbs).
9. Reconnect the pump to the electrical power mains.

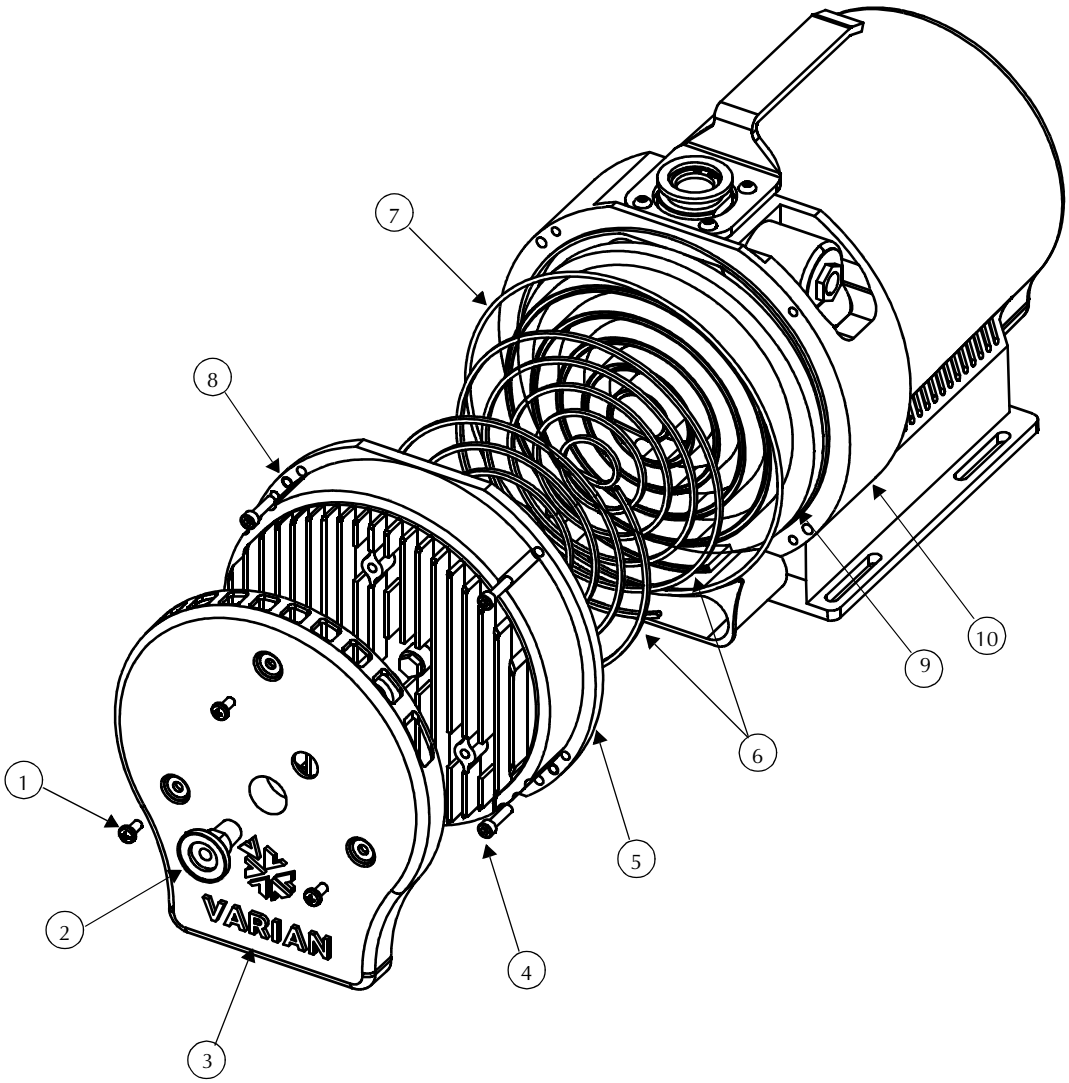

Figure 7 Exploded View of Pump Body

1. Front Cowling Screws; M5 (3)
2. Exhaust Adapter (NW16)
3. Front Cowling
4. Frame Bolts; M5 (4)
5. Scroll Housing
6. Tip Seals
7. Main O-ring Parker No. 2-168
8. Locating Pins (2)
9. Orbiting Scroll
10. Frame

To test the pump:

1. Run the pump for about 5 seconds.

   If you hear loud noises or observe labored operation, this indicates that the Tip Seal or main O-ring are possibly out of place.
2. Disassemble and repair as necessary.

   The pump is now ready to return to service.

NOTE

Newly installed Tip Seals may require several hours of run time to seat properly and enable the pump to meet speed and base pressure specifications.

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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:	

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