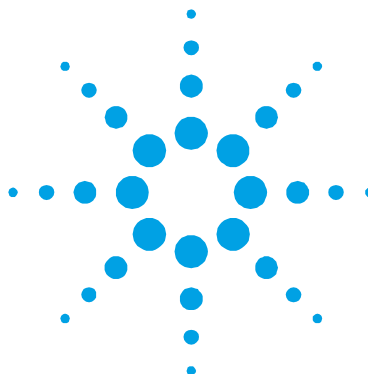




Miniature and 2 l/s Vaclon Pumps

**Miniature Models: 913-0037, 913-0038,
913-0040, 913-0041, 913-0049, 913-0050
Magnet: 913-0042**

**2 l/s Models: 913-0032, 913-0034, 913-0035,
913-0045, 913-0046, 913-0047, 913-0052,
913-5000. Magnet: 913-0011**

**Manuale di Istruzioni
Bedienungshandbuch
Notice de Mode D'Emploi
User Manual**

**87-400-044-01 (E)
05/2011**



Agilent Technologies

Notices

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10040 Leini (TO)

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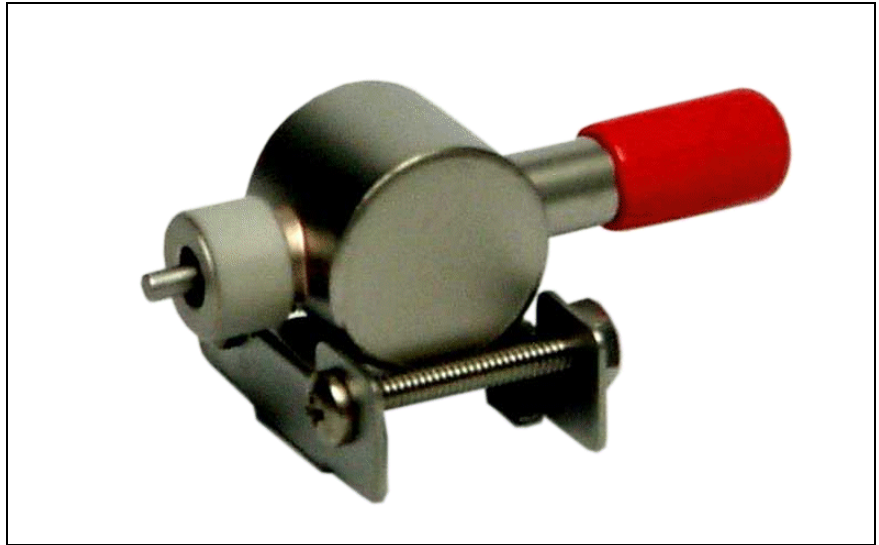
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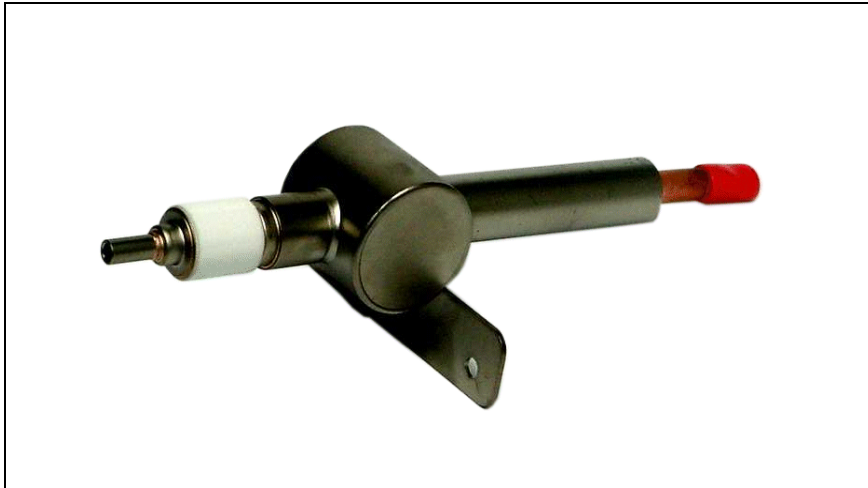
WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

Miniature pumps



2 l/s Vaclon pumps



Contents

1 Istruzioni per l'uso 7

Informazioni di Sicurezza 8

Informazioni Generali 9

Installazione 11

Note di Funzionamento 13

Condizioni di Funzionamento Anomale 15

Smaltimento 16

2 Gebrauchsanleitung 17

Sicherheitshinweise 18

Allgemeine Hinweise 19

Installation 21

Funktionsweise 23

Betriebsstörungen 25

Entsorgung 26

3 Mode d'emploi 27

Informations sur la Sécurité 28

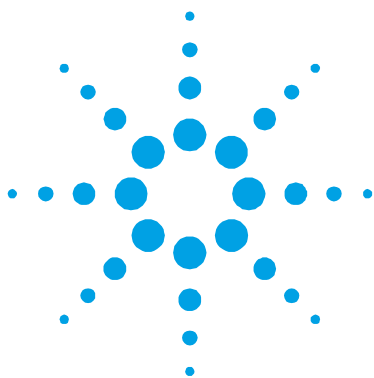
Indications Générales 29

Installation 31

Notes de Fonctionnement 33

Contents

Conditions de Fonctionnement Anormales	35
Mise au Rebut	36
4 Instructions for Use	37
Safety Information	38
General Information	39
Installation	41
Operating Notes	43
Unusual Operating Conditions	45
Disposal	46



1

Istruzioni per l'uso

Informazioni di Sicurezza	8
Informazioni Generali	9
Installazione	11
Collegamento dell'unità di controllo	12
Note di Funzionamento	13
Operazione di "bakeout"	14
Condizioni di Funzionamento Anomale	15
Bassa corrente	15
Alta corrente	15
Smaltimento	16

Traduzione delle istruzioni originali



Informazioni di Sicurezza

Questa apparecchiatura è destinata ad uso professionale. L'utilizzatore deve leggere attentamente il presente manuale di istruzioni ed ogni altra informazione addizionale fornita dalla Agilent prima dell'utilizzo dell'apparecchiatura. La Agilent 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.

Questo manuale utilizza le seguenti convenzioni:

ATTENZIONE! I messaggi di attenzione sono visualizzati prima di procedure che, se non osservate, potrebbero causare danni all'apparecchiatura.

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



NOTA

Le note contengono informazioni importanti estrapolate dal testo.

Informazioni Generali

Queste istruzioni contengono informazioni di base per l'installazione e l'uso delle Pompe Miniature e 2 l/s VacIon.

La seguente tabella elenca i modelli disponibili:

Tab. 1

MODELLO	P/N
Miniature	
Con tubo in rame 180 °	913-0037
Con tubo in rame 90 °	913-0040
Con tubo in acciaio inossidabile da 3/8" OD 180 °	913-0038
Con tubo in acciaio inossidabile da 3/8" OD 90 °	913-0041
Con tubo in rame da 3/8" OD 180 °, preparata sotto vuoto	913-0049
Con tubo in rame da 3/8" OD 90 °, preparata sotto vuoto	913-0050
Magnete in Alnico	913-0042
2 l/s	
Con tubo in acciaio inossidabile da 3/4" OD 180°	913-0032
Con tubo in Kover-glass da 3/4" OD	913-0034
Con tubo in rame da 3/4" OD 180 °, preparata sotto vuoto	913-0035
Con tubo in acciaio inossidabile corto da 3/4" OD	913-0047
Con tubo in acciaio inossidabile da 3/4" OD 180 °, preparata sotto vuoto	913-0045
Con tubo in acciaio inossidabile da 3/4" OD 90 ° a T	913-0046
Con tubo in rame OFHC da 3/4" OD	913-0052
Con flangia 1 1/3" CF 180 ° preparata sotto vuoto	913-5000
Magnete in Alnico	913-0011

1 Istruzioni per l'uso

Informazioni Generali

Il sistema di pompaggio completo comprende La pompa VacIon, il suo magnete, ed un alimentatore. Queste pompe VacIon funzionano sul principio getter nel campo da 10^{-3} Torr a meno di 10^{-9} Torr. Per portare il sistema dalla pressione a meno di 10^{-3} Torr, è necessaria una pompa di prevuoto.

La pompa deve essere alimentata tramite una tensione positiva di 3000-3500 Volt (a circuito aperto). La corrente di alimentazione e quella di corto circuito fornita dall'alimentatore devono corrispondere alla corrente assorbita dalla pompa alla sua massima pressione di esercizio.

Installazione

Durante l'installazione, mantenere la pompa ed il sistema puliti. Evitare di toccare le superfici che saranno sotto vuoto. Quando la pompa è aperta all'aria, far attenzione a non introdurre particelle estranee, olio, fondente per saldatura, o qualsiasi sostanza volatile. Pulire accuratamente il sistema prima del collegamento della pompa. Una pulizia del sistema del vuoto con prodotti chimici sarebbe il metodo più completo; tuttavia non utilizzarlo quando sono presenti cavità e fessure che impediscano il risciacquo

Normalmente è sufficiente uno sgrassaggio con acetone o metanolo ed un successivo risciacquo con acqua.

Per ottenere la massima velocità di pompaggio collegare la pompa al sistema con un tubo il più corto ed il più largo possibile.

Per lavorazioni in ultra vuoto, le giunzioni devono essere saldate con gas inerte (TIG), brasate con idrogeno o sotto vuoto.

Le guarnizioni nel sistema devono essere di metallo morbido tipo rame ricotto, alluminio o oro.

Dopo che la pompa è stata sigillata nel sistema, ricontrollare che l'intero sistema non presenti perdite.

Fissare il magnete alla relativa staffa della pompa tramite le viti in dotazione.

Collegamento dell'unità di controllo

WARNING!



Le tensioni generate dall'unità di controllo ed utilizzate dalle pompe Vaclon sono potenzialmente letali. Per operare in sicurezza assicurarsi che il collegamento di massa sia realizzato correttamente.

Collegare l'unità di controllo alla pompa come segue:

- 1** Collegare la pompa alla massa dell'alimentatore sistemando la molletta di massa sul passante della pompa prima di collegare il cavo di alta tensione. Con i cavi provvisti di filo di massa, collegare il filo di massa ad una massa del sistema.
- 2** L'alimentatore si collega a massa attraverso il suo cavo di alimentazione. Perciò, per assicurare un circuito completamente collegato a massa, la spina a tre poli del cavo di alimentazione deve essere inserita in una presa con collegamento di terra. Non utilizzare prese di adattamento che non permettano la chiusura del circuito di terra.

Note di Funzionamento

Le pompe VacIon funzionano ionizzando il gas mediante una scarica confinata magneticamente (cella Penning). Una tensione di circa 3 kV viene applicata all'anodo mentre i catodi sono mantenuti a massa. Un campo magnetico assiale di circa 1200 gauss impedisce che gli elettroni giungano direttamente all'anodo. Un isolante schermato isola l'anodo dal potenziale di terra. Nel funzionamento corretto della pompa VacIon (con il magnete installato), la corrente assorbita è proporzionale alla pressione (vedere la figura seguente).

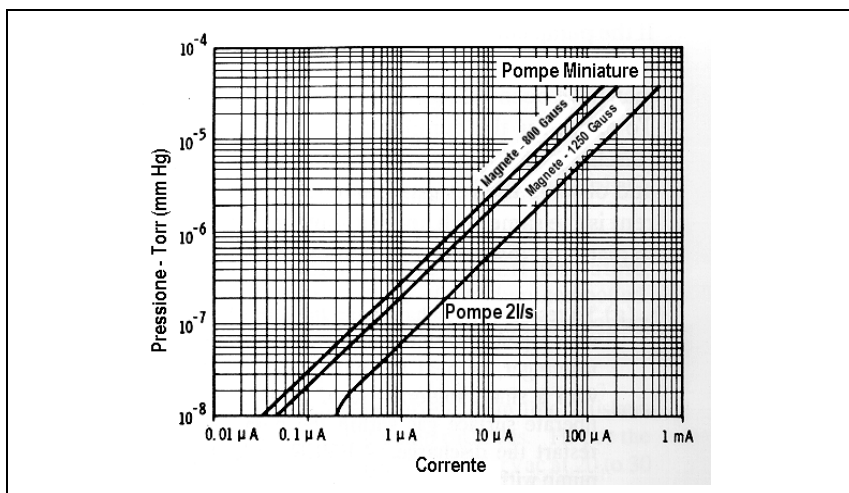


Figura 1 Curva pressione-corrente

Dopo che il sistema ha raggiunto una pressione inferiore ai 10^{-2} Torr, si può avviare la pompa semplicemente accendendo l'unità di controllo. L'avvio della pompa viene indicato dalla presenza di un assorbimento di corrente da parte dell'unità di controllo.

NOTA

Prima di scollegare il cavo dell'alimentatore attendere sempre almeno 30 secondi dallo spegnimento dell'alta tensione in modo da permettere che il condensatore dell'alimentatore si scarichi adeguatamente.

Operazione di “bakeout”

Quando una pompa VacIon non raggiunge la pressione base desiderata e non ci sono perdite, è necessario eseguire un “bakeout” del sistema per eliminare il vapore acqueo. Questa operazione viene eseguita riscaldando la pompa e tutti gli elementi del sistema.

- 1** Riscaldare il corpo pompa ed il sistema per mezzo di un forno o elementi riscaldanti ad una temperatura tra 150 e 250 °C (250 °C è la massima temperatura sopportata da molti cavi di alta tensione). Questa temperatura è abbastanza elevata in modo da “degassare” le superfici della pompa dal vapore acqueo senza danneggiare il magnete ed il connettore dell’alta tensione. Occorre fare attenzione che gli altri componenti del sistema sopportino la temperatura di riscaldamento. Il riscaldamento deve essere il più possibile uniforme su tutte le superfici per evitare che il vapore si ricondensi sulle parti più fredde impedendo così il raggiungimento di valori elevati di vuoto.
- 2** Lasciare accesa l’unità di controllo e controllare che la pressione non superi il valore di 5×10^{-5} Torr (mbar). Nel caso in cui si superi il suddetto valore, occorre spegnere il riscaldatore e riaccenderlo quando si è ripristinata la bassa pressione. Per controllare i riscaldatori ed i valori di pressione in modo automatico durante il riscaldamento, occorre utilizzare un relè sensibile alla pressione.
- 3** Riscaldare la pompa VacIon per almeno 8 ore. Periodi più lunghi di riscaldamento sono necessari quando la pompa deve essere usata con carichi di gas pesanti, o quando si desiderano valori di vuoto ultra alti (10^{-9} Torr [mbar]) o inferiori.
- 4** A mano a mano che la pompa ed il sistema ritornano alla temperatura ambiente, si deve osservare un abbassamento della pressione.
- 5** Tra le varie applicazioni delle pompe ioniche c’è anche la possibilità del loro impiego per processare sotto vuoto altri componenti. Poichè il passante di alta tensione può sopportare un numero limitato di cicli di riscaldamento (fino a 400 °C), si raccomanda di limitare tali cicli al minimo possibile, per aumentare la durata di vita della pompa stessa.

Condizioni di Funzionamento Anomale

Bassa corrente

Se il valore di corrente letto è inferiore a quello normale per quel dato valore di pressione (vedere il diagramma precedente), la scarica si potrebbe essere fermata.

Per verificare se la scarica si è fermata, rimuovere il magnete ed osservare la corrente residua. Se la corrente non cambia con e senza il magnete, non è in corso alcuna scarica nella pompa.

- a** Per riavviare la scarica, colpire il corpo pompa con un attrezzo di plastica morbida, o riscaldarlo localmente con un piccolo saldatore. In questo modo si libera del gas dalla superficie all'interno della pompa e la scarica dovrebbe riprendere. NON COLPIRE MAI la pompa con un attrezzo metallico.
- b** Se il campo magnetico scende sotto il suo valore di targa, la scarica della pompa e la velocità si ridurranno e la scarica potrebbe spegnersi ad una pressione inferiore a 1×10^{-7} Torr.

Alta corrente

Se il valore di corrente letto è superiore a quello normale per quel dato valore di pressione (vedere il diagramma precedente), controllare quanto segue:

- a** Che il cavo dell'alta tensione non sia in corto circuito. Riparare o sostituire.
- b** Che non ci sia una dispersione all'interno dell'unità di controllo. Riparare secondo quanto indicato sul relativo manuale.
- c** Che non ci sia un corto circuito sugli isolatori di supporto dell'anodo causato da frammenti di film di Titanio. Colpire la pompa come descritto al passo a) del paragrafo precedente potrebbe porre rimedio a questa situazione.

1 Istruzioni per l'uso

Smaltimento

- d Che non ci sia una emissione di corrente da “punte” che si siano formate sui catodi. Applicare alla pompa una tensione tra 10 e 14 kVac con una corrente tra 20 e 30 mA per 5 - 20 secondi per bruciare le “punte”.
- e Che non ci siano rivestimenti di film metallici conduttori sugli isolatori a causa di un funzionamento sopra i 10^{-2} Torr per elevati periodi di tempo. Poiché non è possibile smontare la pompa, questa condizione è causa di una limitazione del tempo di vita della pompa. Evitare di usare la pompa ad alte pressioni per lunghi periodi.

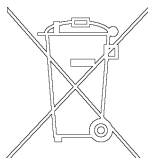
Smaltimento

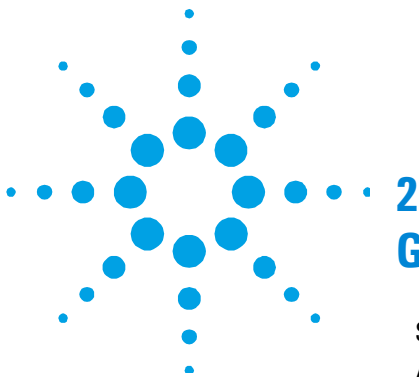
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2 Gebrauchsanleitung

Sicherheitshinweise	18
Allgemeine Hinweise	19
Installation	21
Anschluss des Controllers	22
Funktionsweise	23
Bakeout	24
Betriebsstörungen	25
Stromstärke zu niedrig	25
Stromstärke zu hoch	25
Entsorgung	26

Übersetzung der Originalanleitungen



Sicherheitshinweise

Dieses Gerät ist für den professionellen Gebrauch bestimmt. Vor dem Gebrauch soll der Benutzer dieses Handbuch sowie alle weiteren von Agilent 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 einschlägigen nationalen Bestimmungen übernimmt Firma Agilent keinerlei Haftung.

In diesem Handbuch werden bestimmte Textstellen wie folgt hervorgehoben:

VORSICHT!

Die Vorsichtshinweise vor bestimmten Prozeduren machen darauf aufmerksam, dass bei Nichteinhaltung Schäden am Gerät entstehen können.

WARNUNG!



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

HINWEIS

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

Allgemeine Hinweise

Diese Anweisungen enthalten Grundinformationen zur Installation und zum Gebrauch von Vaclon Pumpen Mod. Miniatur und 2 l/s.

In der Tabelle werden die erhältlichen Modelle aufgeführt:

Tab. 1

MODELL	P/N
Miniatur	
Mit Rohr in Kupfer 180 °	913-0037
Mit Rohr in Kupfer 90 °	913-0040
Mit Rohr in Edelstahl 3/8" OD 180 °	913-0038
Mit Rohr in Edelstahl 3/8" OD 90 °	913-0041
Mit Rohr in Kupfer 3/8" OD 180 °, mit Vorvakuum	913-0049
Mit Rohr in Kupfer 3/8" OD 90 °, mit Vorvakuum	913-0050
Magnet in Alnico	913-0042
2 l/s	
Mit Rohr in Edelstahl 3/4" OD 180°	913-0032
Mit Rohr in Kover-glass 3/4" OD	913-0034
Mit Rohr in Kupfer 3/4" OD 180 °, mit Vorvakuum	913-0035
Mit Rohr in Edelstahl 3/4" OD 180 °, mit Vorvakuum	913-0045
Mit Rohr in Edelstahl 3/4" OD 90 ° T-Anschluss	913-0046
Mit Kurzer Rohr in Edelstahl 3/4" OD	913-0047
Mit Rohr in OFHC Kupfer 3/4" OD	913-0052
Mit Flansch 1 1/3" CF 180 °, mit Vorvakuum	913-5000
Magnet in Alnico	913-0011

2 **Gebrauchsanleitung**

Allgemeine Hinweise

Das komplette Pumpsystem umfasst die Vaclon Pumpe, deren Magneten und ein Netzgerät. Diese Vaclon Pumpen arbeiten nach dem Getterprinzip im Bereich von 10^{-3} Torr bis unter 10^{-9} Torr. Um das System auf unter 10^{-3} Torr zu bringen, ist eine Vorvakuumpumpe erforderlich.

Die Pumpe ist mit einer Plusspannung von 3.000 - 3.500 Volt (im offenen Schaltkreis) zu versorgen. Die Versorgungsspannung und die vom Netzgerät gelieferte Kurzschlussspannung sollen der Stromaufnahme der Pumpe bei ihrem maximalen Arbeitsdruck entsprechen.

Installation

Bei der Installation sind die Pumpe und das System sauber zu halten. Die Berührung von Oberflächen, die unter Vakuum sein werden, ist zu vermeiden. Bei geöffnetem Zustand der Pumpe ist darauf zu achten, dass keine Schmutzpartikel, Öl, Lötflussmittel oder flüchtige Substanzen eindringen. Vor Anschluss der Pumpe ist das System gründlich zu reinigen. Eine Reinigung des Vakuumsystems mit chemischen Produkten wäre hierbei die beste Methode; sie sollte allerdings nicht bei Vorhandensein von Hohlräumen und Spalten angewendet werden, die das Ausspülen verhindern.

In der Regel ist das Entfetten mit Aceton oder Methanol und das anschließende Spülen mit Wasser ausreichend.

Um eine maximale Pumpgeschwindigkeit zu erzielen, ist die Pumpe über eine möglichst kurze und breite Leitung an das System anzuschließen.

Für den Höchstvakuumbetrieb sollen die Verbindungen mit Inertgas geschweißt (WIG) und wasserstoff- oder vakuumgelötet sein.

Die Dichtungen im System sollen aus Weichmetall wie geglähtes Kupfer, Aluminium oder Gold sein.

Nachdem die Pumpe im System versiegelt wurde, ist das gesamte System auf Leckstellen zu überprüfen.

Den Magneten an den hierfür vorgesehenen Bügel der Pumpe mit den mitgelieferten Schrauben befestigen.

Anschluss des Controllers

WARNUNG!



Die Spannungen, die vom Controller erzeugt und von Vaclon Pumpen genutzt werden, sind potenziell tödlich. Um die Sicherheitsbedingungen beim Arbeiten zu gewährleisten, ist sicherzustellen, dass der Masseanschluss vorschriftsgemäß ausgeführt ist.

Den Controller wie folgt an die Pumpe anschließen:

- 1 Die Pumpe an den Masseanschluss des Netzgerätes anschließen, wobei die Masseanschlussfeder am Hochspannungsverbinder der Pumpe anzubringen ist, bevor das Hochspannungskabel angeschlossen wird. Bei den Kabeln, die mit einem Masseleiter versehen sind, ist der Masseleiter an einen Masseanschlusspunkt des Systems anzuschließen.
- 2 Das Netzgerät wird über sein Versorgungskabel an die Masse angeschlossen. Damit der Stromkreis vollständig an die Masse angeschlossen ist, muss der dreipolige Stecker des Versorgungskabels an eine geerdete Steckdose angeschlossen sein. Es dürfen keine Adaptersteckdosen verwendet werden, die keine Schließung des Erdungskreises zulassen.

Funktionsweise

Vaclon Pumpen arbeiten durch Gasionisierung infolge einer magnetisch abgegrenzten Entladung (Penning-Zelle). An die Anode wird eine Spannung von ungefähr 3 kV angelegt, während die Katoden an die Masse angeschlossen sind. Ein axiales Magnetfeld von ungefähr 1.200 Gauss verhindert, dass die Elektronen direkt zur Anode gelangen. Ein abgeschirmter Isolator isoliert die Anode vom Erdungspotenzial. Bei ordnungsgemäßen Betrieb der Vaclon Pumpe (mit dem installierten Magnet) ist die Stromaufnahme proportional zum Druck (siehe nachstehende Abbildung).

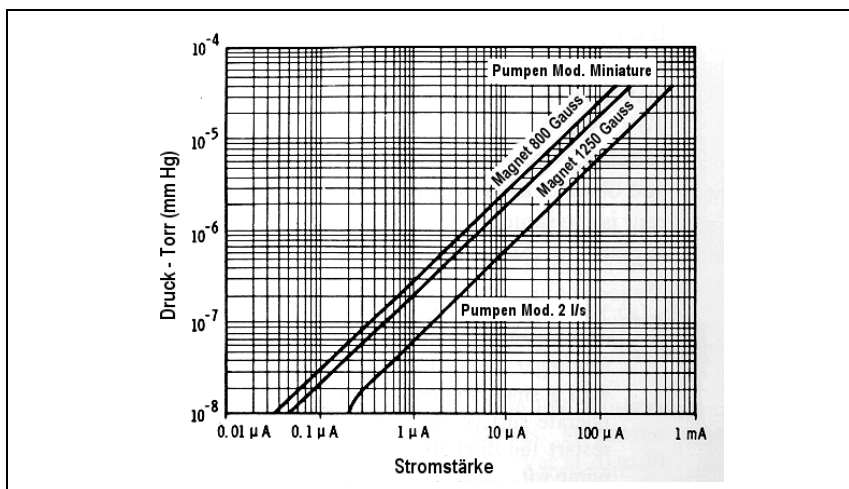


Abbildung 1 Druck-Stromstärke-Diagramm

Nachdem das System einen Druck unter 10^{-2} Torr erreicht hat, ist es möglich, die Pumpe lediglich durch Einschalten des Controllers zu starten. Der Pumpenstart ist anhand der Stromaufnahme durch den Controller erkenntlich.

HINWEIS

Bevor das Kabel des Netzgerätes abgetrennt wird, sind stets mindestens 30 s nach Abschaltung der Hochspannung abzuwarten, damit sich der Kondensator des Netzgerätes entsprechend entladen kann.

Bakeout

Wenn eine VacIon Pumpe den gewünschten Basisdruck nicht erreicht und keine Druckverluste vorhanden sind, ist ein Bakeout des Systems aus-zuführen, um den Wasserdampf zu beseitigen. Dieser Vorgang erfolgt unter Erwärmung der Pumpe und aller Systemelemente.

- 1** Den Pumpenkörper und das System mit einem Ofen oder Heizelementen auf eine Temperatur zwischen 150 und 250 °C erhitzen (250 °C ist die maximal zulässige Temperatur vieler Hochspannungskabel). Diese Temperatur ist ausreichend, um die Oberflächen der Pumpe von Wasserdampf zu "entgasen", ohne den Magneten oder den Hochspannungsverbinder zu beschädigen. Es ist darauf zu achten, dass die anderen Systemkomponenten der Erwärmungstemperatur standhalten. Die Erwärmung soll möglichst gleichmäßig auf allen Oberflächen erfolgen, damit der Dampf nicht an den kälteren Teilen kondensiert und das Erreichen hoher Vakuumwerte verhindert.
- 2** Den Controller eingeschaltet lassen und kontrollieren, dass der Druck nicht 5×10^{-5} Torr (mbar) übersteigt. Falls dieser Wert überschritten wird, ist das Heizgerät auszuschalten und erneut einzuschalten, wenn der Unterdruckbereich wieder hergestellt ist. Zur automatischen Kontrolle der Heizgeräte und Druckwerte während der Erwärmung ist ein druckempfindliches Relais zu benutzen.
- 3** Die VacIon Pumpe über einen Zeitraum von mindestens 8 Stunden erwärmen. Längere Erwärmzeiten sind erforderlich, wenn die Pumpe mit hohen Gaslasten benutzt werden soll oder Höchstvakuumwerte (10^{-9} Torr [mbar]) oder niedriger erreicht werden sollen.
- 4** Im Zuge der Abkühlung der Pumpe und des Systems auf die Umgebungstemperatur muss auch ein Druckabfall entstehen.
- 5** Zu den verschiedenen Einsatzmöglichkeiten der Ionenpumpen zählt auch die Vakuumerzeugung in anderen Komponenten. Da Hochspannungsverbinder nur einer begrenzten Anzahl von Erwärmungszyklen (bis zu 400 °C) standhalten, sollten diese Zyklen auf ein Mindestmaß beschränkt werden, um die Standzeit der Pumpe zu verlängern.

Betriebsstörungen

Stromstärke zu niedrig

Wenn die angezeigte Stromstärke unter dem Normwert für den betreffenden Druck liegt (siehe vorhergehendes Diagramm), könnte die Entladung gestoppt sein.

Um zu überprüfen, ob die Entladung gestoppt ist, ist der Magnet zu entfernen und die Reststromstärke zu beobachten. Wenn die Stromstärke sich weder mit noch ohne Magneten verändert, findet keine Pumpenentladung statt.

- a Zur erneuten Entladungsaktivierung, ist mit einem weichen Kunststoffwerkzeug gegen den Pumpenkörper zu schlagen oder der Pumpenkörper lokal mit einem kleinen Schweißgerät zu erhitzen. Auf diese Weise löst sich Gas von den Innenflächen der Pumpe und müsste die Entladung wieder aufgenommen werden. Gegen die Pumpe darf NIEMALS mit einem metallenen Werkzeug GESCHLAGEN werden.
- b Wenn das Magnetfeld unter den Kennschildwert sinkt, verringern sich die Pumpenentladung und -geschwindigkeit, hierbei könnte die Entladung bei einem Druck unter 1×10^{-7} Torr aussetzen.

Stromstärke zu hoch

Wenn die angezeigte Stromstärke über dem Normwert für den betreffenden Druck liegt (siehe vorhergehendes Diagramm), sind folgende Kontrollen auszuführen:

- a Das Hochspannungskabel darf nicht kurzgeschlossen sein. Reparieren oder austauschen.
- b Im Controller darf kein Leckstrom vorhanden sein. Gemäß der Angaben aus dem diesbezüglichen Handbuch reparieren.

2 Gebrauchsanleitung

Entsorgung

- c An den Hilfsisolatoren der Anode darf kein Kurzschluss durch Titanfolienteile anliegen. Wie unter Schritt a) des vorhergehenden Abschnitts gegen die Pumpe schlagen, was dieses Problem beheben könnte.
- d Es darf keine Stromabgabe durch "Spitzen" erfolgen, die sich an den Katoden gebildet haben. An die Pumpe eine Spannung zwischen 10 und 14 kVAC mit einer Stromstärke zwischen 20 und 30 mA über einen Zeitraum von 5^{-20} s anlegen, um die "Spitzen" abzubrennen.
- e An den Isolatoren dürfen keine Metallfilmbeläge vorhanden sein, die infolge eines längeren Betriebs bei einem Druck über 10^{-2} Torr entstehen. Da die Pumpe nicht demontiert werden kann, bewirkt dies eine kürzere Standzeit des Gerätes. Die längerfristige Benutzung der Pumpen bei hohen Drücken ist zu vermeiden.

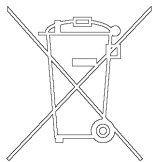
Entsorgung

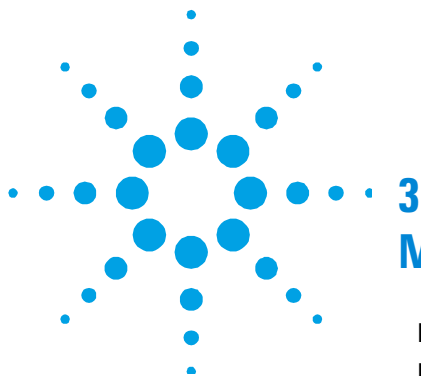
Bedeutung des "WEEE" Logos auf den Etiketten.

Das folgende Symbol ist in Übereinstimmung mit der EU-Richtlinie WEEE (Waste Electrical and Electronic Equipment) angebracht.

Dieses Symbol (**nur in den EU-Ländern gültig**) zeigt an, dass das betreffende Produkt nicht zusammen mit Haushaltsmüll entsorgt werden darf sondern einem speziellen Sammelsystem zugeführt werden muss.

Der Endabnehmer sollte daher den Lieferanten des Geräts - d.h. die Muttergesellschaft oder den Wiederverkäufer - kontaktieren, um den Entsorgungsprozess zu starten, nachdem er die Verkaufsbedingungen geprüft hat.





3

Mode d'emploi

Informations sur la Sécurité	28
Indications Générales	29
Installation	31
Branchement de l'unité de contrôle	32
Notes de Fonctionnement	33
Opération de "bakeout"	34
Conditions de Fonctionnement Anormales	35
Courant faible	35
Courant élevé	35
Mise au Rebut	36

Traduction de la mode d'emploi originale



Informations sur la Sécurité

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 Agilent avant d'utiliser l'appareil. Agilent 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.

Cette notice utilise les signes conventionnels suivants:

ATTENTION!

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

AVERTISSEMENT!



Les messages d'avertissement 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.

NOTE

Les notes contiennent des renseignements importants, extrapolés du texte.

Indications Générales

Ces instructions contiennent des informations de base pour l'installation et l'utilisation des pompes miniature et 2 l/s Vaclon.

Le tableau ci-dessous énumère les modèles disponibles :

Tab. 1

MODÈLE	P/N
Miniature	
Avec tuyau en cuivre 180°	913-0037
Avec tuyau en cuivre 90°	913-0040
Avec tuyau en acier inoxydable de 3/8" ØE 180 °	913-0038
Avec tuyau en acier inoxydable de 3/8" ØE 90 °	913-0041
Avec tuyau en cuivre de 3/8" ØE 180 °, préparée sous vide	913-0049
Avec tuyau en cuivre de 3/8" ØE 90 °, préparée sous vide	913-0050
Aimant en Alnico	913-0042
2 l/s	
Avec tuyau en acier inoxydable de 3/4" ØE 180 °	913-0032
Avec tuyau en Kover-glass 3/4" ØE	913-0034
Avec tuyau en cuivre de 3/4" ØE 180 °, préparée sous vide	913-0035
Avec tuyau en acier inoxydable de 3/4" ØE 180 °, préparée sous vide	913-0045
Avec tuyau en acier inoxydable de 3/4" ØE 90 ° en T	913-0046
Avec tuyau courte en acier inoxydable de 3/4" ØE	913-0047
Avec tuyau en cuivre OFHC de 3/4" ØE	913-0052
Avec flasque 1 1/3" CF 180 ° préparée sous vide	913-5000
Aimant en Alnico	913-0011

3 Mode d'emploi

Indications Générales

Le système de pompage complet comprend: la pompe Vaclon, son aimant et un alimentateur. Cette pompe Vaclon fonctionne sur le principe getter dans une plage de 10^{-3} Torr à moins de 10^{-9} Torr. Pour porter le système de la pression à moins de 10^{-3} Torr, il est nécessaire de disposer d'une pompe de prévide.

La pompe doit être alimentée avec une tension positive de 3000 – 3500 Volts (à circuit ouvert). Le courant d'alimentation et le courant de court-circuit fournis par l'alimentateur doivent correspondre au courant absorbé par la pompe à sa pression d'exercice maximum.

Installation

Pendant l'installation, maintenir la pompe et le système propres. Éviter de toucher les parties qui seront sous vide. Lorsque la pompe est ouverte à l'air libre, faire attention de ne pas y introduire de particules étrangères, huile, fondant de soudage ou toute autre substance volatile. Nettoyer soigneusement le système avant le montage de la pompe. Un nettoyage du système du vide à l'aide de produits chimiques serait la méthode la plus complète. Il est cependant conseillé de ne pas l'utiliser en présence de cavités ou de fissures empêchant le rinçage.

Normalement un dégraissage à l'acétone ou au méthanol suivis d'un rinçage à l'eau sont suffisants.

Pour atteindre la vitesse maximale de pompage, relier la pompe au système à l'aide du tuyau le plus court et le plus large possible.

Pour les opérations sous vide ultra poussé, les joints doivent être soudés au gaz inerte (TIG), et soumis à un brasage à l'hydrogène ou sous vide.

Les joints du système doivent être en métal souple de type cuivre recuit, aluminium ou or.

Après le scellage de la pompe dans le système, recontrôler que l'ensemble ne présente aucune fuite.

Fixer l'aimant à la bride de la pompe à l'aide des vis fournies.

Branchement de l'unité de contrôle

AVERTISSEMENT!



Les tensions générées par l'unité de contrôle et utilisées par les pompes Vaclon sont potentiellement mortelles. Pour opérer en toute sécurité, vérifier que le branchement à la masse soit correctement réalisé.

Relier l'unité de contrôle à la pompe en opérant de la façon suivante :

- 1 Relier la pompe à la masse de l'alimentateur en plaçant la molette de masse sur le passant de la pompe avant de brancher le câble de haute tension. En présence de câbles pourvus d'un fil de masse, celui-ci doit être relié à une masse du système.
- 2 L'alimentateur se relie à la masse par son câble d'alimentation. Pour garantir un circuit entièrement relié à la masse, la fiche à trois pôles du câble d'alimentation doit être introduire dans une prise avec liaison à la terre. Ne pas utiliser de prise d'adaptation qui ne permettent pas la fermeture du circuit de terre.

Notes de Fonctionnement

Les pompes Vaclon fonctionnent en ionisant le gaz à travers une décharge confinée magnétiquement (cellule Penning). Une tension d'environ 3 kV est appliquée à l'anode alors que les cathodes sont maintenues à la masse. Un champ magnétique axial d'environ 1200 gauss empêche que les électrons arrivent directement à l'anode. Un isolant blindé isole l'anode du potentiel de terre. Dans le fonctionnement correct de la pompe Vaclon, (avec aimant installé), le courant absorbé est proportionnel à la pression (voir figure suivante).

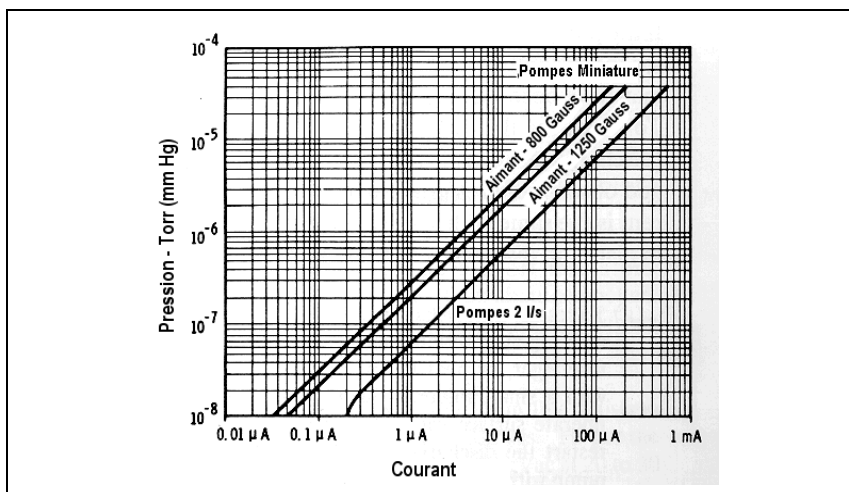


Figure 1 Courbe pression – courant

Après que le système a atteint une pression inférieure à 10^{-2} Torr, il est possible de démarrer la pompe en allumant simplement l'unité de contrôle. La mise en marche de la pompe est signalée par la présence d'une absorption de courant par l'unité de contrôle.

NOTE

Avant de débrancher le câble de l'alimentateur, toujours attendre au moins 30 secondes après la coupure de la haute tension de façon à permettre au condensateur de l'alimentateur de se décharger correctement.

Opération de "bakeout"

Lorsqu'une pompe VacIon n'atteint pas la pression de base désirée et qu'il n'y a aucune fuite, il est nécessaire de procéder à un "bakeout" du système afin d'éliminer la vapeur d'eau. Cette opération est effectuée en chauffant la pompe et tous les éléments du système.

- 1** Réchauffer le corps de la pompe et le système à l'aide d'un four ou éléments chauffants à une température comprise entre 150 et 250 °C (250 °C est la température maximum supportée par de nombreux câbles de haute tension). Cette température est suffisamment élevée pour "dégazer" les surfaces de la pompe de la vapeur d'eau sans endommager l'aimant et le connecteur de haute tension. Faire attention que les autres composants du système supportent la température de chauffage. Le chauffage doit être le plus uniforme possible sur toutes les superficies pour éviter que la vapeur ne se recondense sur les parties plus froides, empêchant d'atteindre les valeurs de vide élevées.
- 2** Laisser l'unité de contrôle allumée et contrôler que la pression ne dépasse pas la valeur de 5×10^{-5} Torr (mbar). En cas de dépassement de ladite valeur, éteindre l'appareil de chauffage et le rallumer lorsque la basse pression est rétablie. Pour contrôler les appareils de chauffage et les valeurs de pression en mode automatique pendant le chauffage, utiliser un relais sensible à la pression.
- 3** Chauffer la pompe VacIon pendant 8 heures minimum. Une période de chauffage plus longue est nécessaire lorsque la pompe doit être utilisée avec de fortes charges de gaz ou lorsque l'on désire des valeurs de vide poussé très élevées (10^{-9} Torr [mbar]) ou inférieures.
- 4** Au fur et à mesure que la pompe et le système retournent à la température ambiante, on doit noter un abaissement de la pression.
- 5** Les pompes ioniques offrent de nombreuses applications. Elles permettent même la préparation sousvide d'autres composants. Le passant de haute tension pouvant supporter un nombre limité de cycles de chauffage (jusqu'à 400 °C) il est conseillé de limiter ces cycles le plus possible pour augmenter la durée de vie de la pompe.

Conditions de Fonctionnement Anormales

Courant faible

Si la valeur de courant lue est inférieure à la valeur normale pour la valeur de pression correspondante (voir diagramme précédent), cela peut être dû à une interruption de la décharge.

Pour vérifier s'il y a eu une interruption de la décharge, retirer l'aimant et observer le courant résiduel. Si le courant n'est pas modifié par le retrait de l'aimant, aucune décharge n'est en cours dans la pompe.

- a Pour réamorcer la décharge, frapper le corps de la pompe à l'aide d'un outil en plastique souple ou le réchauffer localement à l'aide d'un fer à souder. On libère ainsi du gaz de la surface à l'intérieur de la pompe et la décharge devrait alors reprendre. NE JAMAIS frapper la pompe à l'aide d'un outil métallique.
- b Si le champ magnétique descend en dessous de la valeur indiquée sur la plaquette, la décharge de la pompe et la vitesse se réduiront et la décharge pourrait s'éteindre à une pression inférieure à 1×10^{-7} Torr.

Courant élevé

Si la valeur de courant lue est supérieure à la valeur normale pour la valeur de pression correspondante (voir diagramme précédent), contrôler que :

- a Le câble de haute tension ne soit pas en court-circuit. Réparer ou remplacer.
- b Il n'y ait aucune dispersion à l'intérieur de l'unité de contrôle. Réparer selon les indications de la notice correspondante.

3 Mode d'emploi

Mise au Rebut

- c Il n'y ait pas de court-circuit sur les isolateurs de support de l'anode causé par des fragments de film de titane. Frapper la pompe comme décrit au point a) du paragraphe précédent. Le problème pourrait se résoudre ainsi.
- d Il n'y ait pas d'émission de courant sur les pointes formées sur les cathodes. Appliquer à la pompe une tension entre 10 et 14 kVca avec un courant entre 20 et 30 mA pendant 5⁻²⁰ secondes pour brûler les pointes.
- e Il n'y ait pas de revêtements de films métalliques conducteurs sur les isolateurs suite à un fonctionnement supérieur à 10⁻² Torr pendant des périodes prolongées. La pompe ne pouvant être démontée, cette condition entraînerait une diminution de la durée de vie de la pompe. Éviter d'utiliser la pompe à hautes pressions pendant des périodes prolongées.

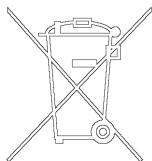
Mise au Rebut

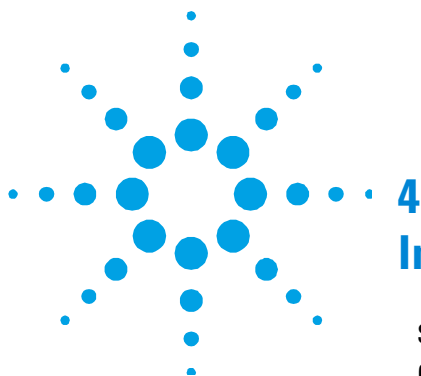
Signification du logo "WEEE" figurant sur les étiquettes.

Le symbole ci-dessous est appliqué conformément à la directive CE nommée "WEEE".

Ce symbole (**uniquement valide pour les pays de la Communauté européenne**) indique que le produit sur lequel il est appliqué NE doit PAS être mis au rebut avec les ordures ménagères ou les déchets industriels ordinaires, mais passer par un système de collecte sélective.

Après avoir vérifié les termes et conditions du contrat de vente, l'utilisateur final est donc prié de contacter le fournisseur du dispositif, maison mère ou revendeur, pour mettre en oeuvre le processus de collecte et mise au rebut.





4

Instructions for Use

Safety Information	38
General Information	39
Installation	41
Control Unit Connection	42
Operating Notes	41
Bakeout Operation	44
Unusual Operating Conditions	45
Low Current	45
High Current	46
Disposal	46

Original Instructions



Safety Information

This equipment is destined for use by professionals. The user should read this instruction manual and any other additional information supplied by Agilent before operating the equipment. Agilent will not be held responsible for any events occurring due to non-compliance, even partial, 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.

This manual uses the following standard protocol:

CAUTION!

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

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.

NOTE

The notes contain important information taken from the text.

General Information

These instructions contain basic information for installing and operating miniature and 2 l/s VacIon Pumps.

The available models are detailed in the following table:

Tab. 1

MODEL	P/N
Miniature	
With 180° Copper Tube	913-0037
With 90° Copper Tube	913-0040
With 3/8" OD 180 ° Stainless Steel Tube	913-0038
With 3/8" OD 90 ° Stainless Steel Tube	913-0041
With 3/8" OD 180 ° Copper Tube, vacuum proc.	913-0049
With 3/8" OD 90 ° Copper Tube, vacuum proc.	913-0050
Alnico magnet	913-0042
2 l/s	
With 3/4" OD 180 ° Stainless Steel Tube	913-0032
With 3/4" OD Kover-glass Tube	913-0034
With 3/4" OD 180 ° Copper Tube, vacuum proc.	913-0035
With 3/4" OD 180 ° Stainless Steel Tube, vacuum processed	913-0045
With 3/4" OD 90 ° Stainless Steel Tube, Tee style	913-0046
With 3/4" OD 180 ° Stainless Steel Short Tube	913-0047
With 3/4" OD OFHC Copper Tube	913-0052
With 1 1/3" CFF 180 ° vacuum processed	913-5000
Alnico magnet	913-0011

4 Instructions for Use

General Information

The complete pumping system consists of the VacIon pump, its magnet, and a power supply. These VacIon pump is a pump which operates on the principle of ion gettering in the pressure range from 10^{-3} Torr to less than 10^{-9} Torr. A roughing pump is needed to lower the system pressure from atmosphere to below 10^{-3} Torr.

The pump should be powered by a positive voltage of 3000 – 3500 Volt (open circuit), direct current supply and the short circuit current of the control unit should match the current drawn by the pump at its maximum operating pressure.

Installation

During installation, keep the pump and system clean. Avoid touching surfaces which will ultimately be under vacuum. When the VacIon pump is open to the atmosphere, take care to avoid introducing foreign particles, oil, solder flux, or any volatile substances. Before attaching the pump, clean the system thoroughly. Chemical cleaning is the most complete cleaning method for the vacuum system; however, do not attempt it when pockets and crevices exist that will prevent thorough rinsing. Degreasing with an acetone or methanol followed by water-rinsing is usually sufficient.

To achieve maximum pumping speed, connect the pump to the system with a tube that has the shortest length and the largest diameter possible.

For ultrahigh vacuum work, joints should be tungsten inert gas welded, hydrogen brazed, or vacuum brazed. Do not use flux in making joints for ultrahigh vacuum.

Gaskets in the system should be of soft metal such as annealed copper, aluminium, or gold.

After the pump is sealed in place, leakcheck the entire system.

Assemble the magnet to the pump magnet bracket with the mounting screws that are provided.

Control Unit Connection

WARNING!



Voltage delivered by control units used with the Vaclon pumps are potentially lethal. To operate the pump safely ensure that grounding connection is correctly made.

Connect the control unit to the pump as follows:

- 1** Ground the pump to the power supply by placing the ground spring over the pump insulator before attaching the high voltage lead. On cables with ground leads, attach the ground lead to a ground lug on the system.
- 2** The power supply, in turn, is grounded through its power lead. Therefore, to ensure a completely grounded circuit, the threeprong plug on the power supply cord must be inserted in a socket that has a ground connection. Do not use socket convertors that prevent the completion of this ground circuit.

Operating Notes

VacIon pumps operate as a multiple-cell Penning discharge. A potential of about 3 kV is applied to the anode cell; the cathodes are at ground potential. Electrons are constrained from going directly to the anode by the presence of an axial magnetic field of about 1200 gauss. A self-shielding insulator isolates the anode from ground potential. When the VacIon pump is operating properly (with magnet installed), the current drawn is proportional to pressure (see the following figure).

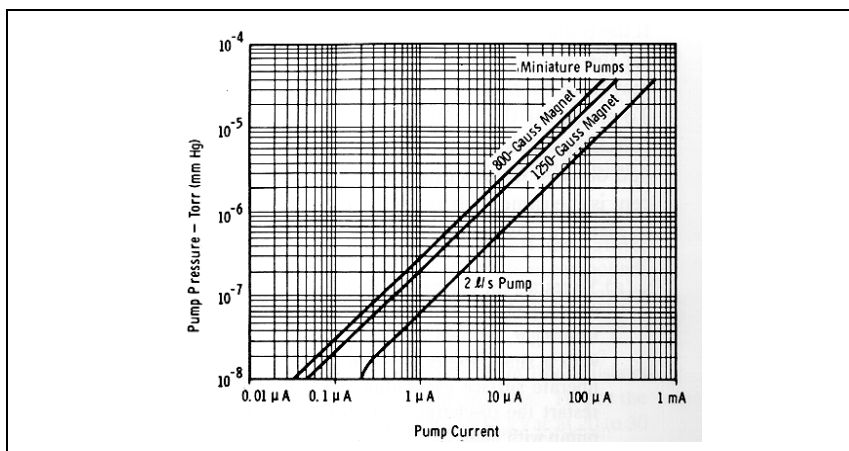


Figure 1 Pressure versus current curve

After the system is rough-pumped to below 10^{-2} Torr, the pump can be started by simply switching on the VacIon pump control unit. A current draw on the control unit will indicate that the pump discharge has started.

NOTE

Always wait at least 30 seconds after turning off the high voltage switch before disconnecting the power supply leads. This should allow the power supply output capacitor to discharge adequately.

Bakeout Operation

When a VacIon pump does not reach the desired base pressure, and there are no leaks, it is necessary to bake the system to remove water vapour. This is done by heating the pump and all the components in the system.

- 1** Heat the pump body and the system with a bakeout oven unit or heating strips to temperatures between 150 °C and 250 °C (250 °C is the maximum allowable for most bakeable high voltage cables). This temperature is high enough to degas the pump surfaces of water vapour without damaging the magnet and high voltage connector. Note that the system components must be compatible with the bakeout temperature. The heating must be approximately even on all vacuum surfaces or water vapour can recondense on the cooler surfaces preventing achievement of UHV vacuum pressures.
- 2** Leave the pump control unit on and monitor the pressure. It must never increase above 5×10^{-5} Torr (mbar); if this value is exceeded, turn the bakeout off and then on again when low pressure is restored.
To control the heaters and to monitor to high pressure limit during bakeout in automatic mode, a pressure-sensitive relay may be used.
- 3** Bake the VacIon pump for at least eight hours. Longer bakeout periods are recommended when the pump has been used with heavy gas load or when UHV pressure, 10^{-9} Torr (mbar) or less is desired.
- 4** As the pump and system cool down to room temperature, a drop in pressure should be observed.
- 5** Since VacIon pumps can be used in many different applications, some are being used successfully in vacuum processing. The high voltage feedthrough on the VacIon pump, can stand a limited number of high temperature bakeout cycles (to +400 °C). Hence, Agilent recommends only a few high temperature bakeouts to +400 °C.

Unusual Operating Conditions

Low Current

If the pump current reads lower than normal for the pressure (see the preceding figure), the discharge may have been extinguished.

To check for the pump being "out of strike" (discharge extinguished), remove the magnet and observe the residual current. If the current is the same with and without the magnet in place, no discharge exists in the pump.

- a** To restart the discharge, tap the pump body with a soft plastic tool, or heat the pump body locally with a small soldering iron. This should liberate surface gas within the pump and restart the discharge. NEVER strike the pump with metal hand tools.
- b** If the magnet strength is below its rated level, the pump discharge and speed will be reduced and the discharge may extinguish at a pressure below 1×10^{-7} Torr.

High Current

If the pump current reads higher than normal for the pressure (see the preceding figure), look for:

- a** Breakdown of the connecting high-voltage cable. Repair or replace.
- b** Ohmic breakdown in the control unit. Repair according to the control unit instruction manual.
- c** Shorting of anode support insulators, caused by a flake of titanium compound. Tapping the pump, as described in step a) of the preceding paragraph, may correct this condition.
- d** Field emission current from fine whiskers formed on the pump cathodes. Hi-pot the pump by applying 10 to 14 kVac at 20 to 30 mA for 5 to 20 seconds.

4 Instructions for Use

Disposal

- e Coatings on the insulators caused by operating above 10^{-2} Torr for extended periods. Since disassembly of the pump is not practicable, this condition must be regarded as a life-limiting factor. Avoid operating the pump at high pressures for long periods.

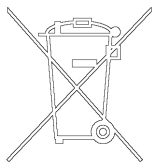
Disposal

Meaning of the "WEEE" logo found in labels

The following symbol is applied in accordance with the EC WEEE (Waste Electrical and Electronic Equipment) Directive.

This symbol (**valid only in countries of the European Community**) indicates that the product it applies to must NOT be disposed of together with ordinary domestic or industrial waste but must be sent to a differentiated waste collection system.

The end user is therefore invited to contact the supplier of the device, whether the Parent Company or a retailer, to initiate the collection and disposal process after checking the contractual terms and conditions of sale.





Agilent Technologies

Vacuum Products Division

Dear Customer,

Thank you for purchasing an Agilent vacuum product. At Agilent Vacuum Products Division we make every effort to ensure that you will be satisfied with the product and/or service you have purchased.

As part of our Continuous Improvement effort, we ask that you report to us any problem you may have had with the purchase or operation of our products. On the back side you find a Corrective Action request form that you may fill out in the first part and return to us.

This form is intended to supplement normal lines of communications and to resolve problems that existing systems are not addressing in an adequate or timely manner.

Upon receipt of your Corrective Action Request we will determine the Root Cause of the problem and take the necessary actions to eliminate it. You will be contacted by one of our employees who will review the problem with you and update you, with the second part of the same form, on our actions.

Your business is very important to us. Please, take the time and let us know how we can improve.

Sincerely,

Giampaolo LEVI

***Vice President and General Manager
Agilent Vacuum Products Division***

Note: Fax or mail the Customer Request for Action (see backside page) to Agilent Vacuum Products Division (Torino) – Quality Assurance or to your nearest Agilent representative for onward transmission to the same address.

CUSTOMER REQUEST FOR CORRECTIVE / PREVENTIVE / IMPROVEMENT ACTION

TO: AGILENT VACUUM PRODUCTS DIVISION TORINO – QUALITY ASSURANCE

FAX N°: XXXX-011-9979350

ADDRESS: AGILENT TECHNOLOGIES ITALIA S.p.A. – Vacuum Products Division –

Via F.lli Varian, 54 – 10040 Leinì (TO) – Italy

E-MAIL: vpd-qualityassurance_pdl-ext@agilent.com

NAME _____	COMPANY _____	FUNCTION _____
ADDRESS: _____ _____		
TEL. N° : _____ FAX N° : _____		
E-MAIL: _____		
PROBLEM / SUGGESTION : _____ _____ _____ _____ _____		
REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.): _____ _____ _____ _____		
		DATE _____
CORRECTIVE ACTION PLAN / ACTUATION (by AGILENT VPD) _____ _____ _____ _____ _____ _____		LOG N° _____

XXX = Code for dialing Italy from your country (es. 01139 from USA; 00139 from Japan, etc.)



Agilent Technologies



Vacuum Products Division Instructions for returning products

Dear Customer:

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

- 1) Complete the attached Request for Return form and send it to Agilent Technologies (see below), taking particular care to identify all products that have pumped or been exposed to any toxic or hazardous materials.
- 2) After evaluating the information, Agilent Technologies will provide you with a Return Authorization (RA) number via email or fax, as requested.
Note: Depending on the type of return, a Purchase Order may be required at the time the Request for Return is submitted. We will quote any necessary services (evaluation, repair, special cleaning, eg).
- 3) **Important steps for the shipment of returning product:**
 - Remove all accessories from the core product (e.g. inlet screens, vent valves).
 - Prior to shipment, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
 - If ordering an Advance Exchange product, please use the packaging from the Advance Exchange to return the defective product.
 - Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
 - Agilent Technologies is not responsible for returning customer provided packaging or containers.
 - **Clearly label package with RA number.** Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.
- 4) Return only products for which the RA was issued.
- 5) **Product being returned under a RA must be received within 15 business days.**
- 6) **Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information.** Customer is responsible for freight charges on returning product.
- 7) Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.

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

EUROPE:

Fax: 00 39 011 9979 330

Fax Free: 00 800 345 345 00

Toll Free: 00 800 234 234 00

vpt-customer@agilent.com

NORTH AMERICA:

Fax: 1 781 860 9252

Toll Free: 800 882 7426, Option 3

vpl-ra@agilent.com

PACIFIC RIM:

please visit our website for individual
office information

<http://www.agilent.com>



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

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

1) CUSTOMER INFORMATION

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

2) PRODUCT IDENTIFICATION

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

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

- 3A. ☐ Non-Billable ☐ Billable ➡ New PO # (hard copy must be submitted with this form):
- 3B. ☐ Exchange ☐ Repair ☐ Upgrade ☐ Consignment/Demo ☐ Calibration ☐ Evaluation ☐ Return for Credit

4) HEALTH and SAFETY CERTIFICATION

AGILENT TECHNOLOGIES CANNOT ACCEPT ANY PRODUCTS CONTAMINATED WITH BIOLOGICAL OR EXPLOSIVE HAZARDS, RADIOACTIVE MATERIAL, OR MERCURY AT ITS FACILITY. Call Agilent Technologies to discuss alternatives if this requirement presents a problem. The equipment listed above (check one): ☐ HAS NOT pumped or been exposed to any toxic or hazardous materials. OR ☐ HAS pumped or been exposed to the following toxic or hazardous materials. If this box is checked, the following information must also be filled out. Check boxes for all materials to which product(s) pumped or was exposed: ☐ Toxic ☐ Corrosive ☐ Reactive ☐ Flammable ☐ Explosive ☐ Biological ☐ Radioactive List all toxic/hazardous materials. Include product name, chemical name, and chemical symbol or formula: NOTE: If a product is received at Agilent which is contaminated with a toxic or hazardous material that was not disclosed, the customer will be held responsible for all costs incurred to ensure the safe handling of the product, and is liable for any harm or injury to Agilent employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product. Print Name: _____ Authorized Signature: _____ Date: _____

5) FAILURE INFORMATION:

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

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



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

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

TURBO PUMPS and TURBO CONTROLLERS

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

ION PUMPS/CONTROLLERS

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

VALVES/COMPONENTS

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

LEAK DETECTORS

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

INSTRUMENTS

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

SCROLL AND ROTARY VANE PUMPS

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

DIFFUSION PUMPS

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

Section 6) ADDITIONAL TERMS

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

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

Sales and Service Offices

United States

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

Benelux

Agilent Technologies Netherlands B.V.
Vacuum Products Division
Herculesweg 8
4338 PL Middelburg
The Netherlands
Tel.: +31 118 671570
Fax: +31 118 671569
Toll-Free: 00 800 234 234 00

Canada

Central coordination through: Agilent Technologies
Vacuum Products Division
121 Hartwell Avenue
Lexington, MA 02421 - USA
Tel.: +1 781 861 7200
Fax: +1 781 860 5437
Toll-Free: +1 800 882 7426

China

Agilent Technologies (China) Co. Ltd
Vacuum Products Division
No.3, Wang Jing Bei Lu,
Chao Yang District,
Beijing, 100102
China
Tel.: +86 (10) 6439 7718
Toll-Free: 800 820 6556

France

Agilent Technologies France
Vacuum Products Division
7 Avenue des Tropiques
Z.A. de Courtaboeuf - B.P. 12
91941 Les Ulis cedex - France
Tel.: +33 (0) 1 69 86 38 84
Fax: +33 (0) 1 69 86 29 88
Toll free: 00 800 234 234 00

Germany and Austria

Agilent Technologies
Vacuum Products Division Alsfelder Strasse 6 Postfach 11
14 35
64289 Darmstadt – Germany
Tel.: +49 (0) 6151 703 353
Fax: +49 (0) 6151 703 302
Toll free: 00 800 234 234 00

India

Agilent Technologies India Pvt. Ltd.
Vacuum Product Division
G01. Prime corporate Park,
230/231, Sahar Road, Opp. Blue Dart Centre,
Andheri (East), Mumbai – 400 099.India
Tel: +91 22 30648287/8200
Fax: +91 22 30648250
Toll Free: 1800 113037

Italy

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

Japan

Agilent Technologies Japan, Ltd.
Vacuum Products Division
8th Floor Sumitomo Shibaura Building
4-16-36 Shibaura Minato-ku Tokyo 108-0023 - Japan
Tel.: +81 3 5232 1253
Fax: +81 3 5232 1710
Toll-Free: 0120 655 040

Korea

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

Mexico

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

Singapore

Agilent Technologies Singapore Pte. Ltd.
Vacuum Products Division
Agilent Technologies Building,
1 Yishun Avenue 7,
Singapore 768923
Tel : (65) 6215 8045
Fax : (65) 6754 0574

Southeast Asia

Agilent Technologies Sales Sdn Bhd
Vacuum Products Division
Unit 201, Level 2 uptown 2,
2 Jalan SS21/37, Damansara Uptown
47400 Petaling Jaya,
Selangor, Malaysia
Tel : +603 7712 6106
Fax: +603 6733 8121

Taiwan

Agilent Technologies Taiwan Limited
Vacuum Products Division (3F)
20 Kao-Shuang Rd.,
Pin-Chen City, 324
Taoyuan Hsien , Taiwan, R.O.C.
Tel. +886 34959281
Toll Free: 0800 051 342

UK and Ireland

Agilent Technologies UK, Ltd.
Vacuum Products Division
6 Mead Road Oxford Industrial Park
Yarnton, Oxford OX5 1QU – UK
Tel.: +44 (0) 1865 291570
Fax: +44 (0) 1865 291571
Toll free: 00 800 234 234 00

Other Countries

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

Customer Support & Service

NORTH AMERICA:

Toll Free: 800 882 7426, Option 3
vpl-ra@agilent.com

EUROPE:

Toll Free: 00 800 234 234 00
vpt-customer@agilent.com

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